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Pour un transfert technologique et social aux villes du Sud, sur fond de cartographie informatisée

The form for a sustainable city

TELE-CENTERS AS AN INSTRUMENT OR URBAN DEVEL-OPMENT:THE CITY OF VIENNA, GLOBAL VILLAGE 1995

Developing an Urban Typology - aTool for Research and Planning of Sustainable Cities

References (selected list):

Development of new "urban concepts" integrating technologies and verifications of their applicability to certain given urban situations

1.THE TASK FORCE WHO PRESENTED THE CURRENT STUDY PROPOSAL

2. TECHNICAL PROPOSAL

ACT-VILL - Development of new "urban concepts" integrating technologies and verifications of their applicabilityto certain given urban situations

PROBLEM IDENTIFICATION

OBJECTIVES OF THE STUDY

CHOICE OF A SAMPLE: THE CITY OF PADOVA

FINAL CONSIDERATIONS

"GRANDS-ENSEMBLES" et DIVERSITE URBAINE

1- LE CONSTAT

2 - LES CAUSES

LES MOYENS

4 - LA DEMARCHE

5 - CONCLUSION

Le Sens de la Ville : approche ethnographique de l'euphorie et de la dysphorie urbaines

1. LA VILLE : ENTRE EUPHORIE ET DYSPHORIE
2. UNE TECHNOLOGIE DOUCE
3. TROIS TERRAINS URBAINS
4. UN SENS RENOUVELÉ POUR LA VILLE...
5. BIBLIOGRAPHIE

Myth of the City: identity, planning, culture

Introduction

How to increase "spatial propinquity" in the city

A model for local integration of different scale and nature networks : application to urban transport interchanges

1 ..... TRANSPORT NODES AND URBAN POLARISATION

2 ..... A MODEL FOR NETWOK POINTS : BASIC CONCEPTS

3 A MODEL FOR NETWORK POINTS ANALYSIS

4 COMBINING ROLES AND FUNCTIONS

CONCLUSIONS : URBAN POLARISATION RELATIONSHIPS

NAPLES AS A GLOCAL CITY. LOOKING FOR STRATEGIES FOR A SUCCESSFUL EXPLOITATION OF LOCAL DIFFERENCES

1 -Project objectives and features

2 Conclusions

CITIES AND TOWNS ON THE EU BORDER: IDENTIFICATION OF THE INSTRUMENTS NECESSARY FOR THEIR IN-

TEGRATION INTO THEIR REGIONAL DEVELOPMENT

INTRODUCTION

1. RESEARCH OBJECTIVES AND SPATIAL EMPHASIS

2. HYPOTHESIS AND METHOD

3. SOCIO-POLITICAL DIMENSIONS AND IMPLICATIONS

BIBLIOGRAPHY

A toolbox for regional integration

Abstract

Introduction

Enabling technology threads

The application of enabling technologies as thinking tools

Conclusions

The information society and the glocal city

1 INTRODUCTION

2 GLOBAL AND LOCAL IN THE INFORMATION SOCIETY

3 HOW ICT NETWORKS CAN CHANGE THE COMPARATIVE ADVANTAGE OF CITIES

4 GLOBAL TRENDS IN EUROPE

5 LOCAL POTENTIAL

6 ISSUES AND OBJECTIVES OF THE PROPOSED STUDY

7 METHODOLOGY AND WORK PROGRAMME OF THE PROPOSED STUDY

METROPOLISES IN TRANSITION, METROPOLISES IN COMPETITION: GLOBALIZATION OF CENTRAL EUROPEAN CITIES AND THEIR INTEGRATION INTO EUROPEAN URBAN NETWORK

1. Introduction

2. Globalization

3. Globalization and localities

4. Transformations in Central East Europe: opening gates for globalization processes

5. Globalization and the integration of Central European cities to European urban network

6. The formulation of research agenda

Reference:

KNOWLEDGE CAPACITY OF CITIES:TOWARD AN IMPROVED PERFORMANCE

1. Introduction

2. Relevance of the Urban Knowledge Base

3. Knowledge Capacity as an Integrative Concept

4. Barriers in Knowledge Networking

5. Contours of Future Research

6. Contours of Local Knowledge Policy

References

UTOPIES URBAINES, DES OUTILS POUR LA RENAISSANCE DE LA VILLE EN EUROPE

Mundane and Dirty: Changing Spaces of London's Heavy Service Economy

CITIES AS ENGINES OF REGIONAL ECONOMIES - THE ROLE OF INFORMATION AND COMMUNICATIONS TECHNOLOGIES IN SUPPORTING ECONOMIC REGENERATION AND URBAN DEVELOPMENT.

SION OF TELEWORKING

Developpement d’un modèle de simulation pour les Villes Européennes de taille moyenne

1 Les systemes urbains

2 L’énergie et l’environnement dans la Ville

3 La gestion de l’énergie et de l’environnement par les Villes

4 Un modèle de suivi des consommations d’energie et des émissions de polluants atmospheriques pour les Villes de taille moyenne

5 Actions actuelles

Complex Urban Areas and their Sustainable Development - Development of a model-based decision support tool and its application to Brussels

1. Introduction

2. Hybrid simulation models of urban systems

3. Decision Support ...
4. ... and Measuring Sustainability
5. Application to the case of Brussels
6. Conclusions

VIRTUAL REALITY TO DETECT CITIZEN REACTION TO TOWN PLANNING

1. INTRODUCTION
2. THE APPROACH BASED ON VE TECHNOLOGIES
3. VE SYSTEM HARDWARE AND SOFTWARE
4. FORCE FEEDBACK INTERFACES
5. MONITORING OF AN EXISTING SPACE
6. CONCLUSIONS

Un modele pour simuler l'impact d'un projet d'amenagement sur la dynamique urbaine

PROTO-URBAN CONDITIONS AND URBAN CHANGE

MARKET SOLUTIONS FOR SUSTAINABLE CITIES

Telematic “Piazze” Network (Electronic Square Network)

COMMUNICATION AS A TOOL TO PROMOTE DEMOCRACY AND SUSTAINABILITY IN CITIES

To design new cities to avoid saturation

Practice profile

A design process to relieve saturation

"Two environmental strategies for land use and infrastructure"

1. Summary

2. Background

3. Usefulness of the project

4. Project design

References

Terms of Development and Prospects of Cooperative Planning Procedures

Summary

EVALUATION OF POSSIBLE TECHNOLOGICAL OPTIONS

TO RELIEVE THE CHALLENGES CAUSED BY THE SATURATION OF CITIES

Pour un transfert technologique et social aux villes du Sud, sur fond de cartographie informatisée

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L'informatique révolutionne la cartographie de multiples façons : en facilitant la superposition des cartes, en projetant les cartes antérieures sur un fond topographique plus précis, en intégrant les périmètres urbains dans des cartes à plus petite échelle, en facilitant le suivi des fronts d'urbanisation et l'extension des réseaux, en localisant les données statistiques dans le cadre d'un système d'information géographique (SIG), en recevant les images numérisées de la télédétection, d'une façon générale en rendant les cartes plus maniables et en accélérant leur processus d'élaboration. Ce faisant, la carte informatisée devient un outil pour l'action, dès lors qu'elle est actualisée en permanence et qu'on peut y faire figurer les projets.

Dans cette communication, nous nous rattachons volontiers à une réflexion récemment menée en

France par les géographes de l'ORSTOM[1] sur *les atlas pour le développement en coopération* (Montpellier, 11 et 12 septembre 1995)[2]. Il s'avère en effet que l'élaboration même d'un atlas peut être l'occasion d'une concertation entre divers acteurs sociaux : chercheurs de différentes disciplines scientifiques, techniciens des services locaux, édiles municipaux, animateurs de quartier, opérateurs divers, etc. ; pas moins de 19 auteurs, 28 collaborateurs et le concours de 48 institutions et organismes pour l'atlas de la ville de Quito[3] (IGM, IPGH, ORSTOM 1992). Les suites à donner à un atlas, ne serait-ce que les actualisations nécessaires ("l'après-atlas" BARBIER et KLEIN 1995b), requièrent également de multiples collaborations.

Cette mise en relation généralisée, souhaitable pour toutes les localités, se révèle particulièrement importante dans des villes secondaires où les acteurs sont en situation de cohabitation, de face à face, sans qu'aucun ne prédomine nettement sur les autres et où chaque initiative doit en conséquence être négociée. Ce sont bien souvent des "cités segmentées" (BARBIER 1995), par la juxtaposition de

1. Institut français de recherche scientifique pour le développement en coopération, qui a conservé son ancien sigle. L'ORSTOM est un organisme de l'Etat français qui a vocation à mener des études fondamentales dans les pays du Sud en partenariat avec la recherche de ces pays et sur des questions touchant au développement.

2. "La réalisation d'atlas est sans doute l'une des productions parmi les plus "visibles" des géographes. A l'ORSTOM, il s'agit même d'une tradition ; au cours des années 1960, la réalisation de l'*Atlas des structures agraires au sud du Sahara*, par exemple, a nécessité un effort et une continuité exemplaires. Il existe aussi une tradition des atlas régionaux. Aujourd'hui, les conditions scientifiques, techniques et institutionnels de la réalisation des atlas ont évolué : les atlas généralistes se transforment souvent en ouvrages thématiques, l'informatique offre de nouvelles possibilités tant sur le plan de la cartographie que sur celui de la diffusion, la demande s'oriente souvent vers la tenue d'atlas "permanents" liés à des observatoires de même nature..." (texte d'appel aux Journées des géographes de l'ORSTOM, 1995).

communautés résidentielles à composition clanique ou ethnique (la ville "multicentrée" - BARBIER et KLEIN 1995a), l'apparition de nouveaux clivages sociaux (immigrés/autochtones, artisans/ bourgeoisie locale, jeunes/élite au pouvoir, etc.), et l'atomisation des services administratifs et techniques issue de la déconcentration des ministères et du resserrement du maillage administratif. A tous, l'atlas apporte une vue d'ensemble de leur agglomération, renforcée encore par les moyens d'informations complémentaires que sont les photographies aériennes et les images satellitales.

Or ces localités sont bien souvent en relation de coopération décentralisée avec des villes européennes, lesquelles ont un savoir-faire à la fois technique (ateliers de haut niveau où l'on pratique la cartographie informatisée, l'interprétation des photographie aériennes, la télédétection, la mise en place de systèmes d'information géographique, l'élaboration de plan d'urbanisme)[1] et de gestion sociale issue d'une longue histoire municipale. On peut envisager, dès lors, un transfert de ces savoirs-

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3. "Cet atlas est le fruit de coopérations : coopération entre des disciplines comme la géographie, l'histoire, la géologie, la sociologie et l'économie qui s'appuient sur des méthodes (ou techniques) telles que la statistique, la cartographie et l'informatique ; coopérations entre des organismes : Institut géographique militaire (IGM), section nationale de l'Institut panaméricain de géographie et d'histoire (IPGH), Municipalité de Quito (pour une partie du projet), d'autres entités techniques de l'Etat et l'Institut français de recherche scientifique pour le développement en coopération (ORSTOM), celui-ci ayant regroupé les participations de l'Institut français d'études andines (IFEA) et de diverses universités françaises" (Jorge Salvador Lara, vice-président de l'IPGH, à la séance de clôture du séminaire international "*De la base de données à l'Atlas infographique de Quito : de l'outil aux applications scientifiques*", qui s'est tenu à Quito le 10 avril 1992).

1. Ne pourrait-on pas établir, dans le cadre de l'Europe, un inventaire de ces ateliers (proposition faite par notre groupe de travail en réponse à l'appel d'offres de la DG XII de la Commission européenne "ACT-VILL") ?

faire avec les précautions d'usage : méthodologie adaptée, fiabilité des instances réceptrices[1], besoins ressentis et exprimés de la part des intéressés, formation du personnel technique correspondant, assistance technique maintenue durant le temps nécessaire, etc.

I - L'informatisation des documents de base

En Afrique noire, la multiplicité de petits ateliers de cartographie employant des géomètres et des dessinateurs ne facilite guère leur équipement. A cela s'ajoute la routine qui fait que ceux-ci travaillent sur des cartes anciennes dont ils prolongent la voirie existante, au coup par coup selon l'ouverture de nouveaux lotissements ; ce qui, en l'absence de coordonnées géographiques suffisantes, conduit à d'importantes erreurs : trames mal orientées, report des superficies (des lots, des ilôts) comme si le support était un plan horizontal (dans ce cas, la surface cartographiée équivaut à la superficie)

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1. C'est là une question inévitable comme le constate l'*Association de professionnels développement urbain et coopération* (ADP) dans le cadre de la préparation d'une journée de réflexion sur le thème "Le financement de l'urbanisation dans les pays du Sud" (prévue à Paris pour le 8 septembre 1995) : "...examiner quelles possibilités de transferts [dans le cas des transferts financiers ici étudiés] se présentent ou s'expérimentent, et avec quels résultats. Cette question renverra à celle de la crédibilité des récepteurs des dits transferts : Etats, collectivités locales (inégalement crédibles selon les sous-continents, mais peu en moyenne et actuellement), autres opérateurs tels qu'associations populaires, montages privés (ou public-privé) donnant suffisamment de garantie. On se demandera bien entendu comment favoriser l'émergence de cette crédibilité financière partout où son absence handicape les transferts et plus généralement l'action, notamment chez les collectivités locales".

Les documents de base plus récents sont rarement utilisés. Pourtant nombre de cités africaines (y compris des villes moyennes, voire petites) ont bénéficié dans les années soixante-dix, quatre-vingt d'une cartographie de qualité, souvent à 1 : 20000, issue de couvertures de photographies aériennes à grande échelle. Mais ces documents sont souvent restés au niveau des services centraux et n'ont pas été diffusés à la base ; on constate aussi qu'ils ne sont pas toujours "lisibles" en l'absence d'une formation géographique adéquate ("lire" les courbes de niveau, retrouver les points de repères auxquels on est habitué, etc.).

L'efficacité des services techniques passent assurément par des regroupements locaux, l'équipement de bases logistiques (parc automobile, bureaux, atelier informatique, etc.), des programmes de formation du personnel. C'est tout un travail de coordination qu'il convient d'entreprendre, avec les intéressés et les autorités de tutelle[1].

Prenons l'exemple des ateliers de cartographie existants à Sokodé, ville du Nord-Togo : on en trouve à la Mairie, à la subdivision régionale des Travaux publics, à la direction régionale du Plan et du Développement de la Région centrale (DRPD), et aux services para-publics distributeurs d'eau (la Régie nationale des eaux du Togo, RNET) et de l'électricité (la Compagnie de l'énergie électrique du Togo, CEET) ; s'y était ajoutée une antenne régionale du Cadastre, dont les locaux ont brûlés durant

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1. Pour Sokodé, nous avons déjà évoqué cette perspective avec les responsables des services concernés (à l'occasion d'une mission en février 1994) ; et nous pensons relancer cette question au dernier trimestre de cette année, en mettant à profit la publication de notre atlas (BARBIER et KLEIN 1995a). Nous aurons à solliciter l'appui de diverses coopérations présentes à Lomé, dont celle de l'antenne du Fonds européen de développement (FED), pour mener à bien un tel projet.

la récente période de troubles politiques. Mentionnons par ailleurs, plusieurs géomètres privés. La DRPD est responsable de l'animation d'une commission d'urbanisme regroupant tous les services techniques concernés de près ou de loin, mais la dite commission ne se réunit pratiquement pas.

Tous ces ateliers travaillent dans des conditions insatisfaisantes : non utilisation des documents de base adéquats, report non systématique sur les cartes des nouvelles opérations faites sur le terrain, absence d'une climatisation pour conserver cartes, photos aériennes et calques d'une façon durable, personnel faiblement encadré[1]. Dans ces conditions, les initiatives sont rares[2].Mais tous les géomètres éprouvent le besoin de disposer d'un fond cartographique plus opérationnel, dès lors que l'agglomération s'étale bien au-delà des cartes existantes[3].

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1. Le personnel d'exécution est tout à fait compétent pour lever une parcelle, la localiser par rapport à un point référentiel (un pont, un carrefour, un transformateur d'électrécité, etc.), ou encore pour concrétiser sur le terrain un plan de lotissement. Un complément de formation pourrait les aider à utiliser avec davantage de profit les cartes géographiques.
2. Seule la DRPD a à sa disposition des géographes qui furent recrutés au début des années quatre-vingt, au niveau maîtrise de géographie et dans le cadre d'un programme PNUD (mis en oeuvre par GTZ). Ceux-ci réalisèrent une carte de l'occupation de l'espace au 1 : 2000000ème par photo-interprétation de la couverture de 1977 à 1 : 300000ème et report sur la carte IGN. Ils réalisèrent également une carte de la région administrative, la Région centrale, en recopiant la carte IGN (avec, en principe, actualisation, mais les relevés sur le terrain ont été trop rares, sinon inexistants).
3. Il est par exemple significatif que les géomètres locaux participèrent activement et sans rémunération à notre projet cadastral sur la partie nord de la ville, en nous prêtant volontiers leurs levés de parcelle (et, pour l'un, le plan d'un lotissement) ; de même, ce fut le bureau d'études des Travaux publics qui, à notre demande, reporta les levés sur la carte de l'agglomération à 1 : 20000ème, tâche dont il s'acquitta fort bien.

Les autorités chargées de délivrer des certificats de vente ou des permis de construire (la Mairie, la Préfecture, la DGUH) sont, quant à elles, demandeuses d'une cartographie permettant la localisation des opérations ; d'autant plus que la DGUH tend à monopoliser cette procédure sans toutefois prendre les moyens de se déplacer dans les villes de l'intérieur ! En ce sens, notre projet de cadastre reçut l'aval du ministère de l'Equipement avant d'être financé par la Mission française de coopération de Lomé.

Les services qui assurent le fonctionnement d'un réseau (RNET, CEET ...) effectuent les extensions sur le terrain, mais le suivi cartographique tarde, si bien que seuls les techniciens savent précisément "où on en est" ! Un manque de transparence qui peut avantager certains en cachant des situations non conformes à la légalité ou au plan directeur d'urbanisme, ou en poussant les usagers à donner des pourboires aux exécutants, mais qui, en définitive, est au détriment de la collectivité.

La numération des documents de base permet de les rendre plus maniables (pour couvrir à 1 : 20000 la ville de Sokodé, qui ne faisait pourtant que 50 000 habitants en 1981, il a fallu 16 planches de 1m2 chacune)[1], d'y inscrire les points de repère jusqu'à présent utilisés et d'en ajouter d'autres, de récupérer les croquis ou les cartes antérieures en les y projetant, d'y inscrire les projets de lotissement, de connecter l'information localisée avec des bases de données, bref de jeter les bases d'un système d'information géographique (SIG) où les informations d'origine diverse, spatialisées, sont

1. Cette opération, ainsi que les autres cartes de l'atlas de Sokodé, a été faite sur micro-station avec le logiciel Intergraph, au Laboratoire de cartographie appliquée du Centre ORSTOM de l'Ile-de-France ; l'habillage et la finition ont été faits avec le logiciel Adobe illustrator.

superposées. Chaque service technique retrouve alors les données qu'il a apportées, mais correctement cartographiées et avec un plus constitué par les autres apports. Des croisements statistiques peuvent alors être entrepris, ainsi que des cartes de synthèse.

II - Une méthodologie légère et adaptée

Un fond de carte numérisé peut donc accueillir des informations partielles et successives en provenance des divers services techniques locaux, au rythme du travail de ceux-ci ; il peut en plus servir de base à un travail plus systématique mené dans le cadre d'un projet. Encore faut-il qu'au niveau d'une ville secondaire de telles opérations restent légères si l'on veut éviter une bureaucratisation de l'atelier cartographique et un alourdissement du SIG. En ce sens, nous présentons deux méthodes, l'une expérimentée à Sokodé pour la réalisation d'un "puzzle" cadastral à partir du levé de parcelles par les géomètres locaux, l'autre appliquée à une banlieue de Mexico afin d'y analyser, en appui à une analyse d'images satellitales, le degré et le type d'urbanisation.

a) une localisation cadastrale par "puzzle"

Au Togo, comme dans d'autres pays africains, la distribution du terrain à bâtir est restée l'apanage des chefs coutumiers (avec élargissement à tous les chefs de canton même lorsque ceux-ci ne sont pas traditionnels). La transaction se fait directement avec une famille autochtone, qui reçoit le prix de la vente. On requiert, aux frais de l'acquérant, les services d'un géomètre pour le bornage du lot. Celui-ci en établit un plan de masse (souvent à 1 : 500) comportant des points de repère pour sa localisation

(un plan de situation, indiquant la partie du lotissement concernée, accompagne d'ailleurs le document), les voies qui permettent d'y accéder (mais les rues sont souvent "en projet"), le nom des propriétaires voisins (mais pas toujours), le bâti qui y existe déjà, les angles topographiques du lot, enfin la superficie, et bien entendu le nom de l'acheteur et la date de l'opération. Le chef coutumier ou de canton signe le document, qui est ensuite présenté aux autorités administratives (Mairie pour les terrains au sein d'une commune, Préfecture s'ils sont en dehors), lesquelles appliquent une vieille pratique coloniale où elles se contentent du simple constat qu'il y a eu transaction entre un indigène et une autre personne (sans toutefois s'engager sur sa légitimité, et donc sans se prononcer sur un contentieux postérieur). On aboutit à un "certificat administratif", que les intéressés considèrent comme une garantie suffisante. Certains poussent cependant jusqu'à l'obtention d'un titre foncier (dans ce cas, l'Administration publie la transaction en conviant les contestataires éventuels à se manifester et elle se rend sur place) (BARBIER 1986).

Nous avons récupéré plus de 10000 documents de ce genre auprès des géomètres locaux et entrepris de les positionner sur un fond cartographique à 1 : 20000, qui venait d'être publié par le bureau d'études italien Technosynésis dans le cadre de l'élaboration d'un plan directeur d'urbanisme de la ville. Cette carte, issue d'une couverture de photographie aérienne de l'Institut géographique national (Paris) prise en janvier 1979 (IGN 1979), présente des repères multiples : réseau hydrographique, jusqu'aux ruisseaux et aux rigoles, courbes de niveau équidistantes d'un mètre, habitat construit en dur ou en construction, cases rondes, murs ou murettes d'enceinte, arbres, sentiers piétonniers, et bien sûr la voirie.

Grâce à tous ces repères, nous avons pu obtenir une localisation qui bien que restant approximative (et en cela elle ne peut avoir de valeur juridique)[1] n'en est pas moins assez juste. La preuve en est que les parcellaires s'arrêtent effectivement devant les obstacles rencontrés que ce soit de nature physique (les bas-fonds inondables, les cours d'eau, les rigoles, le relief) ou humaine (campements de Peuls sédentarisés et chemins empruntés par le bétail, hameaux de colonisation agricole - en l'occurrence d'ethnie "losso"[2] -, constructions et occupations antérieures, etc.). Il a fallu, parfois, resserrer les lots de façon à cadrer un ilôt entre deux point de repère, car la surface cartographiée ne tient pas compte des pentes et équivaut à la projection de la superficie sur un plan horizontal. Pour l'instant notre méthode s'avère fructueuse lorsque les points de repère sont en nombre suffisant (ici, pour la banlieue nord de Sokodé : une route nationale, plusieurs ruisseaux, des collines et de nombreux équipements - un camp de gendarmerie, un établissement scolaire, une mission catholique, etc.), et que le site n'est pas trop accidenté. L'établissement préalable d'une carte des pentes et l'utilisation d'un logiciel qui restreindrait les surfaces à cartographiées en fonction de ces pentes amélioreraient sensiblement la localisation.

En calculant les distances selon l'échelle employée, l'informatique facilite certaines localisations qui seraient fastidieuses à la main (par exemple pour des lots isolés). Il en est de même pour le calcul des angles. Par contre nous restons assez démunis pour procéder à des vérifications sur le terrain en

1. Ce qui n'a d'ailleurs aucune importance puisque les contentieux se règlent sur place en présence des tenants de l'ordre coutumier et des témoins et non devant une carte !
2. Ethnonyme datant de la période allemande et regroupant les Nawdba et les Lâmba de Défalé, deux populations du Nord-Togo.

l'absence de toute construction. Les lotissements restent en effet très longtemps "déserts", les acquéreurs n'ayant pas toujours les moyens pour démarrer leurs projets. Souvent aussi, le père de famille a acheté des lots pour prévoir sa succession : lots mis au nom de ses épouses, de ses enfants, etc. Il s'agit dans ces cas d'une stratégie de réserve familiale qui retarde parfois d'une génération la mise en valeur des lots. Par ailleurs, les nouveaux propriétaires sont souvent des fonctionnaires qui ont été en effectation à Sokodé et ont profité des bas prix pour acquérir du terrain, mais qui, maintenant, se retrouvent - eux et leur famille - aux quatre coins du pays ; et, en leur absence, les voisins sont muets !

Dernière remarque : l'instabilité de la carte foncière reste importante. Certains réservent du terrain, puis ne donnent pas suite, ou bien choisissent un autre lot. Ou bien c'est le géomètre qui a changé le canevas du lotissement, ou encore l'Administration qui n'a pas utilisé toutes les réserves faites, ou encore qui installe un nouvel équipement à un emplacement déjà occupé par quelques lots, etc. En principe, les acheteurs acquièrent des "concessions" qui peuvent leur être reprises si elles ne sont pas mises en valeur. En conséquence, le chef coutumier peut toujours reprendre un terrain non utilisé pour le vendre à une personne plus pressée, donnant en échange au "concessionnaire" antérieur un terrain de même superficie mais plus éloigné. Pour limiter les effets de cette situation foncière non encore tout à fait stabilisée, il aurait mieux valu utiliser les certificats administratifs déjà contresignés par l'Administration plutôt que les calques des géomètres.

b) L'inventaire des paysages urbanisés par la méthode des transects

J.-M. Eberhard (1994 et 1995) a mis au point (à partir de son étude de la banlieue de Mexico) une

méthode légère d'inventaire qui consiste à recenser les objets constituant le paysage urbain (bâti et inter-bâti : morphologie et fonctionnalité, sol, végétation, voirie…) le long de transects. Les informations recueillies demeurent élémentaires, à l'échelle de l'objet, ce qui permet une étude très précise des composants du paysage ; il est ainsi possible de dessiner des "coupes urbaines" respectant les échelles, qui permettent d'identifier de grands profils de quartiers et de les caractériser par des "indicateurs urbanométriques" (densité / fréquence du bâti, matérieux employés, taille et distribution des couverts végétaux, équipements, structuration par la voirie, existence de chantiers, etc.). A leur tour, ces indicateurs rendent possible l'élaboration d'une typologie des quartiers par traitements statistiques et Analyse de Données.

Cette méthode peut également rendre compte : de la nature des sols sur lesquels se développent les activités urbaines, de la dégradation de la couverture végétale aux abords des villes, de l'avancée des constructions dans les banlieues, voire de l'urbanisation des villages périphériques. Les transects, partant du centre-ville et orientés vers les périphéries, peuvent ainsi aider à jauger l'expansion urbaine, et à en suivre les effets sur l'environnement.

Les municipalités de la banlieue sud-est de l'agglomération de Mexico disposent d'une information fournie : celle des rencensements décennaux et des enquêtes intermédiaires. Les divisions administratives morcellent toutefois cette information et il est difficile d'obtenir une vue d'ensemble des phénomènes d'urbanisation qui touchent, des volumes de population et des espaces considérables. D'autres aspects, comme la dégradation de l'environnement ne sont, par ailleurs, pas pris en compte. L'imagerie satellitale (image SPOT de mars 1986) a apporté ici une information décisive, démultipliée par la superposition avec des cartes thématiques (pédologique, Plan d'occupation du sol…), et on a pu

dresser une cartographie détaillée de l'ensemble des mouvements urbains observables par ce moyen, ainsi que certaines de ses conséquences sur l'environnement (déforestation, dégradation des sols…). L'enquête de terrain par transects a permis de donner un contenu géographique précis à l'image SPOT, et de produire une interprétation très riche. La complémentarité entre ces deux types d'information augmente en effet leur efficacité respective.

La superposition d'une deuxième image (décembre 1989) à celle de 1986, a permis de créer un document diachronique à partir duquel on a étudié les secteurs à fort dynamisme, les multiples formes du développement urbain, la "cinématique" des quartiers, les mouvements d'urbanisation adaptés aux conditions naturelles, aux structures foncières, aux réseaux… Dans certains cas, l'analyse des mécanismes de la croissance a été suffisamment précise pour retrouver les modèles déjà identifiés par les auteurs, et pour en proposer d'autres, complémentaires.

Précisons que les images satellitales seront sans doute, dans les décennies suivantes, les seuls documents de base dont on disposera pour la plupart des pays d'Afrique noire. Les coopérations, notamment la coopération française, resserrent leurs aides sur des secteurs prioritaires (la santé, l'enseignement technique, la production agricole, etc.) et se montreront de moins en moins enclines à financer des couvertures aériennes et cartographiques. L'IGN, quant à elle, a désormais une autonomie de gestion et "vend" ses cartes à leur juste prix. En l'absence d'un marché porteur, les cartes sur l'Afrique risqueront de ne plus être réactualisées.

Cela rend d'autant plus urgent une formation à la télédétection, ainsi que notre groupe de travail l'a souhaitée dans sa réponse à l'appel d'offres "ACT-VILL" de la Commission européenne. Certes,

l'analyse des images satellitales rend, pour l'instant, davantage de services en milieu rural qu'urbain, à cause d'une résolution pour nous insuffisante : 10 mètres de précision pour les images SPOT (France) en panchromatique et 20 mètres en multibandes (lesquelles autorisent un traitement coloré) ; 30 mètres pour les images diffusées par Thematic Mapper (USA). Mais, déjà, des informations appréciables sont obtenues, qui permettent notamment des études plus extensives et plus rapides (ORSTOM 1990), entre autres par la méthode des transects sus mentionnée et par la méthode aréolaire pour les études de densité et de zonage (DUREAU, BARBARY 1993). Nous espérons surtout pouvoir accéder aux résolutions beaucoup plus fines dont l'expertise militaire bénéficie déjà. Dernier voeu : que ces documents soient aussi accessibles financièrement pour les budgets qui sont les nôtres, et encore plus pour ceux de nos partenaires du Sud !

III - Vue d'ensemble de la ville et citadinité

Aux populations locales, l'atlas apporte une vue d'ensemble (dans le temps et dans l'espace) que les intéressés n'ont pas toujours. La ville est souvent perçue à partir de la vie de quartier et des itinéraires habituellement empruntés. Cette vue d'ensemble est aussi celle des réseaux en expansion, du débordement de la ville sur les campagnes environnantes, de l'urbanisation de celles-ci, des connexions extérieures, bref du microcosme en voie de mondialisation. L'atlas à plusieurs échelles accompagne cet élargissement de la vision ; par contre les cartes qui cernent de trop près les périmètres urbains, s'exposent à être vite dépassées.

L'étude scientifique d'une ville ne s'arrête pas à un inventaire, si exhaustif soit-il, ni à une

description, si fouillée soit-elle ; elle doit aussi en saisir les caractéristiques particulières et les dynamiques qui marquent le long terme. Elle offre ainsi des clefs de compréhension pour le présent et le futur, identifie des blocages, établit les conditions des évolutions et changements possibles. Un destin collectif, entre passé et l'avenir, se dessine, charriant avec lui les stratégies individuelles. L'habitant des villes est alors invité à se sentir citadin d'une cité au sens politique du terme, citoyen au sens fort du terme[1]. Des choix urbanistiques peuvent et doivent lui être présentés : les projets d'extension de la voirie et des réseaux, les plans des nouveaux lotissements, l'emplacement des nouveaux équipements, les plans urbains (d'occupation des sols - POS -, d'urbanisme, etc.)[2], de même que les esquisses à débattre et les alternatives à une question. Face aux choix cartographiés, le citadin est convié à entrer dans l'Agora : la place où l'on débat ouvertement des affaires publiques.

En ce sens, les interventions sectorielles ou ponctuelles (par exemple au bénéfice d'un quartier) ne sont bien entendu pas à écarter, mais elles restent dans la logique des habitants qui attendent (passivement ou sur un ton revendicatif) que les pouvoirs publics fassent quelque chose pour eux. Les actions intégrées, et si possible planifiées au niveau de l'agglomération entière, sont assurément plus

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1. L'atlas de Sokodé (BARBIER, KLEIN 1995a) se veut à la fois didactique (pour connaître une ville particulière et celles qui lui sont structurellement comparables) et civique (des méthodes pour mieux gérer la cité). Une large approche historique et culturelle a été adoptée en ce sens. Suite à cette publication, les auteurs souhaitent le lancement d'une série de "petits atlas urbains" sur le thème : "connaissance du passé, gestion du présent".
2. Voir par exemple l'analyse du plan régulateur de Quito de 1944 par Henri Godard (IGM, IPGH, ORSTOM 1992).

porteuses d'une mobilisation à long terme et moins égo•ste des intéressés.

IV - Conclusion

Très souvent, l'informatique renforce la capacité des pouvoirs centraux et le poids de la technocratie. Ce risque apparaît évident pour les plus grandes villes, métropoles régionales et capitales d'Etat. Par contre, il ne semble pas fatal pour les villes secondaires si les ateliers mis en place restent de dimension modeste, et davantage lieux de coordination que de centralisation Dans ces conditions, loin d'être une affaire pour les seuls techniciens, l'atlas informatisé peut devenir l'affaire de tous. La connaissance apportée par un atlas didactique (étude d'une ville, méthodologie) peut déboucher sur une recherche-action à caractère civique impliquant de nombreux acteurs, relançant la planification, questionnant le futur, dès lors que l'informatique facilite le suivi de l'observation (par un SIG, par l'analyse des images numériques) et la visualisation cartographique rapide de l'information.

En partenariat suivi et personnalisé, les coopérations décentralisées inter-urbaines semblent les plus à même de pratiquer les transferts technologiques qu'implique ce genre d'opération, tout en évitant les dérives possibles et en promouvant une gestion urbaine largement ouverte aux citoyens et à leurs associations. La capacité de réception de ces transferts est en effet très variable selon les pays et chaque ville. Si la municipalité de Quito a pris rapidement le relai avec la publication d'atlas thématiques et de livres agréablement illustrés[1] sur des thèmes sensibles aux habitants de la ville comme celui de la réhabilitation du centre historique, de l'équipement des quartiers, de l'aménagement

des voies, etc., celle de Sokodé est encore dans "tous ses états" (BARBIER 1993) et a besoin d'être confortée. Dans ce dernier cas, le partenariat doit commencer par une aide à la gestion et un renforcement des capacités budgétaires et techniques des instances réceptrices.

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1988-1994 : Doctorate in geography granted by the Ecole des Hautes Etudes en Sciences Sociales, Paris and prepared at ORSTOM; title of thesis : *Urbanization and urban development of the South East of Mexico between 1986 and 1989. Study conducted through SPOT imagery.*

1986-1987 : Post-graduate diploma granted by the E.H.E.S.S., research and teaching group : *Geography and development*, research work linked to the project *Demographic observation through SPOT imagery on the town of Quito* (ORSTOM-EEC convention; persons responsible : J-P. Duchemin and

F. Dureau; ORSTOM).

1975-1980 : Master of geography, (urban geography), university of Grenoble I.

• additional education :

1983-1984 : data processing : analysis-programming (Control Data, Paris).

Employment record and activities :

1995-1994 : job seeker in research and university teaching; supervision and teaching of geography and remote sensing at the Institut des Hautes Etudes d'AmÈrique Latine (I.H.E.A.L., Paris III).

1988-1994 : researches as part of the doctorate thesis on the urban growth of the South East of Mexico through remote sensing, study conducted at ORSTOM-Bondy : laboratory of applied data processing and RU 55 from the S.U.D. department ;
field survey in Mexico : measurements of the components of the urban landscape in the districts studied ; survey associated with the *Chalco* project (ORSTOM-UAM/Xochimilco-EEC convention; persons responsible : B. Lacombe and E. Preciat).

1987 : researches as part of the post-graduate diploma on SPOT image for a population monitoring of Quito (Ecuador), place : the same as the doctorate.

1985 : Analyst-scientific programmer at the Centre de Recherche, d'Etude et de Documentation en Economie de la SantÈ (CREDES), contract with specific duration.

1984-1985 : Analyst-management programmer at SOBEA, contract with specific duration.

ORSTOM and the *Society - urbanization - development* department

The Institut français de recherche pour le développement en coopération which retained its former initials ORSTOM[1], is a French governmental organization which has been in existence for more than fifty years (it was created in 1944). It gathers some 2 500 officers among which there are 1 500 researchers, engineers and technicians. About 600 of them are assigned to posts in some thirty southern countries. It is a scientific and technical state organization (EPST) which submits to its partners some development programmes focused on four major issues : environment and great ecosystems (ocean, water, earth), agriculture in fragile tropical environments, environment and health, men and changing societies.

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The Institute lays stress on a scientific research conducted in collaboration with the institutions of the South which gathers French and foreign partners and supports training to be a researcher (trainee attachments, research grants, supervision of doctorate theses...). ORSTOM supports the scientific communities of the South through technological transfers, the creation and management of scientific networks, financial aid, an intercontinental computer network ("RIO"), potentialities of publications with seven reviews and scientific series along with a catalogue of 600 titles.

The forty-one *research units* (RU) are gathered into *departments* (Earth - Ocean - Atmosphere ; Continental water ; Agriculture Environment Farming communities ; Health ; Society - urbanization - development) which include the most diverse disciplines (geology, hydrology, oceanography, biology, social sciences, engineering and communication...).

Within the *Society - urbanization - development* department (SUD), a research unit : RU 55 called "Priorities for urbanization" which includes some forty researchers from various disciplines has specialized in urban questions. It gives priority to an analysis in terms of urban policies and strategies developed by local and non local agents. Several themes have been defined : urban mobilities, social and identity reconstructions, urban policies linked to production and accumulation, the urban environment, the global and comparative approach to towns. The last theme is conceived as a reflection on urbanization in the Third World ; it deals with history, the urban area, the role of towns in space, the network of small and middle-sized towns, the growth of megapoles. The analysis of the urban area led to develop new tools : satellite imagery, Geographical Information System which resulted, in the

case of Quito, in the creation of a computerized atlas (other operations in Togo, Benin, Egypt...).

This last research theme includes the works carried out by the research team "*Urban social management and use of new tools of planning linked to computer mapping in the middle-sized towns of Black Africa*" which is composed of Jean-Claude Barbier (sociologist), Philippe Cazamajor (geographer), Jean-Michel Eberhard (geographer) and Bernard Klein (town planner) and complied with the tender ACT-VILL made by the European Committee.

The form for a sustainable city

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Introduction

This paper deals with the problem ,of the urban form from an economist's point of view, i.e. from the point of view of the efficiency of economic activities and the welfare of urban population.

The sustainability paradigm, which is widely utilized here, has widened the scope and the perspective of the economic analysis of spatial systems, adding the environmental dimension as a fundamental one and calling for a long term, inter-generational, frame of reference. Still, it is argued in the paper, the utilization of this paradigm for the interpretation of the development of a typically non-natural, artifact environment as the city requires some caution, proper theoretical tools and some new definitions.

The starting point of our reflection is the function of the modern city, and the requirements that this function present in terms of city form. Therefore the paper addresses the following central issues:

- do we still need cities as efficient organizational forms of social activity?
- which are the typical roles of the (modern) city?
- is the present city form an efficient one?
- what does the sustainability paradigm imply and teach when applied to cities?
- which directions for the search of a sustainable city form?
- which procedural context and institutional design (or which operating metaphor) is the most apt to this end?

Do we still need cities?

The answer, of course, is yes, given the evidence of the long term persistance of cities in all historical societies, and their recent revival under the urgence of a rise in the worldwide (and particularly European) competitive climate (Camagni, 1991). Their form has changed, suburbanization and peri-urbanization processes have dispersed urban population around the traditional cores, but they increasingly play the role of leading territorial organizations as far as both residential and economic activities are concerned.

In fact, cities allow to benefit at the same time from:

- (static) agglomeration economies: they are efficient ways of organizing production, distribution and commercialization, information exchange, social, cultural and political interaction. In spite of the effects of diffusion-enabling technologies, like telecommunication technologies, all functions which imply the handling of goods, all functions which require a direct control over a given working population, and those functions which require direct, face-to-face contacts among people, need an agglomerated location pattern [1];

a) dynamic agglomeration economies, in the form of both faster imitation and innovation processes (due to easier circulation of relevant information, higher density of crucial skills and higher internal mobility) and reduction of uncertainties embedded in all transformation process. In this last respect, cities act as uncertainty reducing and risk insurance devices in the labour market (attracting population) and in commodity markets (attracting economic

1. Agglomeration and proximity effects may be reached through alternative modes of spatial concentration; the so called "industrial districts" can be regarded as simplified cities, agglomerations of activities organized along specific "filières". In fact, they share with the city the characters of spatial concentration, intense internal interaction, social identity and collective representation, but lack the economic diversification of urban activities. See: Camagni, 1995a.

activities) (Sallez, 1993; Veltz, 1993; Camagni, 1995a) [1];

b) accessibility and interaction with external territories, thanks to the presence of long-distance transportation and communication networks.

These elements are particularly crucial in periods of enhanced territorial competition, as those that followed the launching of the European Monetary System, the European Internal Market or the NAFTA in northern America. In Europe, starting from the early 1980's, spatial development privileged the core regions, where big cities are located (GREMI, 1992), and within these regions a process of "metropolization" was increasingly visible, giving rise to wide urban regions around big cities or along the main geographical axes (the western Mediterranean coasts, the Rhone, Rhine and Po valleys, the M4 corridor) (Kunzmann and Wegener, 1991; Sallez, 1993; Camagni, 1994).

The roles of the modern cities and their interaction.

From what precedes, we can summarize the roles of the city, and consequently the modes of its representation, in the following:

1. The same analogy between the city and the territorial districts holds with respect to the function of reduction of dynamic uncertainty; in the latter case, we have the so called "innovative milieux". See the GREMI literature (Groupe de Recherche Européen sur les Milieux Innovateurs) and in particular: Camagni, 1991b.

- the *city as a place*, with a territorial dimension, a size, a density, a physical presence, and
- the *city as a node* in the global information and communication network, virtually with no physical dimension.

The two roles, which refer to the two conventional ways of conceptualizing space - in terms of areas and in terms of nodes and links - reflect two different organizational and behavioural logics: the territorial, mainly short-distance one, which governs routine and day-to-day social and economic interaction, and the trans-territorial, long-distance one, which governs selective actions and interactions.The former logic implies the physical existence of the city; the latter implies its endowment with specific external infrastructure, requiring reduced or even nil floor-space.

The two roles interact deeply with each other, generating feed-back and cumulative effects which may be either positive or negative, as we will see in a while (Camagni et al., 1995).

Cities as nodes in the city-network.

The capability of the city of connecting economic activities throughout the world derives from their nature of nodes in the international communication and information networks. In all times, efficient links (relative to the existing technological level) connected cities among each other; today, airplanes, high-speed trains, fiber-optics cables annihilate physical distances and simplify the geography of centres by the dychotomy "to be or not to be in the network".

Against this statement, one could argue that some networks are nowadays extremely diffused on the territory (like the telephone network), and that other communication technologies, using the ether as a medium, overcome not just space but also physical networks and nodes, reaching whatever place the receiver is located. In this picture, nodality seems to lose importance.

The counterargument is straightforward: it is certainly true that each economic unit might act and might be considered as a node in the information network, but what really matters is the co-existance of different networks in a single node, or, using an increasingly popular terminology in transportation research, their *interconnection.* By consequence, if nodality still matters for some kinds of networks (like transportation networks), nodality still matters for the interconnection among them and between them and other more spatially diffuse and flexible networks.

While in the past the rank of a city was determined by the number of functions that concentrated in that city, nowadays its rank is more and more determined by the number of networks it allows to interconnect: financial networks, technological networks, headquarter networks, cultural and leisure networks, high-speed trains networks and so on.

As a consequence of these evolutions, cities (as nodes) link-up with other cities and nodes in ways that cannot be analysed and understood with the traditional tools of urban geography. The traditional models of city-systems considered only one class of city-networks: hierarchical networks, where each city interacted only with smaller urban units situated inside its regional hinterland. These types of relationships remain important, but are complemented by other more important relationships, that give rise to three kinds of city-networks (Camagni, 1993):

- *complementarity networks,* linking cities performing different roles within the spatial

division of labour (e.g.: the cities of Randstad Holland, relatively specialized in different functions);

- *synergy networks*, linking cities performing similar roles and allowing the integration of the local markets (e.g., the international financial centres, acting on a unique virtual worlwide market; art cities, linked within tourist itineraries);
- *innovation networks*, linking cities cooperating on common projects (e.g.: airports, railways, etc.).

In all these cases, two complementary elements are necessary at the same time: efficient physical networks and a specific function played by the city within the network. The existence of efficient physical networks is a conditio-sine-qua-non for the development of high order functions and the internationalization of the city; the existence of an actual role or of a strategy to build it up is a condition for the effectiveness of the investment in the networks.

Cities as places.

The second element we mentioned, namely the existence of a specificity and a role for the single city, brings us to the consideration of the second way of representing cities: cities as places, characterized by a physical dimension, an identity, an image, a physiology or internal functioning, an

economic role.

All these elements, which represent the field for a multi-disciplinary approach to the city - from sociology to urban geography, from social psychology to architecture, from transportation and land-use planning to urban economics - determine the performance of the city, in terms of its attractiveness to local and non local population and its internal efficiency.

The use of the network metaphor in fact does not exhaust the multiform facets that characterize the city, and may even be misleading: the city cannot be interpreted as (and its image reduced to) an airport, a railway station or an electronic switch addressing telephone calls to the right direction. Cities bear a geographic, demographic, physical and economic dimension that nourish and determine its internal functioning and its role.

The functions performed are always biased towards tertiary and immaterial tasks, planning and control, contact and interaction; in the modern city, towards internationalization.

In order to host and attract these functions the city has to supply efficient external accessibility through long distance networks and linkages, but also an efficiently managed internal territory allowing a good quality of life and an easy utilisation of space for internal movement and residential activities.

The positive interaction between the city-node and the city-place: cities as gate-

Thanks to the presence of dynamic agglomeration economies, cities have always been recognized as the loci of modernization and technological innovation and the engines of economic growth and social transformation. In this respect, they have always developed or attracted the most advanced, economically rewarding and politically crucial functions (Braudel, 1979; Nijkamp, 1986).

Traditionally, all this developed for a long time into multiple forms of territorial control and economic hierarchization, but also gave rise to opposite processes of diffusion of know-how and economic activities, in a never ending cyclical process of concentration and diffusion.

More recently, in presence of an acceleration in the process of international integration due to political, economic and institutional reasons, cities are taking up a new crucial role: the role of gateways in the internationalization process of their surrounding regions.

We distinguish three different processes within the general international integration of the different economies (Gordon, 1994):

- *internationalization,* which refers to international trade and increasing market integration;
- *multinationalization,* which refers to integration in the production sphere, through foreign investment and the selective location decisions of multinational corporations;
- *globalization,* which refers to integration in know-how and innovative activities, through

transnational cooperation agreements and strategic alliances.

When these processes refer to specific regions, their territorial connection happens through those guideposts or gateways we call cities. On the one hand, external firms interested in the control of new regional markets, in off-shore branch-plant location or in potential technological joint-ventures establish their guideposts in the economic barycenter of the different regions; on the other hand, regional activities dispersed throughout the territory find in the big city the competences, the tools and the channels for their international projection.

It is not incidental, for example, that the economic upswing determined in Europe by the launching of the Single Market Project in 1985 coincided with the relaunching of almost all the big cities in the countries of the European Union (Camagni, 1991).

The negative interaction: the increasingly difficult integration between the city-node and the city-place

As we have seen, the territorial and the network natures of the city are widely complementary, but may become conflicting with each other. On the one hand, the quality and quantity of the urban functions demand, and highly benefit from supply of, external infrastructure; on its turn, infrastructure provision need an actual and effective demand in order to be profitable.

But on the other hand, highly efficient long-distance networks have to end up into specific sites within the city; they have to interconnect with each other; therefore they enter in a direct contact with

the physical aspects of the city, with its traffic and congestion, with its costs. Users mainly branched on the air or fast train networks can less and less stand the inefficiency and the slow rythm of the central city, though they need a wide CBD, a diversified local economy, an equilibrated blend of economic and leisure assets.

The market, and in particular the urban land market, provides an initial answer to this possible conflict. The city selectively loses the activities and the functions that make a less efficient use of its assests, through their suburbanization or disappearance; these are in general those activities which are less willing to pay the increasing costs of the city. But at the same time a wide part of the adjustment process happens at the expense of the urban quality of life, the urban efficiency, and in the long run its sustainability.

An effective policy response is needed, especially in terms of proper urban form, internal transport infrastructure and effective interconnections among the different transport means inside the city. Many recent studies about international cities point out in fact that not only the internationalization of internal urban functions is needed, but also an efficient interconnection between the airport and the CBD, the high-speed trains station and the major highways (Bonneville, 1991; Bonnafous, 1993).

A recent inquiry on European cities, reveals that a ring of central European cities already provide a full and efficient interconnection between the airports, the city-centre, the high-speed train stations, the highways network: Bruxelles, Amsterdam, Kring of cities does not present a similar successful interconnection (see Fig. 1: Varlet, 1995).

The integration between the city-node and the city-place is well synthesized by the ancient

aegyptian hierogliph symbolizing the city: a cross (the node) incripted in a circle (the place) [1]. Due to the increasing complexity of the city's internal functioning, which gave rise to an interconnected web of micro-nodes and micro-networks inside the city itself, the urban anchorage of external long-distance networks has become a problem: different people and different transport means, moving (and thinking) at different speeds according to different behavioural logics, merge together into the urban melting pot, generating a creative diversity which may easily degenerate into chaos.

On a planning ground, this integration suffers also from the cultural (and organizational) distance between the two disciplinary approaches that govern each sphere: the transport/communication engineering one and the land-use/urban design and architecture one. Even in most advanced and effective urban planning systems these two skills and responsibilities have often remained separated if not idiosyncratic. This condition makes the management of the two functions, and particularly the control of their dynamic, cumulative interaction, a difficult task.

Is the present city form an efficient one?

The speed, or even the violence, of the urban success as it is witnessed by increasing urbanization rates in all countries is heavily challenging the urban planning capabilities. "Incrementalism", denoting incremental, helter-skelter urbanization in all directions around the city and more recently urban sprawl represent by far the most common forms of urban physical development.

1. I owe this reflection to Jean-Marc Offner.

Insufficient attention has been traditionally devoted to the fundamental question whether this pattern is going to bring to acceptable city environments, both from the point of view of citizens and of economic activities; whether the city is running fastly into a condition of diminishing returns; whether do there exist alternative patterns of spatial agglomeration.

The problem is inherently complicated, as the unsettled theoretical question of "optimal city size" widely shows (Camagni, 1992, ch. 1), but the doubt remains that both economists and planners have overlooked it, relying explicitly or at least implicitly upon the assumption that whenever city sizes run into visible diseconomies of scale, spontaneous market forces could prevent further development and restore an equilibrium city size.

Unfortunately, this is not a sound prediction. Market forces respond to short term signals, with short time horizons; cannot deal properly with the existence of negative externalities and public goods; are unable to supply appropriate solutions when huge irreversibilities and heavy permanences represent a substantial part of the problem; do not take in full account social costs, unless they are internalized in some form of private cost (environmental taxes, congestion costs, etc.).

Furthermore, both the dependent variable of the problem - urban efficiency - and the independent one - urban development - are multifacets. On the one hand: efficiency for whom ? (problem of interclass, intergenerational comparisons). On a short or long term perspective? And on the other hand: is urban size the right indicator? Does density matter? Does urban form matter, taking its economic dimension constant?

In my opinion, the city, and city planners, have lost control over the physical development of the

city, overlooking in particular:

- urban multiplier effects, triggered by the development of some advanced activities;

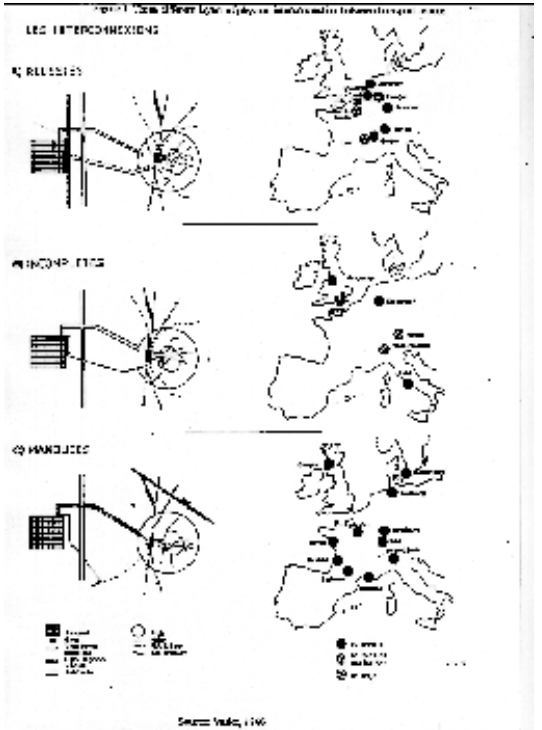
c) the physical impact of non-material relationships (which usually complement and do not substitute for material relationships),

d) the physical impact of network infrastructure, vehicle mobility, vehicle tenure;

e) the widening of the individuals' "bassins de vie" and of their urban labour market;

f) the role of big agglomerations as uncertainty reducing devices both for firms and workers.

In order to cope with the increasing complexity of the problem, new concepts and theoretic frameworks have to be utilized; the concept of urban sustainability provides us with such a framework



Urban sustainability: the new challenge.

Towards a new conceptualization.

Since the publication of the Bruntland Report by the World Commission on Environment and Development (1987), the paradigm of sustainable development has gained not only a widespread cultural and political recognition, but also a significant theoretical acceptance among economists and environmental experts, and reached a relative disciplinary autonomy. On the contrary, the application of the same paradigm to the particular case of the cities, in spite of its acknowledged relevance for mankind in the perspective of both actual and future generations, is still lacking a sound theoretical foundation; policy prescriptions therefore are often forcely designed on the basis of commonsense, trial-and-error procedures or even ideologies and "tastes".

We see two reasons for this condition: the complexity of the theoretical enterprise and the lack of full recognition of the nature and the role of cities in the present debate. On the first instance, we shall admit that the already high complexity (and consequent uncertainty) that governs the relationships between economic processes and the biosphere rises by at least an order of magnitude if also the social, economic and cultural interactions that constitute the city are taken into account. But if these latter interactions are fully accounted for in the theoretical framework, we are confronted with an intriguing paradox: we are trying to make use of theoretical tools issued from the reflection on *natural* resources management in order to understand and regulate an intrinsically *non-natural* environment.

This is in our opinion the second rationale for the ambiguity of much of the present literature on

urban sustainability: the failure to accept that the city gets born in direct opposition to the countryside, and grows as a man-made artifact designed to attain social goals like human interaction, agglomeration economies, effectiveness in the management of economic, cultural and knowledge processes, all goals implying the overcoming of a "state of nature".

The direct consequence of this is that we cannot directly transfer to an urban environment the theoretical tools developed in the case of natural resources: the city means by itself renouncing to a model of life and social organization based on man-nature integration, in favour of a model based on a man-man integration; renouncing to a production function based on land and labour inputs in favour of one based upon social overhead capital, energy and information (Camagni, 1995b).

In terms of the usual concepts developed in the case of natural resources and global sustainability, the city is un-sustainable by definition: it replaces non-renewable resources as fertile land by asphalt and concrete; it overcomes the carrying capacity of its territory imposing a flow of dirt water, air pollution and urban waste to the countryside; it uses resources carried from faraway territories (White and Whitney, 1992). Approaches based on "strong" sustainability principles, allowing only a very limited substitution between natural resources and man-made capital - approaches that are probably the most suitable for natural resources management (Victor et al., 1994) - are automatically useless in an urban environment.

In my opinion, we should follow another pathway to the theorization of urban sustainability. Under scrutiny should not be the city in itself - a macro-historical phenomenon that imposed itself in all civilizations which does not need to be justified and that only superficial romantics can refuse[1] - but

rather some recent trends that endanger its primigenial role as the locus of social interaction, creativity and welfare. I refer here to those unlimited and chaotic growth processes that happen mainly in the phases of economic take-off and fast industrialization; I refer to those recent patterns of diffused, low-density urban expansion that have been labelled as "sprawl", "metropolisation", "périurbanisation", "ville éclatée", "ville éparpillée", "megalopolis", "edge-city development", all phenomena that blurred the conceptual distinction between city and countryside, leading to a geography of non-cities and collapsed rural environment (Camagni, 1994; Boscacci and Camagni, 1994). These processes exacerbate the issue of mobility expansion and energy consumption, as they naturally lead to a car-dependent pattern of land use.

But I refer also to the new processes of ghetto creation in the periphery of the big metropolises of the developed and developing world, partly linked to the recent global transformation of the society and to the time lag by which government policies have realized and tried to manage the problem. Also these latter issues have to be considered in the frame of urban sustainability, as they are, on the one hand, the sign of an imperfect or limited accessibility to the benefits of the urban environment by relevant strata of the local community and, on the other, because thay have a strong impact on the internal functioning and the attractiveness of the city itself.

In conclusion, an inquiry on urban sustainability should hold as a benchmark not really an earthly paradise of ecological equilibria but a multidimensional archetype in which all the different functions

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1. Haughton and Hunter (1994, ch. 1) carefully list such definitions of the city as "parasite on the natural and domesticated environment", "cancer", "lethal illness", "overgrown monstruosities", "systems of disharmony".

of the city appear: the functions of supplying agglomeration economies, dynamic proximity advantages, welfare, internal social interaction and proper accessibility to the external world. In order to achieve the maximum welfare for local population in the long run, the different environments which constitute the city - the economic, social, natural and built environments - have not only to interact maximizig cross-externalities and feed-backs, but to co-evolve in a process of virtuous dynamic adjustment (Camagni et al., 1995a and b).

The main features of the new conceptualization of urban sustainability I have in mind may be summarized as follows (Camagni, 1995b):

- it is necessarily based on a *"weak"* definition of sustainability, as far as substitution between natural and man-made inputs is allowed. Sustainability in an urban setting refers to the goal of a continuously rising (or non-declining) welfare and utility level for local population à la Solow (Solow, 1986), reached through the respect of some environmental constraints and the long term economic viability and attractiveness of the city for internal and external firms;

g) it is based upon a *"procedural" rationality* in the sense of Simon (1972), defined as the coherence of a dynamic process of understanding and decision making, as opposed to a "substantial" rationality, which supposes the possibility of a never falling coherence between

means and goals. A procedural rationality appears as the only appropriate framework for theorisation and decision making in a condition of high complexity and widespread uncertainty regarding the fundamental relationships that shape the object of our inquiry (Froger, 1993; Vercelli, 1994; Faucheux and Froger, 1995). In fact, when such dynamic processes as positive and negative feed-back, synergy, cumulative development, network externalities, increasing returns and indivisibility are the norm, giving rise to processes of morphogenesis, innovation and irreversibility, the possibilities of precisely anticipating the future outcomes of present conditions and policy decisions are low, and require the overcoming of a deterministic approach. Continuous monitoring, fast reaction, decision making flexibility and long-range scenario building look as the most suitable procedures, replacing (or better accompanying) static or comparative-statics optimization exercises;

h) it is based by consequence on the principle of *risk aversion* and *precaution* (Pearce et al., 1989), stating the necessity of a cautious behaviour in presence of the possibility of determining huge negative effects ("if pessimists were righy") or of trickling irreversible

trends;

i) it is necessarily based on the consideration of *"local"* effects and dynamics, holding the necessity of avoiding huge negative trans-border externalities as a constraint, and trusting that a virtuous local behaviour with respect to environmental variables will also positively affect the global equilibrium of the biosphere. In a previous papers (Camagni et al, 1995a) the present author has argued that a "local" approach to environmental problems presents numerous advantages with respect to a "global" one in terms of operationality and effectiveness, due to a reduced distance between polluters and victims (the "locality theorem");

j) once the field of inquiry is restricted to local trends and interactions, an important consequence emerges: the time span for the full explication of all the (negative) feed-backs and cumulative processes among the three environments that represent the city - the economic, social and physical environments - becomes much shorter than in the case of global interactions, and the possibility that also the *present* generation is going to suffer from

present decisions becomes considerably higher.

This element brings out a double consequence. First of all, it allows to avoid at least partially the intriguing and probably (theoretically) unsolvable problem of the representation of future generations at the table of present decisions (Pasek, 1993; Heister and Schneider, 1993): their interests are by and large the same as those of present generations in face of urban life conditions. Secondly, from a normative point of view, it allows to overcome the weakness of intervention processes proposed for the sake of an inter-generational equity, for which the willingness to pay by the present generation is probably limited. The urban society we are going to build is one in which we too are bound to live in! (Camagni, 1995a).

The economy / society / environment relationship in the urban setting.

The focus of the theoretical reflection on urban sustainability is the relationship between the three environments or sub-systems that constitute the very essence of the city: the economic, the social and the physical - natural and built - environments (the integration area in Fig. 2).

There exists a double way of assessing the interaction among these environments (Camagni, Capello, Nijkamp, 1995a):

1. a static and structural approach, addressed to the the study of the external effects that the three sub-systems determine upon each other, of a positive and a negative nature.The scale and quality of the respective assets may represent in fact:

- positive cross-externalities for the other assets when the presence of the former assets determines the productivity, attractiveness or marginal utility of the latter (e.g.: environmental assets increase the economic attractiveness of the city; economic development allows welfare policies and a wider accessibility to the urban amenities, services and jobs; lower social conflict increases effectiveness of the local activities, etc.);
- negative externalities when, due to the limited physical space in which all relationships happen, decreasing returns and bottlenecks appear both in economic terms (rising costs of factors, generating selective crowding-out effects on population and firms) and in physical terms (congestion, conflict, limited accessibility to scarce urban assets). All these effects act as positive or negative location factors; and

2. a dynamic and evolutionary approach, addressed to the assessment of the dynamic relationships among the subsystems, in the form of synergies, positive feed-back effects, cumulative processes (e.g. the virtuous relationship between infrastructure improvement, efficiency and growth, or between rising incomes, demand for urban amenities, their supply and consequent further development), or in the form of hidiosyncrasies, negative feed-back

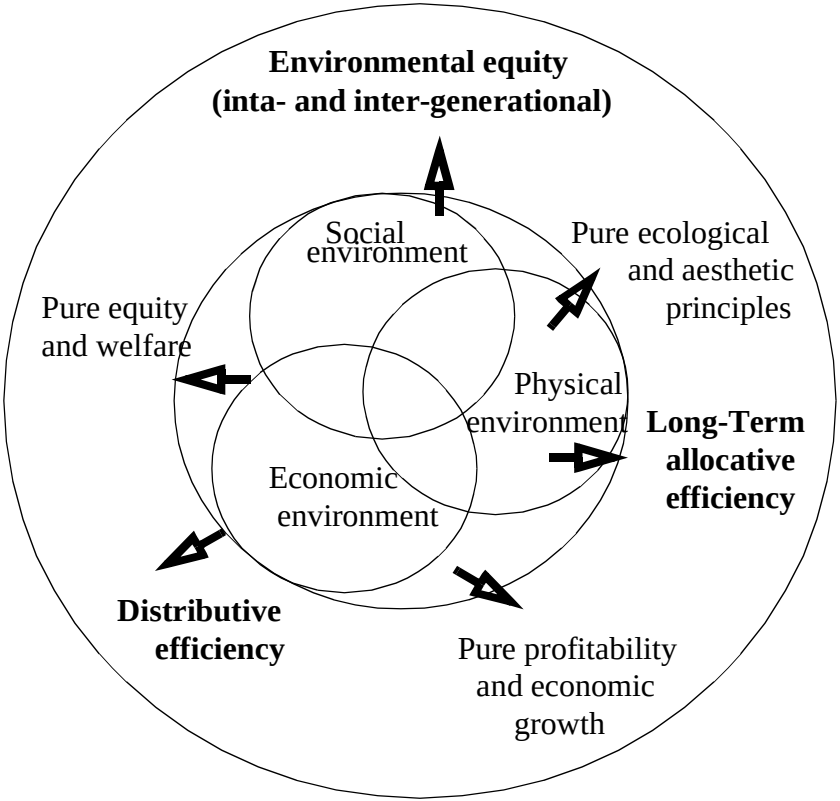
effects and irreversibility (depletion or contamination of natural resources like water may irreversibly affect the economic and residential viability of the city; infrastructure improvements may generate further urbanization processes and decreasing accessibility levels within the city).

As far as the normative side of the coin is concerned, the suggestion put forward in the abovementioned paper was to abandon the logics of pure short term efficiency, pure equity or pure environmental principles, which forcely lead to exploding contradictions between the three subsystems, in favour of new integrated principles of:

- *long-term allocative efficiency* (taking care of possible long term impact of a decreasing environmental quality on efficiency and attractiveness of the city),
- *distributive efficiency* (taking care of the long term viability of equitable social systems),
- *environmental equity* (taking care of the negative distributional effects of environmental policies assessed in mainly economic terms).

Summing up, the tentative definition of urban sustainable development depicts it as *a process of synergetic interaction and co-evolution among the sub-systems that constitute the city - namely the economic, the social, the natural and built environment - that guarantees a non-decreasing welfare level to the local population in the long run, without jeopardizing the development options of the surrounding territories and contributing to the reduction of the negative effects on the biosphere* (Camagni, 1995b; Camagni et al., 1995b) .

figure 2: The locus of sustainability principles and policies



Irreversibility, path dependency and anticipatory response.

One of the most relevant effects of the complex nature of the sustainability issue and of the decision of approaching it in evolutionary and procedural terms, is the full acceptance of the irreversibility element. As a consequence of the "non linearities" which characterize its internal relationsips, the development trajectory of the urban system is subject to very different shapes and outcomes: sudden or explosive growth, sudden decline, catastrophic jumps, converging or diverging cycles, chaotic behaviour. Most of these outcomes are characterized by strong irreversibility in the long run.

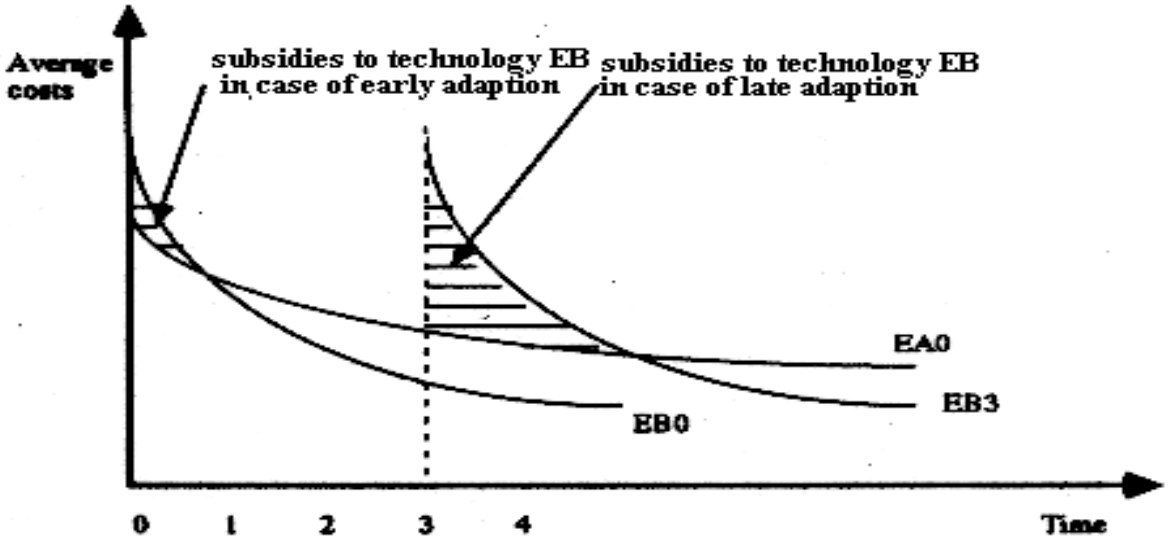
This element calls for a clear distinction between a short term and a long term perspective, both in the analysis and in policy-making. In the short term, all events happen in the neighbourhoods of the contingent historical condition (a 'local' equilibrium point), and urban sustainability policies can work exploiting the (limited) elasticity of substitution among inputs of the production processes (e.g. stimulating energy-saving techniques) or among the transport modes in the mobility pattern of local population (e.g. stimulating the use of public transport facilities).

On the other hand, in the long run, we are confronted with a radical change in the policy framework: in the production and transportation spheres, technologies can change, while in the land-use patterns, the urban form can change. But these processes of change imply in both cases huge cumulative effects via learning processes (in the case of technologies) and positive feed-backs (in the case of the trasportation supply - land-use change - trasportation demand cycle). Once a technological or territorial trajectory gets started, usually the sunk costs encountered for changing its direction are huge and are often overlooked by the comparative statics approaches based on optimizing logics

(Erdmann, 1993). If these sunk costs are high, alternative solutions or different equilibrium points may never be achieved, in spite of their possible superior efficiency, and the systems remains "locked-in" its historical, possibly sub-optimal trajectory.

On the technology side (energy or transportation technologies), the following example may clarify the message and show how important an anticipatory and early response capability by the public administration is. In Fig. 3 the learning curves of two competing technologies are drawn, an EB - environment-benign technology and an EA- environment-adverse one. If the case of an early adoption (time 0), EB technology may need only a small amount of public subsidy in order to overcome its higher short-term cost disadvantage, but in case of a lagged adoption at time 3 the subsidy requested could easily grow bigger, as a consequence of internal learning processes on EA technology and external investments on complementary assets (Camagni, 1995b).

Irreversibility and path-dependency find another clearcut example in the territorial pattern of metropolitan expansion that have taken place in countries like the United States. As Sternlieb and Hughes (1982) have rightly put it more than ten years ago, when the issues at stake were the risk of oil shortage and the goal of energy saving: "the U.S. has invested the bulk of its capital development since World War II in an increasingly centrifugal fashion. We cannot declare this obsolete without bankrupting the country".



EB0 = environment-benign technology adopted at time 0
EB3 = environment-benign technology adopted at time 3
EA0 = environment-adverse technology adopted at time 0

Source Camagni, 1995a

The role of values and policies.

From all what precedes, it appears clearly that the relationship between economic development and environmental quality is much more complex, indirect and mediated than it is commonly thought of, especially in the urban realm where social, cultural, political and historical elements interact and co-evolve with respect to the production system and the natural environment.

The usual negative trade-off between per-capita income and environmental quality therefore is probably a valid relationship in a short-term, *coeteris paribus* condition when it might be assumed that all other elements remain equal. In this case, it is certainly true that development, whenever it occurs, builds upon the exploitation of some natural resource: soil, energy, biomasses, and it impinges on the surrounding environment with the results of the manufacturing process: non-recyclable and non-degradable products, combustion gases, dirty water and waste.

But "other things" do not remain equal in the process of economic development and urbanization: infrastructure construction, and in particular sewage and drinking water systems, but also sanitation, housing and social infrastructure improve at a pace that widely overcomes the simple effect of demographic density and agglomeration; priorities and social values with respect to quality of life and environmental goods change, and communities are increasingly willing to allocate resources in that direction[1] (Beckerman, 1993).

In most developing countries, evidence shows that those elements of the environmental quality that matter most, viz. access to safe drinking water and sanitation, relate positively with average income levels, and show higher scores in urban than in rural areas.

On the other hand, in the cities of developed countries even a first glance suggests that the concentration of the more traditional forms of air pollution, SO_2 and smoke, is much lower than in cities of developing countries. In Britain, for example, during the 1960's, average smoke concentration in urban areas fell by 60%, and concentration of sulphur dioxide fell by 30%. In Greater London smoke emissions decreased by over 80% in the period 1958 to 1970, in presence of an increase of at least 30% in output (Beckerman, 1993).

3. Our undestanding of the relationship development / environment therefore is that the short-term trade-off shifts upwards as time passes, brought by the evolution of social overhead capital, of cultural and political awareness with respect to the environment, by government intervention and economic transformation. Through the interpolation of short-term relationships one gets the long-term trajectory of the same relationship, that may show different abstract shapes: a positive shape, in case of early and successful response of the local community to environmental decay, and a negative shape in case of slow response and low environmental awareness. These alternative outcomes are depicted in Fig. where the

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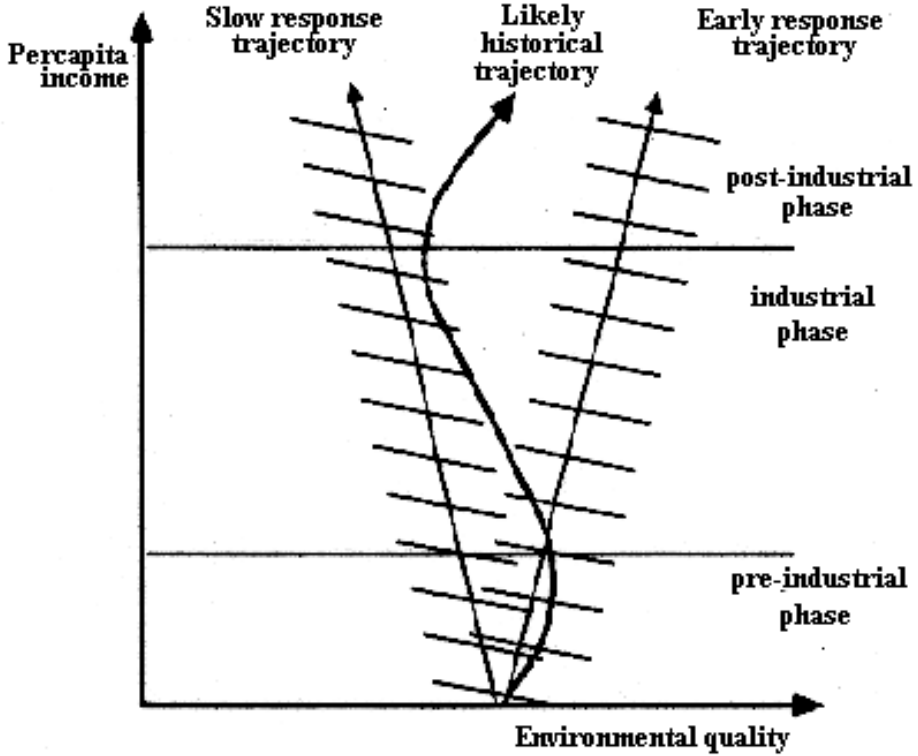
1. In the U.S., expenditure on PAC (pollution abatement and control), rose at an average annual rate of 3,2% between 1972 and 1987, and represent a rising share on GNP; similar data are available for Germany (3,4% increase during the period 1975-1985) and for Japan (with an increase of 6,1% from 1975 to 1986, referring only to public expenditure). See Beckerman, 1993.

VASE model is presented: Value-driven Alternative Sustainability Evolutions) (Camagni, 1995b).

4. While econometrics does not supply us with a definite response on the long-term shape of the development / environment relationship, mainly due to the fuzzy and subjective nature of most environmental indicators, our guess is that the likely relationship bears an S shape (Camagni et al., 1995a), indicating:



Source Camagni, 1995a

- a positive relationship in the early stages of development and urbanization, when social overhead capital provision shows wide and increasing returns;
- a negative relationships in the intermediate phased of development, coinciding with rapid industrialization and metropolitan growth;
- a positive relationship again in the case of post-industrial societies, thanks to the emergence of new social values with respect to the environment (environmental quality is in fact a luxury good, increasingly appreciated at high income levels) and the decline of the share of polluting, manufacturing activities.

What precedes shows once again that this is not, hopefully, a deterministic world, in which effects follow mechanistically from causes and trends or "stages" are fatally linked in time sequences defined from the beginning. Complexity of interactions and co-evolutions mean a wide spectrum of possible paths and outcomes, difficult to control and to forecast, but very much open and sensitive to discretionary practices and policy decisions, provided that they are shared by the vast majority of the local community and are implemented in a far-sighted and anticipatory way.

The role of autonomous environmental values, emerging in the cultural and political sheres and embedded in grass-roots movements, research efforts, public declarations and policy engagements both at the supra-national and local scale, is clear and fundamental in this context.

What is (and what is not) a sustainable city?

From what precedes, we can easily understand what a sustainable city is not.

A sustainable city is not:

- a green city: a friendly environment is not the sole condition for sustainability, as it does not guarantee an efficient management of the other functions of the city;
- a properly designed city, as also the external linkages matter and have to be carefully matched with the internal infrastructure and the internal functioning of the city;
- a conflict-free city: given the "procedural" attribute of sustainability, it refers mainly to a city which is able to cope effectively with urban conflict;
- an autarchic city: on the contrary, the city is intrinsically touched by the social division of labour, and buys commodities and factors wherever they are cheaper and more suitable to its needs;
- an exchanger of goods, people and information; this element may define a fair, a marketplace, a railway station, not a city.

On the positive side, it more difficult to define what a sustainable city is. In general terms we can assume that a sustainable city is a city that is able to efficiently manage the evolution and the dynamic interaction of its subsystems (economic, social, built environments) and its functions (place and node) through anticipatory planning practices, in order to guarantee a non decreasing utility level to its citizens in the long run.

In search of a sustainable city form.

City form is a relevant element determining its long term viability and sustainability. The elements that have to be taken under direct control in this respect are:

- *city size.* Diminishing returns to urban scale are often highlighted by the econometric literature; average trip length is found to increase for urban populations higher than 50-100.000 inhabitants (Fig. 5); environmental quality is found to be negatively associated with city size (Capello, 1995);

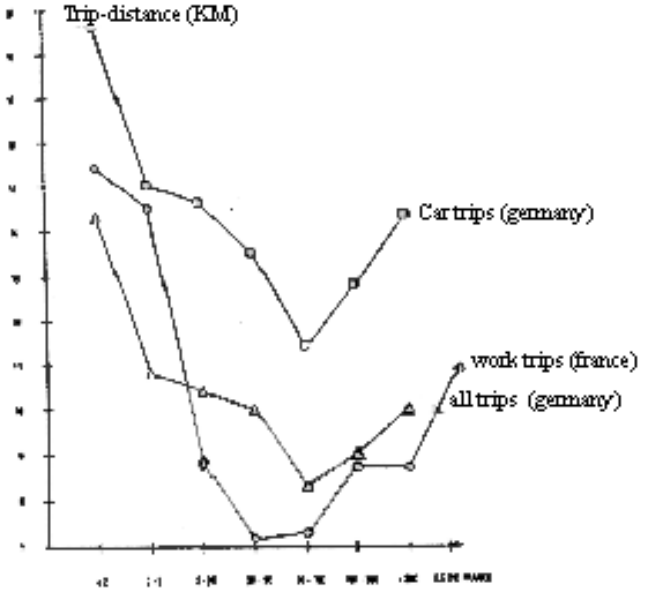
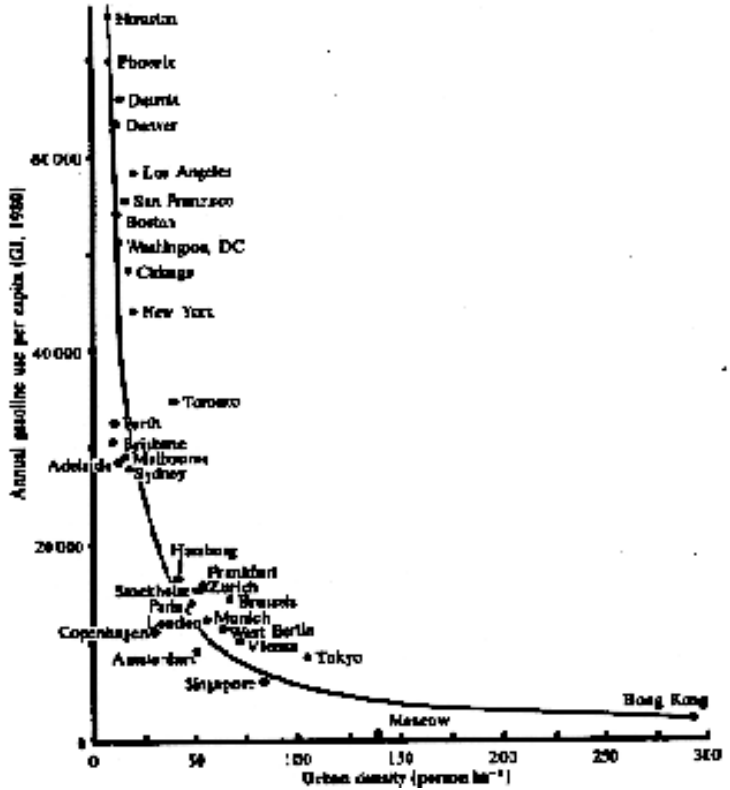


Fig. 5 TRIP LENGTH ACCORDING TO THE POPULATION OF THE AREA OF RESIDENCE
(Source: Heuzinger, 1999)

k) *population density*. Density is commonly assumed to be the most important determinant of energy consumption for transportation, being inversely correlated to it (Fig. 6), as Newman and Kenworthy (1989) have shown and Capello (1995) has confirmed in the case of Italian cities;


Houston
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Adelaide
Hamburg
Frankfurt
Zurich
Brussels
Stockholm
Paris
Munich
West Berlin
Vienna
Copenhagen
Amsterdam
Tokyo
Singapore
Hong Kong
Moscow
80 000
40 000
20 000
0
50
100
150
200
250
300
Annual gasoline use per capita (GJ, 1980)
Urban density (persons ha⁻¹)

l) the *interconnection* among the main long-distance transportation networks and their efficient anchorage into the city (as it was shown before);

m) *good matching between land-use and transportation networks* : mobility generating functions should be located in the vicinity of the main internal transportation nodes, as the planning doctrine of countries like Holland and Denmark has been claiming for a long time;

n) *city shape*. This last issue deserves some thorough reflections.

The new emerging urban paradigm: the multicentric network-city

One of the possible answers to the problem of urban diseconomies of scale and to the increasing contradiction between the abstract node function of the city and its heavy physical realm consists in rethinking in an integrated way the general city shape.

The international debate on this issue is intense (see for example Breheny, 1992) and many international institutions have contributed to it (OECD, 1990 and 1995; EEC, 1990) launching a plea in favour of "compact" city forms. Arguments for and against this suggestion have multiplied recently, as, on the one hand, the compact, monocentric, big city has shown in the past its low "sustainability", due to excessive density of functions, congestion costs and slow pace of internal renewal, and, on the other hand, also the low-density, spread city, with its heavy dependence on

private transport means and its high land consumption, has added new problems to the traditional ones.

Nevertheless, one general conclusion has come out in a sufficiently clear way. A possible land-use pattern that can avoid the limits of the two extreme patterns might be found in the *munticentric network-city*. This pattern in fact maintains the "urban effect" linked to the agglomeration of different functions in compact centres, avoiding at the same time the diseconomies coming from excessive size of the single centre through the multiplication of the centres.

Conditions for the effectiveness of the new (or better revisited) "paradigm" may be listed in the following (Camagni and Gibelli, 1994):

- the single centres have to bear a diversification of functions, possibly linked with each other "en filière" (intersectoral linkages, residence/leisure/production linkages, etc.), in order to contain inside the centre the widest possible share of trips. Under this respect, mono-functional centres should be avoided, as they maximize trip generation with respect to other centres;

o) the centres should be linked with each other through a network of effective transport links, organized both in a radial and an orbital way with respect to the major city-centre;

p) each centre shoud keep or develop its specific image and character, in order to work as a magnet (with respect to both trips and locations) and not as a repeller (emphasizing spread trends);

q) each centre should maintain a compact form, allowing compact green belts to surround itself and to define the connective fabric of the wider regional territory.

Northern European countries such as Holland and Denmark have long since oriented their land-use planning towards integrated systems of medium-sized, compact centres, and this pattern is increasingly seen as a policy benchmark and an effective solution in many big cities around the world (OECD, 1995) (Tab. 1).

Key: * to *** denotes degree of popularity of measures tried
. denotes measures not in use or no information given
eg new developments linked to provision of public transport
+ eg employment encouraged to move to other parts of the country

In policy term, the new paradigm implies first of all, a deep integration between transportation and land-use planning and secondly, an anticipatory policy intervention with respect to actual

development processes. It may also be implemented at different spatial scales:

- at the regional scale, distributing high order functions (e.g. in the public administration and government activities) among different centres;
- at the metropolitan scale, maintaining the urban fringe continuous and compact and concentrating development in newly developed centres, spatially separated and linked among each other;
- at the urban scale, trying to re-concentrate and push some polarization effects in the already urbanized, middle-density urban peripheries, through the selection of what French planners call some "lieux magiques", bearing a symbolic meaning for local population, and recreating around them an "urban atmosphere".

Tabelle 1:

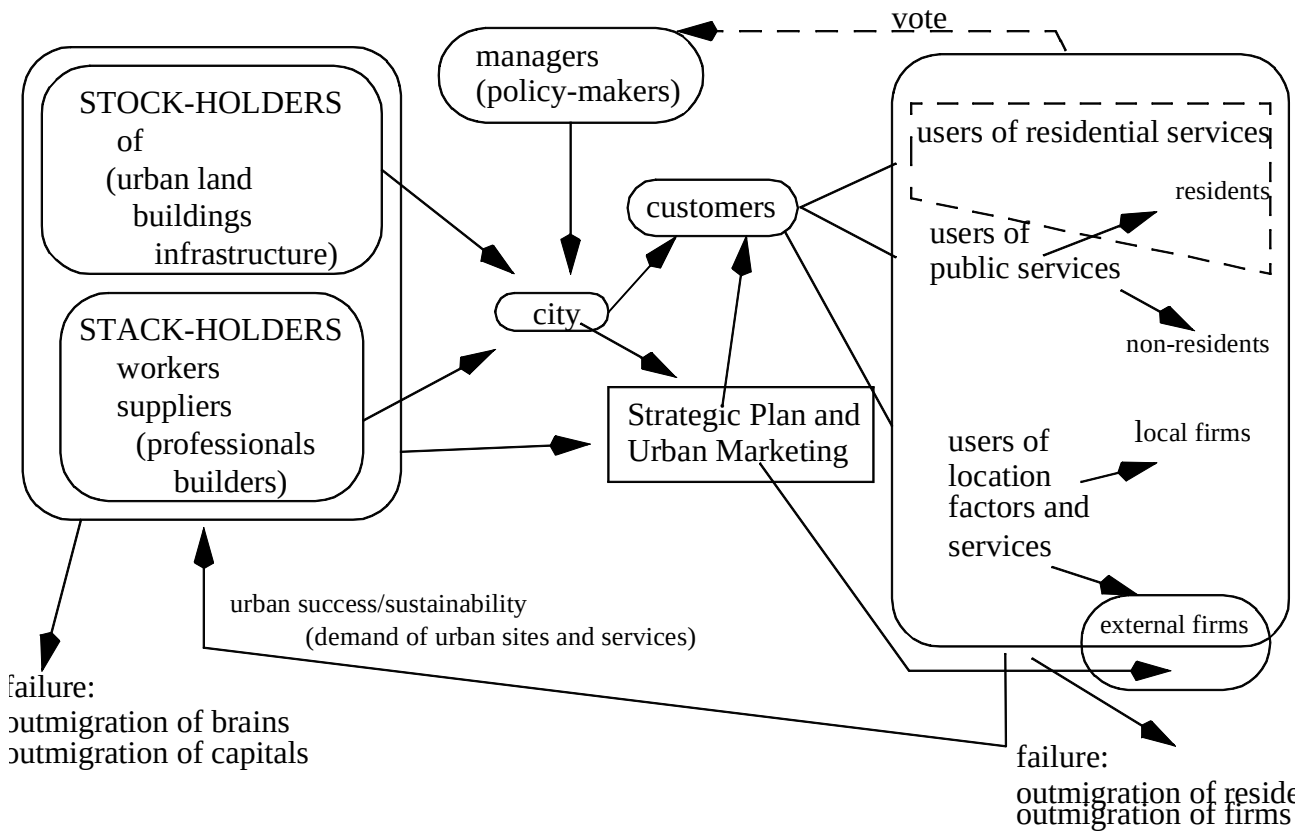
Policy/measures	Metropolises (10 - 30 m)	Large cities (1,5 - 5m)	Medium cities (0,5 -1,5 m)
PLANNING			
Strategic land-use/transport planning#	**	***	**
Regional policy	**	**	.
Restraint on central city growth	**	*	.
Designated growth areas & new towns	***	**	*
Regeneration of city centre/inner areas	.	.	*
Relocation of employment groups	*	.	.
Fiscal inducement to locate	**	.	.
Zoning regulations	*	.	.
Green belts	*	.	.

Tabelle 1:

Policy/measures	Metropolises (10 - 30 m)	Large cities (1,5 - 5m)	Medium cities (0,5 -1,5 m)
TRANSPORT			
Road construction	*	*	*
Rail construction	***	**	**
Improved service/lower fares	*	**	***
Traffic management	**	**	**
Bus/tram priority	*	**	**
Toll charges/road pricing	.	.	.
Parking controls	**	**	**
Park and ride	*	*	*
Car restraints	.	*	.
Cycle priority	.	*	.

Tabelle 1:

Policy/measures	Metropolises (10 - 30 m)	Large cities (1,5 - 5m)	Medium cities (0,5 -1,5 m)
Pedastrian Priority	.	*	*
Traffic calming	.	*	*
Car pooling	.	.	.
Standards for noise/air pollution	.	*	.


vote
managers
(policy-makers)
STOCK-HOLDERS
of
(urban land
buildings
infrastructure)
STACK-HOLDERS
workers
suppliers
(professionals
builders)
city
customers
Strategic Plan and
Urban Marketing
users of residential services
residents
users of
public services
non-residents
users of
location
factors and
services
local firms
external firms
urban success/sustainability
(demand of urban sites and services)
failure:
outmigration of brains
outmigration of capitals
failure:
outmigration of reside
outmigration of firms

The new procedural context and institutional design: Strategic Planning and the metaphor of the city-corporation.

In the conditions of a highly complex competitive environment, the new challenges facing urban policy-making require new procedures and institutional design.

Sustainability means (and depends on) success in supplying an efficient and pleasant urban environment both to residents and to potential users of the city (hauseholds and firms). Therefore, new objectives of competitiveness and external "visibility" are added to the traditional objectives of control and orderly expansion of the physical urban environment; and other traditional objectives linked with the wealth of the inhabitants and the quality of life acquire new meanings and a new strategic relevance.

The new instrument, or better the new philosophy of public intervention, capable of meeting-up with the new requirements is recognized in the Strategic Planning, a concept and a tool borrowed from the long term planning procedure of the major companies.

In fact Strategic Planning arises as a corporate planning instrument aimed at improving the dynamic efficiency of the company, and may be defined as the iterative process of determining long term company objectives (in terms of products/markets/technologies) integrated with the activities of control/optimization of those processes suited in carrying out such objectives. It was introduced in

the private sector during the last 20 years and has begun to be applied, during the 70's and most of all during the 80's, even for programming and planning activities for the public organizations. The increasing conditions of uncertainty in which the public enterprises, and in particular local administrations of the larger towns, are found to be operating and the parallel growing dissatisfaction for the results of the physical comprehensive planning explain well the ever increasing utilization of this planning model (Gibelli, 1993).

Strategic planning in fact:

- is implemented by "willing" and "intentional" subjects;
- privileges the prospective analyses and scenarios,
- brings back local complexity and specificity (strength and weakness) to a unique strategic plan,
- operates in an open pragmatic dimension, well aware of acting within a context of "bounded" rationality and, as a consequence, behaves in a dynamic and flexible manner towards defining objectives and actions to be taken,
- uses learning processes and iterative revisions,
- promotes consultation and extended participation of interests and civil society,

- attributes strategic relevance to the phases to be actuated by the plan,
- entrusts the planning documents with a persuasive and promotional function.

The use of this instrument within an urban environment (there are now many experiences abroad: San Francisco, 1980; Los Angeles, 1989; Lyon, 1991; Barcelona, 1991; Birmingham, 1992; Randstad Holland, 1991; Madrid, 1992; Lombardy Region, 1992 ...) is explained with these specific characteristics which create a less rigid philosophy and planning instrument, more capable of meeting-up against external challenges and to exploiting the opportunities which manifest within today's complex societies (Gibelli, 1990).

The city makes use of the major companies' own approaches and instruments. In order to strengthen this convergence, it seems suitable to directly explore the new metaphor which is indirectly proposed: *the city as a major corporation*[1].

As a company, the city keeps up privileged relations with four actors, or groups of actors (see fig. 7):

1. *the customers,* clients or users of its products/services. These belong to three categories:

- users of residential services.

1. See: Camagni, 1994b. The same metaphor is utilized by Businaro, 1994

- users of public services (both residents or non residents), and
- users of location services or factors (represented by both local companies or external companies).

figure 7: Strategic interactions in the city as a major corporation

The "production" activity of the city-corporation is directed towards these three categories of customers; the city must understand the needs of these categories, it must carry out and syntonize its services towards such needs, it must optimize the size of its production, that is to say, the size of the city itself and of its services, in order to reach the best efficiency and minimum cost (the verb "optimize" is to be intended as being different from "maximize").

Urban marketing, a new important function of the city-corporation, technically embraces all the functions of market analysis, definition of a market strategy and promotion of the company product and image (and not only the latter!); it must not only address itself to the outside world, but also to the inside of the city itself, to the residents and the already localized companies;

2. *the stock-holders* of:

- urban land,
- buildings,
- ınfrastructures.

It is well worth remembering this category which is more often than not overlooked in the analyses (but not in the urban practice!). Each policy of urban revitalization, renewal and sustainability, if successful, generates a valorisation of the urban capital stock and, therefore, a clear advantage for this category. As a consequence, on the basis of a sound economic reasoning, this category may be called

to contribute in financing the city's development policies;

3. *the stake holders,* all those people who are connected with the good running of the city-company:

- workers (the employed),
- suppliers (the professionals, bearers of competence, and builders who carry out the single projects).

In general only the interests of the employed are explicitly considered, whilst the others, which make up strong interest groups, are often neglected. In a process of renewal of urban policy (and also of urban politics), these groups play a fundamental role, since they are bearers of both strong social demands and planning professionality and skills, both indispensable for "good running" of the city. The wealth of debate in the civil society and participation processes from the bottom may avoid a harmful welding of interests, which often happens, between urban professionals, builders, property promoters and public administration;

4. *the managers,* that is to say, the policy makers. These have the task of not only managing the urban activity, but also the technical and political circuits between the various partners which have been mentioned.

The new type of urban policies, started up through a Strategic Planning process, try to actuate a virtuous circuit, the "circuit of urban success and sustainability" (fig. 7). This is manifested through a strategic plan in the direction of the three above mentioned clients (resident families, commuter workers, internal and external companies), aimed at the following:

- maintenance of the residents and local companies, and attraction of new companies, through actions aimed at improving the quality of life in the city, quality of the physical environment, quality of the services and location factors for the companies;
- increase (maintenance, or qualitative upgrading) of urban employment and, therefore, of local income and local public assets, to be used in turn for financing new projects;
- increase in the local demand of "competence" and infrastructures, and activation of wide qualified work opportunities for the stakeholders.

These objectives and interventions in turn are destined to increase the value of urban capital stock and to create new urban values in the form of land rents of a "differential" or "absolute" character (Camagni, 1992, chapter 9). The canalization of a consistent amount of the new land rent so created in the direction of the local collectivity, through direct or indirect taxation (land taxes, betterment levies, real estate capital gains tax, contributions for urbanization costs), constitutes a final objective of the strategic plan, crucial both in a political sense, for creation of a social consensus, and in a

technical sense as it allows to close the virtuous circuit of urban success and urban sustainability, and to secure overall consistence of the project.

In case of failure of this strategy we have, on the other hand, a vicious circle or urban crisis with:

- residents moving away to other cities or other areas,
- companies moving away,
- outflow of capital in search for profitable investment in other urban areas,
- outflow of brains and competence.

In conclusion, one of the merits of the city-corporation metaphor resides in the fat that it shows us which groups may benefit from sustainability policies and qualified development processes of the city. It is necessary to have a clear perception of these groups since:

- they are capable of guiding many public decisions,
- they are ideal partners for private-public cooperation schemes,
- they may be called-up to contribute in financing urban revitalization and sustainability policies.

Conclusions.

This paper tries to convey five main messages:

1. the city performs a double role, being at the same time a "place" and a "node" in the trans-territorial communication and transportation network. The two roles interact cumulatively, in the positive but also in the negative sense, generating diseconomies and negative externalities on each other;
2. the urban sustainability concept if used in the proper way, provides a new and usefull framework to handle these problems; it reminds us that the city is a non-natural realm, developed for mainly social and economic goals, where the environmental elements play a fundamental role in determining the long term attractiveness and viability of the entire urban system;
3. sustainability policies intrinsically bear a procedural nature: the goal is not really that of devicing the optimal urban structure, form and lay-out but rather that of controlling the co-evolution of the urban sub-systems and functions, in order to manage the negative

interactions and to maximize positive feed-back effects;

4. as far as the urban form is concerned, a pattern that allows to maintain the advantages of aggregate urban size limiting the micro-territorial disadvantages of an excessive size of the single centres is the polinuclear network city, where internal integration of economic and residential functions minimizes external mobility and allows the reaching of an "urban atmosphere", green belts may be designed around the single subcentres and a compact urban form is maintained;
5. the metaphor of the city-corporation may allow a smoother and more efficient plannning procedure, in that it shows the proper planning tool ("strategic planning"), planning attitude (participatory and intentional) and planning philosophy (calling stock-holders and stake-holders to contribute to the financing of sustainability policies).

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TELE-CENTERS AS AN INSTRUMENT OR URBAN DEVELOPMENT:THE CITY OF VIENNA, GLOBAL VILLAGE 1995

Werdigier Wolf

Deleuze and Guattari present metaphors from biology and compare different types of roots as abserved in nature with different ways of human thinking. The hierarchical way of thinking, to which we are used to, they represent by forms of main roots with ramifications. But, so they say, this way of thinking should be contrasted by a non-hierarchical way of thinking, which can be represented by the physiognomy of the Rhizom. This is a type of roots, growing horizontally, building up a mesh, so that the different parts are equivalent to each other and, although they are not elements of a central organism, they exist a s physiological units. (Deleuze, Guattari: Mille Plateaux) This philosophy of network-thinking brings us to start with very concrete technological building blocks first and then to go on to observe the broader framework.

The building blocks

The building blocks presented here are derived from new possibilities opened by the new Information and Communication Technologies: The concept of the local telematic neighbourhood-center (1) and the concept of "public services competence centers"(2). The same is true for several other technological building blocks, which we propose, such as the "telematic mini-malls and local markets", the "transport interchange service-centers", the "hybrid-city-fragments", the "virtual art districts", the "virtual bebob-conventions" (youth-club), the "local tele-university departments", the "horticultural academies and service-centers", but these, not having the chance of further development subsidised by the Act-Vill-program, can not be presented here. However, the two first named building-blocks are under construction now and are going to start on February 1996 in Vienna.

The Telematic Neighbourhood-Centers

The first priority when talking on telematic-neighbourhood-centers is the orientation of its functional concepts towards the concrete needs of the people and businesses existing in its direct neighbourhood. The program of training, job-creation and public and private services, as well as telework, is directly defined by the needs of the people and the companies there. The second principle is a high degree of flexibility in space, that means, that within a residential area a neighbourhood-center should occupy space, which can be used as residential appartments as well, so that reduction

and enlargement is possible (see fig. 2, 3, 4).

Third, speading of more than proportional influence of these rather small telematic neighbourhood-offices (100 to 200 m2) might be justified, as these telematic neighbourhood-centers serve in two phases, one after the other:

Phase 1. By introducing new ways of work and by applying telematic technology into the every-day-life, by tele-cooperative work and distant learning, people in this area are introduced into the new ways of work within the future information society.

Phase 2. In the following phase 2 then, when awareness about the possibilities and empowerment by the new technologies is reached by the people living there, the effective use of telematic-neighbourhood-centers for tele-work, tele-training and tele-businesses will become the main features of the neighbourhood-centers. So we observe at the beginning a higher proportion what we call awareness-training and a lower proportion of telework, whereas in the second phase this proportion will change to the opposite.

The complete functional concept of a telematic-neighbourhood-center is organised around the main goal of telework and business support services equiped with several support facilities:

- awareness-training
- editing support (desk top graphics, marketing, WWW home-page-production, CD-ROM

production, etc.)

- telelearning and teletraining of different office qualifications
- private services (telebanking, insurance, social services, travel
- agencies, etc.)
- recreation and local networks, mail-box and internet-cafe (fig. 5)

The organisational concept for the first phase is taken by three main-partners:

- an industrial partner (having the interest to apply hardware, software and network-applications) - the banking-sector, having the interest on widening the market for tele-services, telebanking, teleshopping and other services
- the City of Vienna, having the interest of building up local focus-points, as local agoras, bringing people together for working and learning and reducing the problems of isolation at home. (fig. 6)

Today only 25 % of the Austrian house-holds are equiped with a PC and only 10 % of these are equiped with a modem. So the telematic neighbourhood-centers also have the responisibility of multiplicators to spread knowledge to a wider population.

Further more it is the interest of the city, to decentralise services to the local residential areas, often very far away from any kind of social infrastructure, including concepts of job-creation and opening the job-market by training-programs in cooperation with companies in the local market. Many of these concepts are existing already and now have the possibility of decentralised applications in those areas, where people really need them.

The public Services Competence Centers

The local market place always has been the focal point of the city. It defined the agora. Later on the town became the representation of the community. When introducing a new technological building-block, aiming at the decentralisation of public-services, a new telematic public-service office is conceptionalised in combination with the local market place: The public Services Competence Center.

The fundamental idea of this approach to the public service (Burgerservice) is a reorganisation of all the departments, so, that they are directly oriented to the demand of the people.
When looking at the present structure of public bureaucracies, we find departments like blocks each beside the other organised in a vertical way from top down. Every block or every column of this organisation "produces" a specific public service and therefore has to be adressed seperately from each other in one of the main buildings in the city. By telecommunication technology we are able to offer

all these services as a bunch taken together and decentralised in each of the neighbourhoods of the city. We compare this with the structure of a cake where we have all the public services piled up vertically like several layers of creame, dogh, paste, etc. and bringing this cake slice by slice to each of the neighbourhoods, we can offer in every neighbourhood a section through all the services of the city in one place, serving in one stop (see fig. 7).

This new organisation of public administration brings anenormous improvement in the level of service to the local people and at the same time a reduction in staff as the new neighbourhood-centers are decentralising the staff from the main departments and by reorganisation a high percentage of procedures is computerised or completely simplyfied. In fig. 8 an example of a local service center is given.

The city of the 21st century

If we now start to bring the technological building blocks, two of which have been described before, into a broader framework of future perspectives, we may draw three main lines of development leading to the 21st century.

The Concept of Dematerialisation

A metaphor might explaine this better. A tale from Northern Africa describes a rich man, defining his last will before his death: One half of his wealth should go to his oldest son, one third should be inherited by his second oldest son, whereas his youngest should get only one ninth. When he died, he

owned 17 camels and the three sons had to divide this heritage to satisfy the father*s last will. They could not find a solution and discontent led to animosity and less perspective for solution made them even more aggressive.

There was no escape from this dilemma until an other rich man with several camels visited them and offered to give one of his camels to them, so the three sons would then have 18 camels. Then they can divide by half to get nine, divide be three to get six and divide by nine to get two, having all together seventeen camels, leaving over the one, which then he can get back. Thus he helped them to solve the problem, without any physical input.

This story tells us, that we need solutions, first before we think of additional production.

If we look on the possibilities by telematics, where archieves are replaced by computer-files, where office space can be replaced by telework, where services can be replaced by tele-services and even transport of materials, goods and persons can be replaced by transportation of data, then we find, that flexibilisation of work as well as flexibilisation of buildings lead to multiple used spaces with higher efficiency. These tendencies can be interpreted as a step by step dematerialisation of the city. The retrofit concept of using empty space where we can find it, can start within existing offices letting vacant space for intermediate business to use. If we consider the university buildings as an example, less than 50 % of its space is occupied over the year. This can be changed by dematerialisation.

New Combinations

Telecommunication will enable new combinations of functions, leading to hybrid building which

until now have only been seen in city-centers. New combinations will evolve, according to the philosophy of Marc Auger, when more and more people live in intermediate spaces like airports, railway stations, conference-centers, etc., where they work, live and wait. It will become important for the city of tomorrow, to equip these spaces with efficient infrastructure for using the time spent there in an effective way, but also for recreation and health. Not only the centrally located and highly accessible points of transport interchange which often the intermediate spaces are, will develop as hybrid-buildings, also in the peripheral zones, a new perspective of hybrid-buildings evolves: A combination between glass-houses and residential land-use, a combination between art-museum-galeries and office-space a reengineering of vacant office-space into residential use and within the residential areas a reengineering of appartment-space for local offices. All these are examples of future flexibilisation and new combinations. The technological capacity for these are existing already, the desires of the people asking for this as well. It is the institutional barriere, which is inhibiting the developement, such as legislation for subsidised housing not allowing for office-use, office investment capital, not allowing for residential use, etc.

New Social Clusters.

The third line of perspective can be drawn, if we think of the consequences of the bottle-nack-metaphor when transforming city office work to decentralised telework as shown in fig. 10. This transformation leads to a reduction in contacts to collegues, to side informations in the corridors, to cooperative work ing in working-groups, in meetings and in the coffee-bar. The only communication channel which can be taken to the residential area, when teleworking, is the communication on tele-

phone and computer-networking.

But there is an other side of this coin showing all the linkages which can be developed on the local residential level. These are linkages not only to nature and social contacts to neighbours, but also to other people in a much more relaxed atmosphere, where the "local agora" is a guarantee for. Maybe we can talk of metropolitan villages.

For these villages we need a new architecture, which mainly has to be seen from an organisational point of view. Not romanticism and fassade-architecture of Potjemkin is needed, but a normal street, where the different buildings like schools, office-buildings, glass-houses, supermarkets, etc. linked together and be used in an exchanging way. The most popular cafe might be the one in a sports-club, the most fashionable interesting place might be in the gymnasium of the school. The best working desk might be in the green-house, the best dance-club might be in the supermarket. The exchange of space not only reflects the actual demand for change by the people. It also leads by flexible organisation, to the better use of space and also is inspiring new environements.

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Developing an Urban Typology - aTool for Research and Planning of Sustainable Cities

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Abstract

Planning for a sustainable, high-quality urban environment is seriously hampered by the lack of operational concepts and a lack of theoretical framework. This paper presents a research project for developing a new typological classification of the urban fabric on a micro level. The classification will be used as a basis for urban descriptions, analysis, design and planning. This paper is limited to a discussion of the general background, the research problems, the objectives, the methods and the exptected results of this project.

The project uses a typo-morphological approach. The urban structure is seen as composed by

elements of the same urban form that are added to each other The basic element that is studied is the urban block - ranging from high-density inner city blocks, to low-density one-family houses. Classification will be based on a number of parameters: (a) urban density, (b) percentage of plot covered with buildings, (c) average building height (d) configuration of buildings and plots in relation to street. Classification is operated with datas from digitalized data bases, using Geographical Informations Systems (GIS).

The results of the project are multiple. The project will make it possible to plot out accurate typological maps of cities, as a basis for urban planning and management. It will also accumulate new knowledge of sustainability and urban quality related to the urban types; which will lead up to design of a "sustainability index" and a "quality index" which could be used for comparisons and evaluations of urban areas.

The need for a new theoretical framework

Urban planning is in a crisis. We lack an adequate theory - a theory that can explain the ills of our cities and help us to make cities better. Instead we have confusion. The air is full of conflicting urbanistic ideals, beliefs, and recipies. The result is that our cities are getting even more chaotic. At the root of this crisis is the collapse of the functionalistic urban doctrine that was codified in the Athens Charter 1933. Functionalism has since then proved unable to cope with the increasing problems of the modern city - worse still, there is reason to suspect that the functionalistic models have been the active cause of some of the urban problems of today.

There is urgent need for action plans to make cities better, more sustainable. Such is the message in many recent reports from experts and politicians (See for example "Agenda 21" from the Rio Conference, and the "Green Paper on the Urban Environment"). But there is still a long way to go. The problems are very complex, having social, cultural, economical, as well as environmental dimensions. The biggest obstacle to progress is the lack of theory. Everybody can agree that cities should be more sustainable, that urban qualities must be restored; but since there is no consensus as to the real causes of the problems, there can be no consensus as to the cure.

How can we make cities better, more environmentally sustainable? Many ideas are put forward. One idea, that is enthusiastically supported by many urban planners, is that cities should be more densely built, more compact. The idea behind this is that compact, high-density cities are energy-efficient, transports could be reduced to a minimum. The need for commuting from home to work would be minimised, car traffic would be greatly reduced. The advocates of this idea also argue that people are attracted by the bustling life in high-density city centers. Increasing urban density is the strategy recommended - both for sustainability and for a better quality of life in cities.

But the advocates of the compact, high-density city have met strong opposition. Another line of thought argues that the sustainable city - quite contrary - must be a "green city", a city with ample place for recycling of water, for planting and cultivating. Local recycling is an ecological imperative: the waste that today is dumped into the sea or burnt to ashes ought to be brought back to fertile soil. According to the proponents of the "green city", life would be less hectic, less aggressive, more in harmony with nature, than in todayõs cities. Two models of the sustainable city, both can mobilize strong arguments. Two alternatives - seemingly irreconcilable!

Today there is no consensus among planners and researchers as to the strategy for more sustainable cities. Some argue for increasing densities, others for lower densities. The result is confusion!

The issue of urban quality is perhaps even more confused. The air is full of ideas of how to increase urban quality in the future. One school believes in high tech applications to increase urban quality - for example through automatic traffic flow control, or "the intelligent home" where people can communicate, shop, or entertain themselves with the help of computers and telecommunications. Others emphazise the cultural dimension of urban quality: they associate urban quality with the vitality of "urban life" - theatres, restaurants, art galleries, shops, museums and historical buildings. Others emphazise the democratic dimension. (emphazising local participation and self determination). Others stress the dimension of the "health and security"in the urban environment or "equality" and so on. No one can deny that each of these dimensions is important, but we have a very weak grasp of how actions in one directions will affect the other dimensions or the whole. It is not unlikely that initiatives to raise urban quality in one dimension could have the opposite effect in other dimensions. Attempts to create a general theoretical framework for urban quality have not been vert succesful. (See for example Lynch: A Theory of Good City Form).

To sum up: we lack an adequate theory of quality in urban planning and design. What we need is above all a new theoretical framework in which the accumulated information about the existing urban environments can be analysed.

Much of the confusion seems to stem from unclear notions of what a "city" is. To many the concept "city" brings to the mind the historical well-defined city; but a modern city is much more than an

urban core, iit is also a vast and complex suburban zone. The modern city consists of many different kinds of zones or districts, such as the early 20th century suburbs, the postwar residential enclaves, the industrial enclaves, the institutions, and not to forget the unbuilt areas between. The city is not homogenous. It is an aggregate of several parts which differ from each other, in terms of urban density, in types of buildings etc.

Let us return briefly to the paradox of sustainability and urban density. In practice the choice between a future ideal compact high-density city - or an ideally spread out low-density city is obviously an intellectual game. In reality the established urban structures are very hard to change on the macro level. We should focus our interest more on the changes and transformations that occur on the micro level - the urban block.

Changes in urban density are occuring all the time, but these changes are by no means uniform. Concentration and deconceentration way be simultanuous, but occur in different areas. Let us assume a scenario of restrictions on private car use (in order to reduce pollution, energy consumtion and the "greenhouse effect"); increasing residential densities wuld seem a good policy in order to make collective transport more effective. But it would not be neccessary to increase urban densities uniformally, in each district of the city. The best results would be obtained by densifying the peripheral areas with the lowest densities today. On the other hand we have the scenario, that local recycling of waste water and organic waste must be increased - which in turn suggests that densities should be reduced. But it does not necessarily follow that each district should have a lower density.

So the density paradox - having to increase and decrease urban density at the same time - dissolvs

when we analyse on the micro level.

Sustainability, density and urban quality must be studied on the micro level, rather than on the macro level. The statistical averages for a whole city or a whole region are not very informative, may even be misleading. We need a theoretical framework for a study of the small elements in the urban structure - the urban blocks, or groups of buildings.

The problem of quality in urban environment is also primarily related to the micro level -the indivudual districts or urban blocks in the city. In every city there are more attractive residential districts and less attractive districts. We all know (and social surveys have proof) that certain types of areas, the post-war, large scale housing estates, have the most serious social problems (vandalism, criminality, hard-to-let apartments).

Unadequate urban quality is (together with the problem of urban sustainability) the most alarming of the urban problems of today: this is true in the larger cities all over Europe. The most resourceful households (in terms of income and education) move out from the areas with the lowest urban quality, which tend to be occupied by the least resourceful - the jobless, the poor, the immigrants. The problems accumulate. Social and ethnic tensions increase between areas for different social stratas. A viscious circle is created. Everybody will agree that this viscious circle must be broken. Otherwise the stability of the whole society is threatened. Action programmes are urgently needed. But what kind of programs will be succeful? Opinions differ. Today there is no comprehensive theory of urban quality.

The key to understanding where the large-scale post-war housing estates went wrong is the study

of the urban form (urban design) on the micro level - the urban block. Recent research suggests that the degree of vandalism and other social ills is correlated to certain features of the urban design: the number of stories, the number of flats in each building, the relation of the buildings and the entrances to the streets and the surrounding open spaces. (See for ex Oscar Newman, Defensible Space or Alice Coleman, Utopia on trial!).

We are in urgent need of a comprehensive theory of urban quality, based on practical experience. Such a theory inform us on how to amend and reconstruct the problem-ridden post-war housing estates. Such a theory could point out the problematic features, the urban forms that should be avoided in the future. It could formulate rules for a better urban design in the future.

To sum up - given that sustainability and urban quality are the two key problems in urban planning today, is seems clear that we onõt have an adequate theory and that we need a new theoretical framework for analysis and design on the micro level (the urban block).

A new theoretical framework

This project proposes that a new micro-level typological classification is the sort of theoretical framework that we need. The project is about how to develop such a typology. But before we move on to the practical methodology we ought to comment on the meaning of typology.

Typology has been a part of the common practice in architectural analysis and design for a long time, typology as such is by no means a novelty as such. However we have almost entirely relied on

building typologies, and these typologies have been based on the functional content (see for example the works of architecture historian Nikolaus Pevsner). According to functional typology schools, hospitals, museums, residential buildnings are studied as separate categories of buildings. Although functional typology may be quite productive for the design of buildings, it is much less useful for urban descriptions and urban analysis. Functional typology does not take into account the immediate surroundings of the building, the context. Nor does it take into account that functions often change over time, while urban forms are very stable.

A typo-morphological urban analysis (as opposed to the functional typology) means that buildings are studied in context - together with the public and private spaces that surround it. The object of such analysis may be a group of buildings and open space (an urban block), the building lots, or the street-pattern.

Typo-morphological urban research can be traced back to the 50s and 60s. At this time Italian architects were systematically studying of building types in Italian historical city centres. (See the works of Aymonino, Caniggia, Rossi and others). At the same time British geographer MÊRÊG Conzen studied the historical evolution of British medieval Cities, from a somewhat different standpoint. Conzen developed a typological (or typo-morphological) study of the urban forms - the street-net, the urban blocks and the individual plots. Similar research has been done in a number of European cities, and in San Francisco (See Moudon (1986) and Lawrence (1986)). These historical studies demonstrate that urban elements (the urban block, the street pattern) are very stable over long historical periods. They also demonstrate that functions can change to a surprising extent whithin a traditional urban pattern, without breaking the pattern.

Typomorphological urban research is still only at the beginning, in the future it can be expected to develop along several lines (See also Moudon 1987):

1. as a tool for description of the existing urban structure. The classification in urban types will provide a basis for description of the existing urban structure in a specific city, in terms of caracteristic urban typologies.
2. as a tool for analysis. It can provide deeper insights into the "sustainability" of the different urban types: by gathering basic environmental data (for example annual energy flow per capita, consumption of water, production of waste, recycling capacity, capacity for local cultivation, potential of recycling building materials etc.). It will also be possible to evaluate the relative attractiveness of the different urban types, by gathering socio-economic data (fr example annual turnover of inhabitants, average income, social interventions, signs of vandalism etc).
3. as a tool for planning and design. In providing a deeper understanding of the urban types, of sustainability and quality, a better description of the existing built environment, it will pave the way for a better planning practice, both on the micro level and the macro level.

Notes on a typology for Swedish urban blocks

This project is about developing a typological classification of urban types in Swedish cities. (But the methodology is essentially the same regardless of the country). The proper starting point should always be the history of urban development. The urban typology is best understood in its historical context. The political and economical swings, the changes in in building practices and building codes, the architectural ideologies and town-planning doctrines - all of this is reflected in the built environent. We can expect to find specific regional and national caracteristics in Swedish urban types, but - this is perhaps even more striking - we also find that the Swedish urban types are very similar to the urban types of other European countries, for example Germany, Austria, Denmark, Norway and Finland. The historical periods have produced similar urban types over a great part of Europe.

In the case of Sweden the following periodization seems suitable.

1. the pre-industrial period, up to the middle of the 19th century, a period with little urban growth.
2. The late 19th century the "Haussman"-perod, with very rapid urban expansion.
3. the early 20th century, the "Garden City"-period, with the advent of suburban growth, and
4. the late 20th century "functionalistic" period.

1. the preindustrial period (before 1850)

- The caracteristic urban type was the traditional Swedish wooden town, with timbered houses n one or two stories. The streets are narrow: 6-10 metres. The dwelling-houses are as a rule placed along the streets, wooden fences protecting the private courtyards and small planted gardens from the streets.

2. The Haussmann period (1870 - 1905)

- High density blocks of flats in 5-6 stories, with back buildings. The transformation of inner Stockholm (and other large Swedish cities) in the late 19th century followed the continental urban pattern (Paris, Berlin, Vienna). The Building Code of 1874 set the rules. Apartment buildings in 5-6 stories lining broad streets (18 m). Urban density was very high (e=2,5 - 3.0). Public parks were laid out in order to compensate for the loss of private gardens.- Around 1900 low density suburban villa districts for the affluent were laid out along new electric tramways from the city centre.

3. The period of Garden suburbs (1905 - 1930)

- Reformed inner city blocks 4-6 stories with large open courtyards. Following new building regulations that were introduced during 1910-30 back buildings were no longer permitted; new inner city blocks were designed with large, planted courtyards. The urban density was accordingly reduced.

- New suburban developments were laid out following the pattern of English and German garden suburbs. Mixed developments (detatched houses, semi-detatched houses, row houses) with low or

moderate urban density (e= 0,2 - 0,3)

4. The functionalist epoch (1930-)
5. The functionalist ideal of open blocks of flats in green space made its breakthrough in Swedish urban planning as early as 1930.

- In Sweden the most common type of block of flats during the period 1930-1950 was the three story "walk-up" (or lamella house). The traditional separation of private and public space was abandoned.

- In the period 1955-1975 high rise blocks of flats became more common, with point blocks (6-10 stories) or slab blocks (6-10 stories). Traffic separation was introduced, separate roads for walking and biking were built separate from the regular network of roads for motor traffic.

- After 1975 the era of high-rise blocks of flats came to an end; instead two-storey blocks of flats or terraced houses (in Sweden called "row-hoses") increased their share of the total. The traditional closed block in 4-6 stories made a come-back in central areas of the large cities.

A preliminary typology would contain eight basic types or classes.

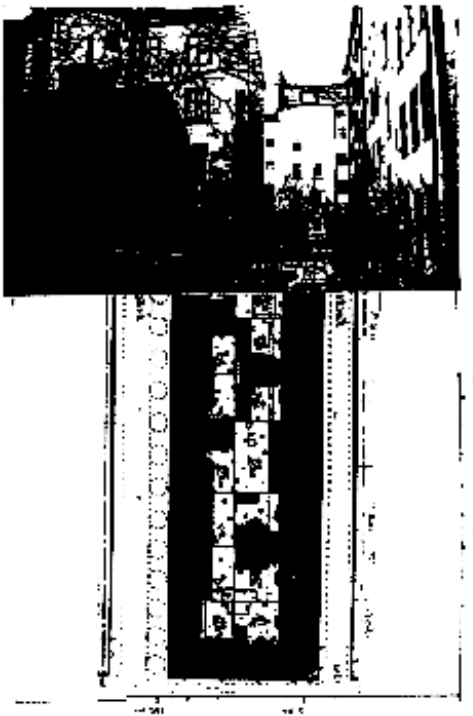
1. High density inner city blocks of flats in 4-6 stories.
2. Inner city blocks of flats with open planted courtyards.

3. High rise point blocks or slab blocks, 6 - 12 stories.
4. Medium density blocks of flats, 3-4 stories.
5. Low-rise, pre-industrial districts in city cores.
6. Garden suburbs, mixed developments with terraced or semidetached houses.
7. Detached houses ("bungalows") on small individual plots
8. Detached houses or villas on larger plots.

These types are illustrated in the following pages.
Fig A-D:
Some examples of Swedish urban types.
A Preindustrial low-rise traditional blocks; before 1850
B High density inner city blocks with back buildings. 1870 -
C Suburban vila district, ca 1900 - large detached houses on large plots
D Garden suburb, mixed development: semidetached houses and 3-4 family houses on small plots, 1905 - 30
E Blocks on flats 4-6 stories, ca 1910-30
F Blocks on flats; lamellas, 1930 -
G Small one family houses, (bungalows) on small plots, 1930 -
H High rise development, point blocks or slab blocks, surrounded by open space, 1955 -

A

B

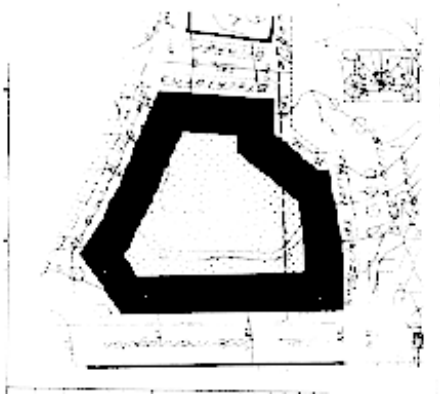


C

c

D

E



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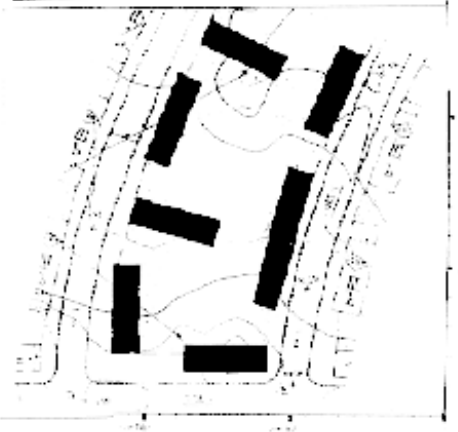
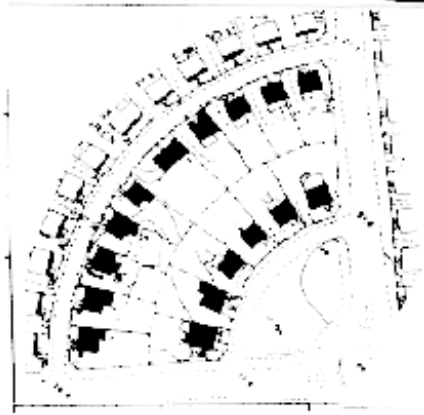




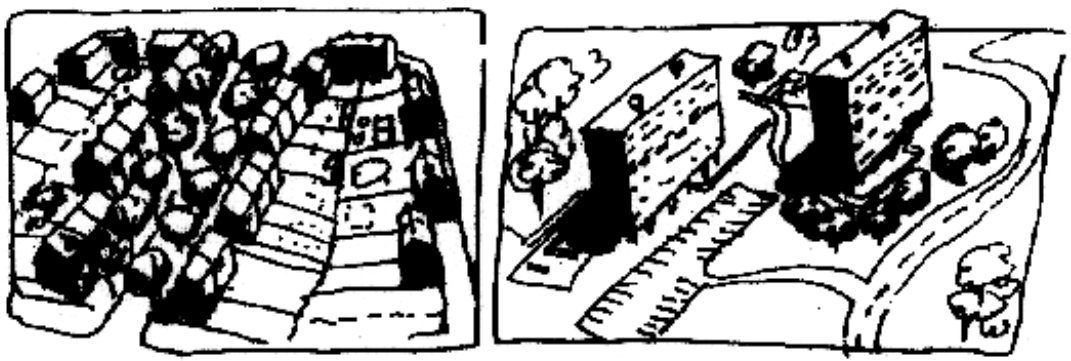
G

H

The eight basic urban types differ from each other in many aspects. They were built during different historical periods; the architecture, the building materials and technics are different. Some have a quite central location, others have peripheral locations. Some are rented, others owner-occupied. But the primary interest in this project is in the morphological caracteristics, that is the urban form and how the form affects on the quality and the sustainability.

As a first step we must distinguish between two radically different urban patterns - the traditional urban pattern, and the modernistic urban pattern which has dominated the post-war period.

The traditional uban pattern consist of small-scale elements, individual building plots, that are aggregated into blocks, along streets. the modernist urban pattern consist of large elements, large buildings with surrounding unbuilt space.



Idealized figures showing traditional urban pattern (left) and modern urban pattern (right).The traditional pattern is made up of small-scale units (individual plots); the modernistic pattern is one large-scale unit (a housing estate). The open space in the traditional pattern is divided into public space (streets) and private space (gardens). In the modernistic pattern the open space is unified, continous and there is no boundary between public and private space.

The importance of the basic pattern - traditional or modernistic - is great. It influences the way that a certain area can adopt to changing demands, to changes in functions and lifestyles. The traditional urban pattern can easily and gradually adopt to external changes. The buildings on the individual plots can be enlarged, transformed internally or even be pulled down to be replaced by new buildings. But in the modernistic urban pattern gradual adaption is not feasible. Rebuilding often affects the entire housing estate and is often quite radical.

So, the pattern, or configuration of buildings, plots and streets is a very important parameter, that affects the classification of the building types.

Other, more traditional parameters, that are used for classification of the urban types in the project are following:

r) residential density, (e= ratio of total residential area to area of land)

s) building height, (average number of storeys) (n)

t) percentage of built-up area. (v)

The mathematical formula is as follows:

(e) = (v) x (n)

These parameters can also be analysed in a graphic diagram (see fig 3 on next side). If we register a number of different urban blocks, and place each block as a dot in the diagram, (according to their urban density and number of stories), we find that the individual observations of blocks (dots in the diagram) tend to cluster into a larger bubble. (See RŒdberg 1988!) Different types form different bubbles. In the diagram the 8 basic urban types are illustrated.

It will be noted that the bubbles are placed along a straight line (or rather a string of pearls) going from the bottom left, (low density villa districts) to the upper right (high density inner city blocks). There is however one striking exception to this rule. The high density, modernistic high-rise areas. They place themselves in the upper left part of the diagram.

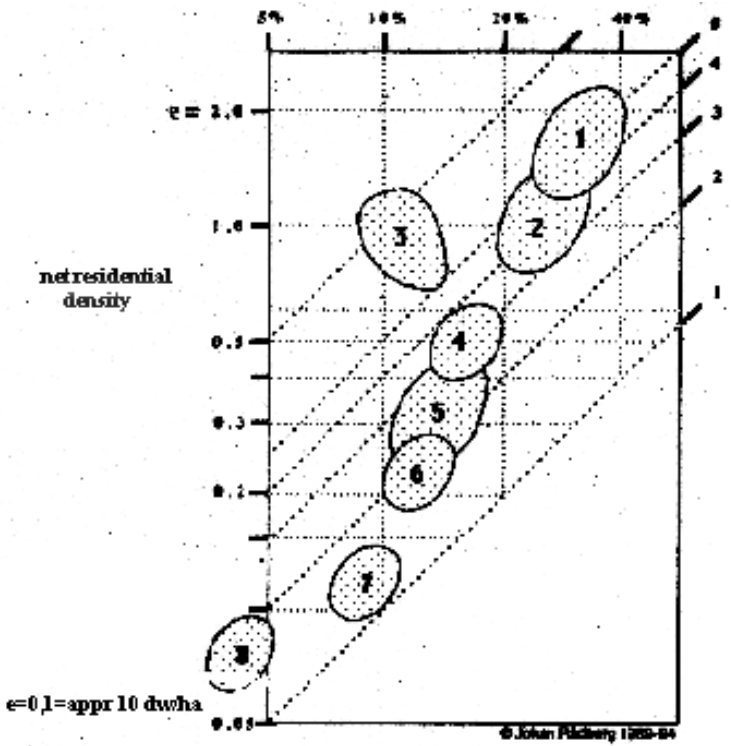

percentage of land covered with buildings
building height
5%
10%
20%
40%
e = 2.0
1.0
0.5
0.3
0.1
0.05
4
3
2
1
net residential density
1
2
3
4
5
6
7
8
e=0,1=appr 10 dw/ha
© Johan Ritzberg 1969-84

Diagram showing urban density, building height and percentage of built-up area, in eight Swedish urban types.

1 High density inner city blocks, 4 - 6 stories.
2 Blocks with planted inner courtyards, 4-6 stories,
3 High rise developments, point blocks or slab blocks 6-12 stories
4 3-4 storey "walk-ups" (lamellas).
5 Preindustrial low rise traditional blocks;
6 Garden suburbs, mixed developments
7 Small one-family houses (bungalows) on small individual plots
8 Villas on larger plots.

Project objectives

The general objective of the project is to develop a typological urban classification system, as a basis for research, for urban descriptions and for urban planning and design.

The classification system is primarily based on the Swedish urban environment, but the structure of the typology and the basic parameters should be adaptable to the urban types of other countries in Europe.

The project is expected to result in
(1) a new method for registration and analysis of the urban environment in a given city, on the basis of a typological classification system.

(2) descriptions of the existing urban structure in a given city, for example digitalised maps and/or databases.

(3) new knowledge of the relationship between urban form and environmental caracteristics - summarized in a sustainability index

(4) new knowledge of the relationship between urban form and quality (in terms of long-term attractivity) -Ê summarized in an index of urban quality.

(5) a method for identification and registration of historically and culturally valuable areas in given cities

Project methodology

The project will proceed in five consecutive steps or project-parts. The first project-part, (step 1) concerns the formulation of the urban classification system. The basic parameters will be specified. Tests will be made on which parameters could be easily obtained from central data bases. The reliability of the given parameters will be studied. The classification system and the parameters will then be modified and tested in small-scale studies in parts of a selected city.

The registration of objects will be implemented in a Geographical Informations System (GIS). The primary source for information on urban elements (building lots, residential and other buildings) in

Sweden is the Central Institute for Information on Real estate (CFD) in Gmation on ca 3 millions of units - almost every building in the urban areas of the country. This central data base comprises about 100 different parameters; the number of parameters is continuously enlarged. The central parameters in this project are (a) the urban form (given as coordinates), (b) the total area, (c) number of stories (c) the built-up area in relation to open space (e) the ratable value etc. CFD data base is the single most important source of building data in Sweden, but there are several other sources. The city planning offices often have digitalized maps with information of actual plans, regulations, roads infrastructure etc.

A tailored GIS program will be designed as a tool for registration and classification of the urban elements. (See Aglialas, D & Harlow, C, 1990.) The registration and classification process will be semi-automatic, which means that the operator can intervene manually when a specific object by cannot be identified according to the determined geometrical conditions.

After the the first project-step the selected parameters and geometrical conditions will be evaluated and modified if necessary.

The next project-step, (Step 2) will be a full-scale study of a selected city. The urban elements (blocks) will be classified, with the help of the GIS. The result will be illustrated in a detailed digitalised map showing the urban types, their extent and geographical location.

The elements (blocks) are also registered in a data base. This means that additional information related to each object (block) can be fetched from other data bases, using a geografical code as a link. Such additional information will be: the number of households in each object, age distribution,

income distribution, taxation, percentages of empty flats, social care, car ownership, the annual per capita consumption of electricity, water production of waste. an so on. The range of information available from other data bases is almost unlimited.

In the next stage of the project (Step 3) a typological catalogue for urban research will be created. This typological catalogue should consist of at least 300-500 objects (urban blocks) from different cities (large and medium sized) all over the Country. The objects are selected by statistical methods to get a proportionality to the total population in each of the typological groups. The research catalogue can be used as a reference selection for specialized studies of ecological problems. Such studies could be the study of the flow of material, and energy, or evaluations of the opportunities or constraints for new ecological innovations in existing residential areas with different urban form.

In the next step (Step 4) the accumulated information related to the objects in the research catalogue, (such as specific energy consumption, waste production, possibilities for local infiltration and cultivation etc) will make it possible to construct a sustainability index. This index should be tailored as a tool for comparisons between existing areas.

In a similar process the project will try to develop a quality index, (containing a mix of parameters based on social data and urban form). This index would also be used for comparisons between existing areas.

Finally (Step 5) the project will develop methods to supplement the basic typological map with complementary information concerning culturally and historically valuable districts or objects, or valuable landscape elements etc.

At a later stage (Phase II) the project is planned to develop into a joint project, with city planning offices and planning consultants in Sweden, Finland, France, with Swedish Research Foundation ARKUS as coordinator. This stage of the project falls outside of the scope of this paper.

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Developing a Typological Classification
as a Tool for Urban Analysis and Urban Planning

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Architect diploma: 1968 KTH Stockholm
Licentiate of Engineering: 1984 KTH Stockholm.
Doctor of Philosophy: 1988 KTH Stockholm.
Associate Professor in Urban Planning and Design: 1993 KTH Stockholm.

Books and scientific papers (selective list):

- "Doctrine and Density in Swedish Urban Development 1875-1975"
Doctoral Thesis. 1988. ByggforskningsrŒdet. Stockholm.
- Den svenska tr
- "Termite's Heap or Rural Villages? The Problem of Urban Density and Sustainability", paper presented at the international conference "The European City - Sustaining Urban Quality," in Copenhagen 24-28 april 1995.
-"Towards a Town-Planning Doctrine for the Future - the Case for a Garden City", paper presented at the international conference "Cities of the Future" in Helsinki, 1993.
- Numerous articles in nordic publications on Planning and Architecture 1985-95.

Development of new "urban concepts" integrating technologies and verifications of their applicability to certain given urban situations

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DEVELOPMENT OF NEW "URBAN CONCEPTS" INTEGRATING TECHNOLOGIES AND VERIFICATIONS OF THEIR APPLICABILITY TO CERTAIN GIVEN

1. THE TASK FORCE WHO PRESENTED THE CURRENT STUDY PROPOSAL

The tenderer of the present offer is a task-force composed of the following members:

A) VELA srl, lead-contractor and agent responsible;

B) Prof. CESARE MARCHETTI (IIASA-International Institute for Applied System Analysis), co-ordinator of the proposed study;

C) ASSESSORATO alla COMUNICAZIONE della Provincia di Milano;

D) AIRU (Associazione Italiana Riscaldamento Urbano);

E) CNR-SIAM (Consiglio Nazionale delle Ricerche-Servizio Informatico dell'Area Milanese).

In addition to the organisation directly taking part to the task-force, it is important to underline the interest of the AEM, Milano (Azienda Energetica Municipale - Municipal Energetic Company of Milano) in the present study. Such important endorsement will allow to verify in the course of the study the achieved results with the concrete problems of the city of Milan. The letter of endorsement of AEM, together with a brochure of the company, is enclosed in Annex 1.

2. TECHNICAL PROPOSAL

INTRODUCTION

That man is a territorial animal that does not need demonstration. History is a collection of squabbles between human groups competing for territories. Now the *basic instinct* of a territorial animal is to *expand its territory.* A larger territory means larger resources and opportunities and the rational is obvious. However, exploiting a large territory is also expensive, both because it requires the physical exertion of moving over large distances, and because *moving means to be in the open,* under the possible attack of enemies and predators.

For an animal, and for a pre-technological man, a balance can be struck by *adjusting* one single parameter: *mean travelling time per day*. Strictly speaking this fixes only the *"exposure"* but in fact, multiplied by a mean speed of moving of a certain animal, it gives a distance, or a *range*, i.e., a territory.

Furthermore, *man has a cave instinct.* The protection of the high trees with dense foliage of the tropical rain forest has found a good substitute in the hiding shade of the cavern, where he spent most of the time not devoted to huntering and gathering. This relic is important as the big business of air transport pivots on this instinct, as we shall see in a moment.

The work of Zahavi of the World Bank[1] is remarkable because it shows the *quintessential unity of travelling instinct around the world,* above culture, race, and religion, so to speak, which gives unity to the considerations relative to the history and the future of travelling, and provides a robust basis for *forecast* in space and time. The empirical verification by Zahavi about the *exposure time* reports *one hour per day* as a mean over the year and over the population. The tails of the distribution are interestingly not spread much around the central value. Basic instinct are pervasive.

Walking about 5 km/h, and coming back to the refuge for the night, gives a radius for territory of about 2.5 km and an area of about 25 km. This is the definition of the territory of a village, and this is precisely the mean area of Greek villages today, sedimented through the history of a pedestrian population. The same principles operates when a city through its importance, political or economic, expands her population and, as a consequence, her physical size. No city walls of large ancient cities (up to 1800) have a diameter greater than 5 km or 2.5 km radius. Even Venice *today*, still a pedestrian city, has exactly 5 km as the maximum dimension of the *connected core.*

When introducing mechanical transportation with speed higher than 5 km/h, the physical size of the city can grow in proportion as the historical analysis applied to the city of Berlin clearly shows. *Cars make all the difference.* Having a speed 6 or 7 times greater than a pedestrian, they expand daily connected space 6 or 7 times in linear terms, or 50 times in area. Ancient cities had typically a maximum population of about 1 million people.

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1. Zahavi, Y. 1981, *"The UMOT- Urban Interactions"*, report No. DOT-RSPA-DPB-10/7, U.S. Department of Transport, washington, USA.

Extending this concept, it is easy to move toward a 50 million people in conurbations like Mexico City with a population density equal to that of Hadrian's Rome. If the Japanese will complete a *Shinkansen Maglev (Magnetic Levitation train)* connecting Tokyo to Osaka in less than one hour, with the large transportation capacity possible in Maglevs, we will witness a 100 million people quasi linear city, whose liveability can be ensured by the application of new technologies.

Another aspect, that is often neglected, is the *aesthetic* dimension of cities. The aesthetic message has an anthropologically important function: that of *reassuring* the city inhabitants. A beautiful surrounding has in fact the extremely important function of ensuring the individual that everything is fine. As a matter of fact, aesthetics, which includes colours, sounds and smells (which are even used to cure various illnesses) and shape, is the interface between the spirit and the matter (an example is the pyramid which is considered to be a means to concentrate the energy of earth). And in fact, each colour activates different neuronic impulses into our brain, and shape may contain different electrostatic electromagnetic or information, as it is shown by the electronic charges concentration on tips of conductive materials (this is also the reason why it is not safe to stay under a tip - like trees - during a storm and why lightening-conductor attract lightenings).

Therefore it is important that cities are designed taking into account physical and chemical properties of matter, i.e. cities should be designed starting from nature, where aesthetics derives from functionality (e.g. tree branches, whose hellyptic structure aims at maximising the momentum of inertia towards gravity and then the mechanical resistance).

OBJECTIVES

General objektive of the study

The actual problem faced by the present study is the fact that a very large number of cities with more than 5 millions inhabitants are agglomerating all over the world, and continuously growing, without either a general or detailed insight of this phenomenon. In other words, there no exist any guidelines allowing to maintain such cities at human measure (i.e. comfortable cities) and ecologically sustainable.

The general objective of the study is therefore to trace the guidelines of an archetype drawing the new structures of cities and pointing out the drawbacks of the old ones, through an appropriate use of anthropological demands and constraints and the potential of new technologies applicable to a hierchized structure (the fractal city). In addition to that, the proposed guidelines will have to take into consideration the concept of "growth", in order to include it in the starting structures, and ensuring a no-schocking evolution of these last ones, coherent with the progressive city growth.

In other words, the main objective of the study is *to build a scenario of a human centred, agora city, i.e. a city based on the respect of all the above mentioned anthropological principles*. We can call this a "*natural city*", since this seems to be the evolution pattern naturally followed by cities. In this sense the perspective of the proposed study is revolutionary, though being based on the empirical observation of the structure of a natural city.

A natural city is a *"fractal city"*, with a village structure as a base, in the sense specified in the

following pages, thus keeping the social intimacy that is strongly missing in modern cities.

A fractal city, being based on a village-structure, is *suitable and comfortable* to the citizen, in the sense that all the services are available in a limited amount of space, i.e. of time, minimising the distance he has to cover in order to deplace. The natural city ensures all the social requirements of a liveable environment: homes, workplaces, entertainments, meeting points, shopping centres, are accessible in a restricted area, thus not requiring the citizens hurrying as aliens from a zone to another of the town. A natural, or fractal, city is therefore a human centred city, able to maintain the aesthetic message that reassures its inhabitants and ensures an harmonic relationship between the citizen and the urban space, social cohesion and economic development.

A city is basically a communication-tool. Through an exchange of information, services, objects, but mainly through direct contacts among persons. At a village-size, such exchanges take place in just one container, without specialisation. When the conurbation grows up, two main requirements have to be met:

the first one is that services and contacts have to be *hierarchized according to the frequency of use;*

the second one is that transportation means have to join any two points of the town in less than on hour and the centre to any point in less than half an hour.

The first point means that a natural city is organised on several levels (see figure 1): at a first level there are the quarters. Here all the services that are daily needed have to be available to all the inhabitants of the quarter (i.e.: shops for daily purchases, banks, newspapers,...).

At a second level quarters are organised in a number of seven, where the central one plays the role of the further hierarchical level. Here all the services that are needed, let's say, on a weekly basis will be available.

The organisation of the city goes on the further levels following the same hierarchical pattern (6 inferior levels, plus a central one that presents the functions of the higher level). In this sense the natural city is a fractal city based on a village-structure.

Obviously such city design can be matched with the most advanced technologies, e.g. making a cabled city where all the services and interactions with the local administration can be distributed at any desired level of the hierarchy. It will be the subject of the study to point out a portfolio of technological options that may help the reaching of the desired scenario of a human centred city.

The above described pattern can be applied to any medium sized city in the world. However even a very large town may still be sustainable and human centred city if evolving through the above described pattern of the fractal city.

An extremely detailed study carried out by Virirakis[1] of the Athens Institute of Ekistics, shows, for example, that the city of Athens, that presents the features of a natural city, has a functional structure based on 5 levels of hierarchical organisation.

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1. Virirakis, J. 1971: *"Population Density as a Determinant of Residents' Use of Local Centres"*, Ekistics 187, June; and Virirakis, J. 1972: *"The minimization of energy as Determinant of the Grouping of Community Facilities"*, Ekistics 199, June.

Such curious, complex and quantitatively rigorous organisation has a precise purpose: *to allow all the necessary contacts, minimising the distance to cover*. This minimisation deeply regulates the city in detail organisation. And this is perfectly efficient and effective. If all the services where concentrated in the centre, as many urbanists have dreamt of, the total distance covered by the citizens to use them, would be about 6 times as much as required by the above described hierarchical organisation. If, on the contrary, services would be casually distributed, as it seems to be in an *artificial* town as Brasilia, the total distance would be 17 times as much as in a natural, but unexpectedly well organised, town as Athens!

As far as the other requirement is concerned, i.e. transportation means joining any two points of the town in less than one hour, and the centre to any other point in less than half an hour, this is partly connected to the first one.
The key problem of big towns and above all of the growing ones is mobility, and any city planning has, first of all, to design an efficient and effective transport network.

As underlined in Prof. Marchetti work for the EU[1] on the impact of *Maglev*, such revolutionary technology does have, for example, the potential to solve the problem of transport (of men and materials) for a city as big as 100 million people on an indicative area of 3.000 kmð. (The cities of

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1.
Marchetti, C. 1994: *"Mobility: on potential and effects of introducing Maglevs in the European transport system"* draft final report to Commission of European Communities - Joint Research Centre, Institute for Prospective Technological Studies, I-21020 Ispra (Varese), on Contract N.5374-93-07 ED ISP A.

Tokyo-Osaka are actually approaching this figures, together with Mexico City, with 50 Millions of people).

The unsustainability of cities is mainly due to unsolved or partly solved traffic problems. If every agora of the above described natural city had a stop of a very fast metro/train (for example based on the Maglev technology), any point of the town could easily be reached in few minutes from any quarter.

In fact, through a "*hub&spokes*" transport system (i.e. a point playing the role of the hub, with several spokes leaving from that in every direction), with small and very frequent trains, it could be possible to reach any part of the city changing only once and covering the longest distances in few minutes. Therefore the Maglev technology, or a likely one, could not only compete with airlines on medium distances (500-600 km), but also be applied both within a city and connecting cities with airports in order to ensure the international connections of the agora city.

The study will also have to take into consideration the other city *sub-systems* that have to be optimised in order to make cities sustainable, such as power supply, heating system, communication and tele-information systems, information services to citizens, water consumption (that has to be recycled), sewage system, but also the aesthetic messages that make them psychologically sustainable.

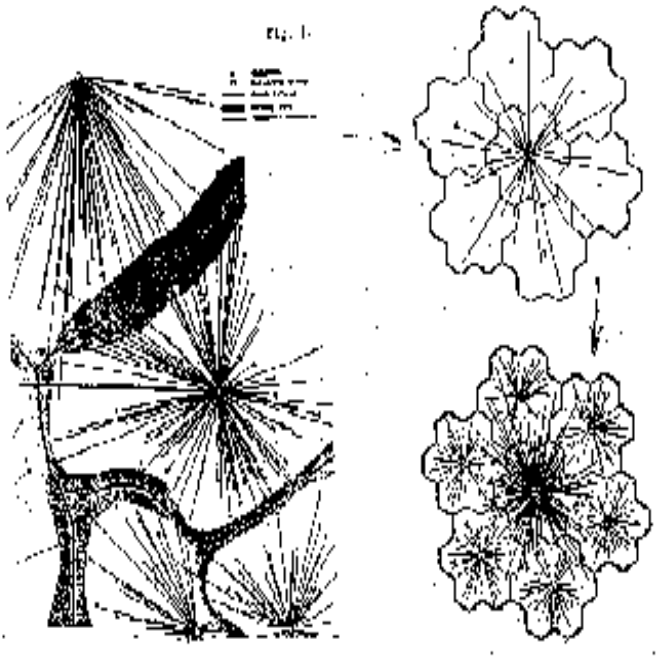
A sustainable city will therefore minimise chemical, acoustic and aesthetic pollution. Solid waste could be for example containerised and then transported out of the city (where they will be recycled, reprocessed and disposed of) through the general transport system. The heating system will have to

ensure a thermal management of town that minimises the need of combustion, e.g. improving and implementing a widespread design of buildings able to minimise energy consumption and exploit the solar energy. All the citizens will have access to a sophisticated and effective information service, performed by local administrations, and so on. All of these aspects will be therefore analysed and integrated in the general plan of the city to be designed, always referring to available and envisageable technological solutions.

Figure 1:

The structure of the organisation of the services of a town is of a fractal nature, as Virirakis has quantitatively identified. The unit is the quarter, whose limits are defined where people do their daily purchases. Quarters are then organised on bundles of seven, where the central one presents the services that are more rarely used, let's say weekly. Such bundle is the building element of another bundle of seven, with a higher hierarchical level, and so on. Such services hierarchization minimises the time that the population of the city need to have access to all the services as a whole.

(Source:Virirakis, J. 1972: "The minimization of energy as Determinant of the Grouping of Community Facilities", Ekistics 199, June)



Particular objectives of the study

Particular objectives of the study will be:

1. to show the desirability of the above mentioned "fractal city" scenario, calling urban designers together with other scientists and researchers to develop their own interpretation of a new "agora city";
2. to identify the "challenges" related to such a scenario and specify the actual problems that will be solved by the study, developing and comparing different solutions, referring both to space organisation/hierarchization and to new technologies;
3. to draw the functional and engineering structure of the "fractal city", by making use of new technologies: i.e. the fractal structure of cities will be determined by new technologies;
4. to show the applicability of the scenario to existing cities, also drawing the transition phases that will be needed in order to reach the desired scenario;
5. to examine the portfolio of ideas and solutions applying it to at least two concrete case-studies (a case-study will be the city of Milan, the other one could be the city of Paris: the

most interesting case to examine will be selected during the study);

6. to simulate, through the use of city modelling, the transition to the scenario for each of the above mentioned case-studies;
7. to simulate the situations of each of the test cities when the desired scenario will be achieved;
8. to provide, as a result of the study, a general scheme that will be applicable to any city;
9. to provide the results of the study in a form that may concretely help policy makers to take actions to move to the desired scenario.

Therefore the study will ultimately:

- pell out in detail the characteristics of a "fractal city", i.e. of a human centred, sustainable city (e.g.: as already partly pointed out, a city that ensures the availability of all the services needed by a citizen minimising the distance he has to cover, that ensures a more human dimension promoting social relationships, solidarity at a "village" level, no matter the size of the city, and so on);
- identify the specific challenges which are considered to be priority targets for actions to

implement the scenario (e.g. the hierarchization of the city organisation through the availability of different services at any bundles level, a transport systems ensuring the desired mobility of citizens within precise time limits, and so on);

- define in detail the problems to be solved and the ways in which to select the best approach among the different potential solutions (e.g.: the use of different technology options, from the Maglev to air-shuttles, from a cabling of cities to ensure telematic services available in every block/quarter to the problem of water recycling and waste treatment according to existing situations and to the necessary transition phases to achieve the desired scenario, and so on).

METHODOLOGY

The proposed study foresees five phases:

u) First phase

The objective of this phase is the definition of the "natural city" scenario.

All the characteristics of the natural city will be pointed out, comparing different options under the perspective of the anthropological requirements that make of a city a desirable one.

For this phase, where also sociological aspects are to be considered, it is mainly required the expertise of a urban scientist and designer.

The opinion of other experts will be requested, through interviews to other urbanists, urban architects, sociologists, anthropologists, in order to compare different approaches and cultural viewpoints.

v) Second phase

The objective of the second phase is to elaborate a first description of the most relevant challenges connected to the designed scenario.

Different concepts will be developed in order to increase the portfolio of options that can contribute to the realisation of a human centred city. Ideas of solutions already attempted or proposed by cities will be analysed. All the technological aspects related to such different options will also have to be drawn.

In this phase, together with the contribution of the urban scientist, the involvement of engineers and of an information scientist will be required, in order to draw all the technological aspects related to the analysed options.

At the end of the phase, a ***"first progress report"*** will be produced.

w) Third phase

In this phase, conceptual developments and description of new ideas and solutions that could respond to the challenges will be carried out. All the proposed solutions will be compared in order to revise the challenges, pointing out the answers that are considered to be as the most effective and efficient, in order to respect the principles of a human centred city.

At the end of this stage, the functional and engineering structure of the natural city will be designed, also taking into account the best technological solutions applicable in order to achieve the desired scenario.

It is particularly important at the end of this phase to show the applicability of the scenario that is being drawn to existing city, also identifying and describing the transition phases that will be needed in order to transform any city into a natural city.

In this phase, together with the contribution of the urban scientist, the involvement of an energetic expert, of engineers and of an information scientist will be required.

x) Fourth phase

The chosen portfolio of ideas and solution will be in this phase applied to, at least, two concrete case-studies.

Existing mathematical models (developed by Virirakis at the institute of Ekistics for the analysis of the town of Athens, whose availability is already ensured) will be adapted and used. It is important to underline that the availability of the mathematical models for the simulation allows to remarkably

reduce the costs of the study. An appropriate software will be developed, in order to simulate the transition of the test-cities towards the desired scenario and the situation in this cities once they have achieved the agora status.

From the test-model carried out on the sample-cities it will be possible to infer results that will provide general enough information as to be applicable to any other city. A general scheme will be therefore designed that will be suitable to any situation.

Also in this phase, the contributions of the urban scientist, of engineers and of an information scientist will be required.

The results of the city modelling conducted on the sample cities will be described in detail in a ***"second progress report"***, including the description of the conceptual development and description of the new ideas and solutions applied in the model. The general scheme, that will allow to extend the results of the test to any other city, will also be provided.

y) Fifth phase

In this last phase the terms of reference of the natural city scenario will be drawn, providing all the interested parties with:

- a detailed description of the characteristics of the desired scenario of a human centred city;
- the chosen technological solutions that will have to be implemented in order to reach the natural city scenario;

- the program of action necessary in order to ensure the transition from a present situation to the ideal one;
- indications on how to implement the proposed solutions in a typical city environment
- a training course (one man-month) on the use of the developed simulation code, addressed to Commission experts as well as other interested parties (city authorities' technical consultants, urban designers and so on).

The results of the study will be provided in a "final report", in a form that may concretely help policy-makers to take actions in order to move towards the desired scenario. Our proposal is to include all the results of the study in a CD-ROM, with an information retrieval system allowing a user-friendly guided research to all the subjects of the study. Therefore, all the data, the pictures, the software developed (provided the respect of copy-rights) will be available in an easy-to-diffuse, user-friendly form. The mastering of CD-ROMs will be possible thank to the participation of CNR-Siam, which is endowed with all the necessary facilities.

We wish to underline the extreme importance of the divulgation of such a study, together with the raise of an interactive debate on this subject, in order to give a concrete following to the analysis carried out and to realise important changes in concrete urban situations towards more liveable environments. This is the reason why a training course on the results of the study as well as on the use of the software is considered to be of primary importance. Again, the participation of CNR-Siam

ensures the availability of conference rooms and all the electronic facilities (mainframe and PCs) necessary for such action.
All the experts involved in the study will contribute to this last phase.

ACT-VILL - Development of new "urban concepts" integrating technologies and verifications of their applicabilityto certain given urban situations

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"SUSTAINABLE URBAN LANDSCAPE"

The visual quality of urban landscape: analysis and evaluation tools, regulatory

PROBLEM IDENTIFICATION

Several environmental factors concerning life in the cities can be measured with scientific criteria (e.g., pollution): on the contrary, the sector of visual quality of urban landscape, even if it is the historical and psychological scenario where we live every day, is still largely unexplored.

Nobody can say with sufficient objectivity why a certain part of town looks to him as nice or ugly or how can it acceptably change, not even its administrator who must examine and decide upon projects that will modify the appearance of the city (roads, buildings, industries, green, etc.).

Landscape is part of the more general cathegories of territory and environment, with its own peculiarity, and an information "container" with well defined boundaries (the visual and "a/cultural" approach) that allow us to develop an analysis of this theme neither indefinite nor infinite; this often happens when for one landscape environmental, ecological, historical, socio-economic data etc. are added together, determining a bottomless pit of unhyerarchical information that can bring to a substantial managerial and legal failure the territorial planning of the area.

This mention of territorial planning is not casual: in fact, although urban planning often saw landscape as a desert, to be reclaimed through "development", the need to look to the landscape with different eyes and to try and find its possible objectivity is now emerging from the evolution of the methodological criteria of territorial planning itself.

In other words, the trend towards considering (out of necessity) the whole territory as the object of urban planning has consolidated, where environment in its broadest meaning (including landscape) is not considered an optional accessory deriving from socio-economic considerations as much as becoming the basic structure for determining land use choices.

This is what "sustainable development" means, but the search for the limit of this sustainability is all but easy to determine; and, coming to our specific theme, what is a "sustainable landscape"?
Moreover, shouldn't we determine the starting point (the "real landscape") first?
Recording the "real landscape", then, in order to identify (or at least think about) the "sustainable landscape".

OBJECTIVES OF THE STUDY

Just like regulations already ruling environmental or economic aspects interacting with city life, this study intends to explore the sector of visual perception of urban landscape, in order to derive sufficiently clear control rules for the urban landscape itself, even if the number of variables includes also aspects of the dynamic fields of subjectivity and culture.

CHOICE OF A SAMPLE: THE CITY OF PADOVA

The urban features of the current city of Padova are very similar to those of many other European cities.

The city, originally grown inside its Roman walls and subsequently contained by a new fortified wall built in the XVI century, underwent a rapid development that brought with it uncontrolled building activities along the main axes (North-South and East-West).
This uncontrolled development was not rationally governed by local administrators, and in the years 1950-1980 the historical city centre was progressively abandoned by residential citizens, who moved to boroughs that were often very poorly serviced; this, in turn, generated dissatisfied expectations and the perception of a low quality of life.

STUDY METHODOLOGY

Part 1 - Methodological and analytical aspects of urban landscape

The work team will apply a methodology recently developed for a study, ordered by Region Friuli - Venezia Giulia, concerning the whole range of regional landscapes; this methodology will be appropriately adapted to the specific problems and peculiarities of the city and boroughs of Padova. This part will be further divided in two phases:

- Phase 1.1: survey of existing literature on the subject, both from a general and methodological point of view and in particular about Padova;
- Phase 1.2: systematical field analysis trying to identify the prevailing and characterizing elements in the Padova urban landscape and in the boroughs surrounding it;

In particular, these elements will fall in three general cathegories:

1. mainly natural components: e.g.,

   geomorphology
   hydrography
   vegetable cover
   avifauna

2. mainly anthropic components: e.g.,

   architecture and housebuilding (with a great many subdivisions)
   infrastructures
   cultivations

3. mainly cultural components: e.g.,

   art and literature
   tourism
   local traditions
   ideology
   dominant opinions
   "insider" vs. "outsider" opinions

In particular, this systematic analysis will imply the need of a campaign of interviews and opinion polls on the degree of approval and visual fruition of urban landscape and of the corresponding motives.

This part of the study will be developed through:

z) an exploration survey of the degree of satisfaction/dissatisfaction with natural and anthropic elements characterizing the urban landscape; the description of ideal elements for its composition, the symbolic and cultural meanings representing landscape quality.

The survey will consist of interviews to "focus groups", i.e. to samples of citizens identified in accordance to anagraphical/residential criteria: age, sex, education, residential area (centre vs. suburbs). The number of components of each group will vary between 10 and 12. In order to enhance similarities among the members of each group and to maximize its contribution to the goal, the interviewees will be divided in groups that will be homogeneous by sex and age.

This survey will thus allow to:

1. define landscape quality in terms of the gap between citizens' expectations and perceived situation;
2. identify "key elements" representing factors of quality in the citizens' expectations;
3. identify a survey tool to use on a wider sample in order to obtain more complete information on the quality of landscape.

aa) the preparation of a survey tool to use on a wider sample, with the objective of understanding on the one hand the expectations and perceptions of citizens, and on the other how these are perceived by people having the instruments (the technicians) or the power (the politicians and administrators) to intervene on the landscape.

ab) the use of these tools on the three cathegories, in order to understand the gap in visual quality of landscape:

- as expected and perceived by the citizens;
- as expected by the citizens and perceived by the technicians and administrators;
- as perceived by the technicians and administrators and influenced by actual factors.

ac) the identification of new objectives for a visual quality of urban landscape, of elements characterizing these objectives and of the obstacles to be overcome for their achievement.

Taking in consideration all the elements and their interrelations, the study will also identify "key views" and situations of intervisibility.

Upon conclusion of the field analysis of the elements constituting the urban landscape, the city

territory will be divided in areas having the following denominations:

- General Landscape Types (e.g.: historical city, contemporary city, industrial area, rural landscape, etc.);
- Landscape Units, belonging to the above listed types;
- Landscape Sub-areas, belonging to the "Units";
- Borderline Areas, having mixed characteristics.

Data collected will be visualized on a cartographic base (1:5.000 scale) and through photographies and videorecordings.

Part 2 - Evaluation of visual quality aspects of urban landscape

The purpose of the second part of the study is to establish a scale of values in the urban landscape, as objective as possible, although this objectivity varies with the type of elements under evaluation (e.g., the objectivity of natural components of landscape is higher than that of cultural components).

This part will be divided in 5 phases:

- Phase 2.1: identification of three cathegories of landscape elements:
  - sensitive elements, to be protected and valorized;

- depreciating elements, to be contained and/or eliminated;
- potential elements, i.e. to be implemented in order to increase the value of the "urban scene".

- Phase 2.2: determination of the influence of the visual quality of an area on another (e.g., near suburbs/city centre)

- Phase 2.3: comprehensive and synthetic evaluation of the quality of landscape by Units and Sub-areas;

In particular:
- determination of a "scale of landscape complexity" of the Units (e.g., an industrial area is simpler than an area where historical and modern architecture are both present);
- determination of a "scale of sensitivity" of the Units;
- determination of a "scale of compromission" of the Units.

At the same time, the degree of objectivity and of modifiability of the same elements will be determined.

- Phase 2.4: quantitative and qualitative determination of "indicators" of the landscape value of an area;

For instance:

- presence of depreciating elements;
- presence of mass tourism;
- presence of infrastructures;
- stability in the foreseeable evolution of landscape.

- Phase 2.5: quantitative and qualitative determination of "thresholds" finalized to the conservation (or to the "visual elimination") of characterizing landscape elements;

Comparison and connection of the study with city plans currently in force or being approved (town-planning scheme, actuation plans, etc.) will also be pursued.

Part 3 - Evaluation of visual quality aspects of urban landscape

The purpose of the third part of the study is to identify decision and control tools that can be used by local administrators and citizens alike.
The phases of the third part will include:

- Phase 3.1: examination, from the point of view of this study, of the Housebuilding

Regulation currently in force;

- Phase 3.2: preparation of a regulatory approach to be eventually used in proposing modifications to the Town-planning Scheme in accordance with the results of this study;
- Phase 3.3: redefinition of the boundaries of the areas protected by Law N. 1497/39 included in the municipal territory;
- Phase 3.4: preparation of several practical rules and criteria to be followed when submitting projects (e.g., protection of sensitive landscape elements, reduction of depreciating elements);
- Phase 3.5: definition of the informatical functions and support technologies needed to test the feasibility of a prototype of a management system.

The purpose of this phase is to give a "sustainable landscape management system" to the decision makers, i.e. to identify a set of resources of several types:

- organizational (which administrative procedures and which professional abilities should be available);

- instrumental (mainly informatical, telematical and multimedial)
- economic (budget estimate for realization and standardization).

This system should become as objective a tool as possible in terms of:

- structured knowledge of landscape;
- assessment of the state of the landscape;
- evaluation of impacts on landscape;

and as functional as possible in terms of:

- producing correct analyses and syntheses;
- simulating correct results;
- suitability for defining alternative hypotheses;

in order to reach its maximum communication potential both towards technicians and towards decision makers and the general public.

FINAL CONSIDERATIONS

The complete study will serve as a model for other cities in similar landscape situations; in any case, the methodology developed and its application will hold true in general and reply to the needs illustrated in the tender documents.

EXAMPLE OF A SCHEME FOR THE SURVEY OF PREVAILING AND CHARACTERIZING ELEMENTS OF URBAN LANDSCAPE

MORPHOLOGICAL AND VEGETATIONAL CHARACTERS

Land morphology:

- Plain
- Hill
- Highland

Vegetation:

- Public gardens
- Lines of trees and/or public ornamental vegetation
- Punctual and/or private vegetation and/or kitchen-gardens
- Cultivations
- Natural extended areas and/or parks

BUILDINGS

Historical and cultural identification:

- Rural
- Historical styles (specify)
- Thirties, contemporary

Socio-economic identification:

- Upper class

Middle class
Low class

Ground floors:

Dominance of original doors (even with shops)
Dominance of shops (substituting the original type)
Change of ground level

Heights (excluding garrets):

Up to three floors above ground
Four or five floors above ground
Six floors above ground and more

Building type:

Compact streetfront, with inner court
Rowhouse
Condominium
Mansion
Villa
One / Two family house

Roof cover:

Pitched - pantiled
Level

Position in respect of the road:

At road's edge
At a distance from the road, in the center of the lot

Building density:

- Low
- Average
- High

Fa‡ade finishing:

- Stone
- Plaster
- Decorations
- Prevailing colour: .....

Presence of characterizing monumental buildings

ROADS AND SQUARES

Road visual:

- Open towards the hills
- Closed in the town
- Oriented towards monuments or representative buildings

Presence of signals and/or advertising:

- Yes/No

Road network type:

- Main road + secondary roads
- Mainly undifferentiated network
- Long and regular straight lines
- Curved, irregular, narrow streets
- Roads lined with high walls

Roads lined with buildings
Roads lined with low walls or fences
Urban flow axes
Provincial or state roads

Traffic:

Continuous
Cyclical
Sporadic
Continuous rows of parked cars

Pedestrians:

Constant presence
Sporadic presence

Square:

Designed
Resulting (casual)
Containing elements of visual attraction

DETRACTING ELEMENTS

Opposition between:

Terrain morphology / Building type
Cars / Pedestrians ("Wild" parking)

Ancient / Modern
Order / Disorder
Dimensional relationships among buildings
Residence / Lack of vegetation
Residence / Production activities
Residence / Infrastructure
Urban characters in general / Street furniture
Lack of an urban "design"

Single detracting elements:

Buildings
Abandonment
Litter, in general
.....

SOGESCA S.r.l.

Società Generale di Engineering
per lo Sviluppo Compatibile con l'Ambiente

Societary form:Limited liability company

Date of establishment:July 31, 1986
Capital:180.000.000 Lire
VAT code:IT 02110860281
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Court Register number:27244
Premises:35128 Padova, via Turazza, 28/9
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WHAT IS SOGESCA

SOGESCA Ltd. is a leader company in the sector of environmental and innovation services, both on a national and an international scale, active since 1986.
SOGESCA's staff is able to cope with an integrated management of environmental problems and it is complemented by several external experts.
The company is part of several Italian and European networks for the dissemination of information and for the development of studies and projects.
In particular, **SOGESCA** can boast a vast experience in Environmental Impact Assessment and EcoManagement and Audit; it coordinated a "Pilot training project" in support of the EC EMAS scheme that was promoted by the Venetian Chambers of Commerce and cofinanced by the LIFE Programme of the European Commission.
As to territorial analysis and planning, **SOGESCA** counts among its most significant experiences the collaboration given to the Regional Government of Veneto in preparing the new Regional Plan for

Reduction and Disposal of Special Wastes; in the field of risk management **SOGESCA** coordinated a project cofinanced by the ENVIRONMENT Programme of the EC for the study of an integrated information system for industrial risk management at regional/subregional scale, with the participation of universities and private companies from Italy, France and Spain.
SOGESCA holds consolidated international relationships in France, Greece, Hungary, Spain, Germany and the United Kingdom and is present, through its correspondents, on other main markets in the European Union and out of it.
ORGANIZATIONAL DEVELOPMENT

- EcoManagement and Audit
- Quality Management Systems
- Industrial Health and Safety
- Consultancy on legislation (Environment, Health and Safety, Energy)

The Council Regulation (EEC) No. 1836/93 “allowing voluntary participation by companies in the industrial sector in a Community eco-management and audit scheme” - that in any case implies the compliance with laws in force - and the EN 29000 standards on Quality Systems draw new frontiers for industrial competitivity and sustainable development.
The Italian Legislative Decree No. 626/94, regarding the improvement of workers’ health and safety on the workplace, forces companies to formally manage the risks for workers caused by production processes.
SOGESCA, having an experience on EcoManagement that is unique in Europe and availing itself of the help of some of the best qualified Italian experts of Quality and Safety, gives assistance on all environmental and managerial aspects, from the perplexing depths of legal counseling to the top organ-

izational qualification, up to risk evaluation and to preparation for environmental and quality certification.

SUPPORT TO INNOVATION

- Assistance to R&D
- Consultancy for submission of projects to prospective financial sources
- Technology Transfer

SOGESCA coordinates several projects cofinanced by the EC; currently, they refer mainly to the LIFE and ENVIRONMENT Programmes.
The experience developed allows us to activate services for all R&D and demonstration financing programmes, also at national and regional level.
The role of SOGESCA can range from a consultancy in the writing and submission of forms to the complete (scientific and technical) management of the projects, including the eventual search and acquisition of international partners and technologies needed for a more efficient work.

TERRITORIAL AND ENVIRONMENTAL
ANALYSIS AND PLANNING

- Landscape and town planning analysis
- Territorial risk analysis
- Localization of activities having strong environmental impact

- Territorial, sectoral and town planning
- Design of Environmental and Territorial Information Systems

Planning aspects, besides being a natural part of Public Administration duties, keep gaining more and more importance in the definition of corporate strategies for the private companies.
A thorough knowledge, organization and analysis of environmental and territorial data, through Information Systems and more traditional tools, becomes an asset and constitutes a unique support to decision making.
SOGESCA contains a Territorial Unit having vast competence also on GIS (Geographical Information Systems), and it developed high level expertise in strategic planning, both for private companies and for public planning boards.
SOGESCA can boast abilities ranging from initial general analysis to the preparation of a detailed methodology, to data aggregation and preparation of support material (specialized maps, data banks, etc.)

THE TOOLS

- Law updating
- Databank connection
- International network of connected companies
- Remote sensing and thematic cartography
- Environmental quality and sensitivity indices

- Use of simulation models
- Permanent cooperation with sectoral specialists.

MAIN REFERENCES

1988

“Feasibility study on the realization of a platform for hazardous waste treatment and by-product recovery” - Customer: ITAXambiente (Milano)

“Study about cleaner technologies in leather and hide industry” - Customer: Centro Studi “L’Uomo e l’Ambiente” for Concia Srl

1989

“Environment as a Resource: a Technological Reply” congress, in the framework of the “Novoe Pererabotke Othodov” international fair, Moscow - Customer: Centro Studi “L’Uomo e l’Ambiente” for IPES Srl

“Noise, vibrations and radiations in the urban environment: technical, sanitary and legal aspects” refresher seminar for environmental operators, Vicenza - Customer: Centro Studi “L’Uomo e l’Ambiente” for the Municipality of Vicenza

1990

“Perspectives of biotechnologies in the agroindustrial system” - Customer: ESAV (Venezia)

“Environmental impact study on the enlargement of the Cartiera del Timavo e del Sole paper mill at Duino” - Customer: CMS ASSOCIATI (Trieste)

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Cartiera del Timavo e del Sole paper mill at Duino" - Customer: Cartiera del Timavo e del Sole paper mill, Duino (Trieste)
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1991
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"Project for the readjustment of the tanks and additive storage area" - Customer: Cartiera del Timavo e del Sole paper mill, Duino (Trieste)
"Waste tyres disposal: prefeasibility project" - Customer: CeRFAA, Mestre (Venezia)
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Training course concerning chemical risk and potential emergency situations for the staff of the Cartiere Timavo e Sole paper mill at Duino. - Customer: Cartiere Burgo paper mills (Torino)
"Preliminary environmental impact study on the MSW treatment and disposal plant of the Consorzio per l'Igiene dell'Ambiente e del Territorio of the municipalities neighbouring Vicenza (Vicenza 1 Basin)" - Customer: Centro Studi "L'Uomo e l'Ambiente" for the Municipality of Vicenza

1992
Technical and scientific coordination for writing the "Development of a treatment and valorization system for polluted sediments of river and lagoon origin" project - Customer: Consorzio Venezia Disinquinamento (Venezia)
Technical and scientific contribution to the "Multicriteria comparative evaluation for the identification of preferred sites for the construction of the MSW disposal plant in the Province of Vicenza". - Customer: Consorzio per l'igiene dell'ambiente e del territorio (C.I.A.T.)
Technical and scientific coordination for writing and carrying out the "Feasibility of an integrated in-

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Technical and scientific coordination in the “Environmental impact evaluation concerning the relocation of the production activities of FT Finissaggio e Tintoria company”. - Customer: Veneto Progetti Scarl (Conegliano)
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1993
Scientific supervision in the planning of the “EcoTekhItalia’93” international fair (preliminary questionnaire, scientific revision of the “Report on the state of environment in the Russian Federation”, participation to the preparation meetings). - Customer: MilanFair Overseas Exhibitions (Milano)
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Environmental risk assessment project for landfills of the Consortium - Customer: Consorzio Fognature Industriali e Civili (Arzignano)
Consultancy in the scientific organization of the “Mediterranean as a resource” congress in the TERRA ’94 international fair - Customer: Fiera del Levante (Bari)
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1995
Technical and scientific coordination for writing the “Modification and substitution of varnishes used by wooden furniture industry and setting-up of their application techniques to reduce air pollution by volatile organic compounds” project. - Customer: Region of Veneto
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Spinea (Venice) - Customer: ECOVENETA SpA (Vicenza)
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Preparation of the "Steel Research (new technologies, new materials, new productive processes)" report - Customer: European Parliament (Luxembourg)
Techical and scientific assistance in reference to major industrial hazards and to emissions in the atmosphere - Customer: Chemical Pan (Bari)
"Consultancy in the information, training and support activities of the Province concerning European environmental financing programmes" - Customer: Province of Genoa
Assistance in writing the technical documents and budget for surveys on the abusive landfill in Campalto (Venice) - Customer: CO.VE.CO. (Venice)
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"GRANDS-ENSEMBLES" et DIVERSITE URBAINE

Jean Msika

1- LE CONSTAT

1. 1

Devant l'aggravation constante de l'exclusion et des tensions sociales et ethniques dans les cités H.L.M., les déséquilibres s'y approfondissent: les remodelages de façades et de "mobilier urbain", les réhabilitations d'entrées d'immeubles et de cages d'escaliers et le saupoudrage de mesures sociales, certes nécessaires pour le court terme, ne suffisent pas à assurer une évolution favorable de ces "grands ensembles".

L'évolution des Grands-ensembles: une longue histoire d'échec

Déjà, en 1977, les auteurs du cahier 45 de l'IAURIF[1] "Vivre dans les grands ensembles" s'interrogeaient sur l'avenir de ces quartiers en difficulté et préconisaient des *"actions rapides et globales"*.

Depuis, après 18 ans d'échec et d'atermoiements, les déséquilibres s'y sont approfondis: on ne peut que constater *"l'essoufflement de la politique de la ville"* (Le Monde du 6/1/94) et aux dernières élections municipales, le progrès inquiétant de l'intolérance dans le tissu pavillonnaire mitoyen de ces quartiers.

Persan mure les caves de sa cité H.L.M., alors que d' autres municipalités misent sur la dédensification (implosions médiatisées de tours et de barres) et le développement systématique des lotissements pour cadres.

Tel architecte propose de redensifier en édifiant des barres "très modelées" de 4 à 5 étages devant les barres existantes, ce qui provoque une levée de boucliers bien compréhensible lors d'une rencontre avec les habitants de la Caravelle à Villeneuve la Garenne.
Le projet d'évolution (diversification fonctionnelle, restructuration de l'espace public...) du quartier "Democratie" de Venissieux (69) a du être abandonné et les dix tours de logements y ont été implosées, avec retour à la "table rase".
Les "zones de développement économique" que la D.I.V. souhaitait associer aux "quartiers en difficulté" (entretien avec Mr. Francis Idrac, Délégué Interministériel à la Ville, publié par "Le Moniteur" du 25/2/94) ont bien du mal à voir le jour, les investisseurs étant évidemment réticents à s'engager dans des projets qui ne pourraient qu'aggraver les enclavements. Les fameux "Grands Projets Urbains" sont donc dans une impasse quasi totale.
Certaines tentatives de mutations ont eu lieu: elles ont le plus souvent abouti à des échecs car, trop timides, elles ne procédaient pas d'une démarche d'ensemble prenant en compte toutes les dimensions de la Cité.

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1. Institut d'Aménagement et d'Urbanisme de l a Région Ile de France

"*L'absence de projet urbain global sur le quartier a cristallisé le débat sur quelques îlots, ce qui n'a pas aidé les locataires concernés à dépasser le champ de leur quotidien.*"
Les Obstacles aux Mutations Urbaines des Grands Ensembles, Analyse de six opérations en Ile de France, Conseil Régional d'Ile de France, mars 1993.
Tous ces échecs, ces approximations, l'enlisement de la Politique de la Ville ne seraient ils pas liés à l'absence d'une base méthodologique et d'outils appropriés à la complexité du phénomène urbain?

1. 2

La "dédensification" en cours, avec ses implosions médiatisées de tours et de barres, et son retour à la table rase, n'est pas acceptable car, en s'attaquant à un patrimoine de logements déjà amortis, elle réduit les chances des sans-abri de retrouver un logement compatible avec leurs ressources.

1. 3

Parallèlement, la généralisation (même en zones inondables!...) des lotissements pavillonnaires (second volet de la politique de "dédensification") nous propose la disparition de la Ville-lieu convivial d'échange et de culture, pérennise les ségrégations sociales et compromet l'environnement par une dépendance totale à la voiture particulière, génératrice de pollution: voici la "Ville-étalée", qui nous offre l'isolement au bout d'un immense échangeur, avec bretelles sur l'Hypermarché et sur la "Zone d'activités"...

1. 4

La dérive persistante des cités-dortoir et la forte tendance à la dédensification, solution démagogique, menacent à terme la cohésion de la société, et annoncent une explosion de l'insécurité et de la criminalité que de simples mesures sécuritaires et répressives seront impuissantes à endiguer (voir la MEGA-SUBURBIA en armes et les villes - ghettos en ruine d'outre Atlantique...)

2 - LES CAUSES

2. 1

La Charte d'Athènes proposait de séparer les zones d'habitation des zones de travail systématiquement considérées comme génératrices d'insalubrité. Pourtant, la plupart des activités n'occasionnent pas de nuisances ingérables, et pourraient donc figurer en milieu urbain mixte: le zonage entraînant des migrations quotidiennes massives, la pollution atmosphérique occasionnée par la circulation automobile a largement remplacé les rejets des cheminées d'usines. Le zonage a donc **éliminé la diversité** urbaine tout en menaçant davantage la qualité de l'air.

Caractéristiques des "grands ensembles" issus de la charte d'athènes

La charte d'Athènes a servi de modèle pour d'innombrables "grands ensembles" à la périphérie des villes d'Europe .

Cette Charte préconisait une ségrégation des fonctions,

"*Nous allons séparer les zones de travail des zones d'habitation*", ...

Marcel Lods, "Comment devrait être conçue la ville de demain,"

Encyclopédie Pratique de la Construction et du Bâtiment, Paris 1968.
un espace public à l'échelle exclusive des automobiles,

> "*Les distances entre les croisements de rues sont trop* faibles....Les croisements de rues actuels, situés à 100, 50, 20 ou même 10 mètres de distance les uns des autres ne conviennent pas à la bonne marche des véhicules mécaniques. *Des espaces de 200 à 400 mètres devraient les séparer*".
> Le Corbusier, La Charte d'Athènes.

elle excluait l'imbrication de l'ancien et du nouveau en préconisant la table rase,

> "*Penser qu'on puisse se tirer d'affaire à l'aide de "rattrapage" est pure lillusion L'arrangement des villes anciennes est un leurre*".
> Marcel Lods.

et proposait la vision idyllique d'une ville dédensifiée : la disparition de la rue ou de tout espace public défini au profit d'un parc verdoyant.

> "*Autour de pelouses vertes, des immeubles largement espacés permettront aux gens de jouir d'une large vue. Il n'existera au pied des maisons que des lieux de promenade silencieux et calmes. Il sera prévu les terrains nécessaires aux jeux des enfants... aux*

promenades des adultes, à celles des vieillards..."
Marcel Lods.

Effectivement, les "grands ensembles" se présentent comme des ghettos résidentiels dont les habitants sont contraints à des migrations quotidiennes. Le monofonctionnalisme des quartiers et la destructuration de l'espace public (le plus souvent le parc idyllique s'est transformé en parking menaçant) y ont engendré des problèmes sérieux (déséquilibre habitat-emploi, ségrégation sociale, insécurité, vandalisme, etc.).

2. 2

Lors de la construction des "grands ensembles", l'application des principes de la Charte d'Athènes, l'urgence et la recherche d'une efficacité monocritère ont conduit à concentrer, en marge de l'urbain, des logements d'un type unique (collectif locatif social..) dans des quartiers à **fonction unique et immuable** ("vocation sociale"...). Ces quartiers sont privés de diversité et donc de toute possibilité d'évolution, de croissance ou d'adaptation. Or, la diversité (diversité sociale et fonctionnelle, diversité des parcours, des sensations, des occupations, des relations, des possibilités...) caractérise les quartiers de ville équilibrés et vivants, sociologiquement viables, qui sont le plus souvent relativement denses.

2. 3

La densité **n'est donc pas** une cause de déséquilibre, mais bien plutôt une des conditions de la diversité urbaine:; si une certaine densification des "grands ensembles" monofonctionnels est l'occasion d'y introduire une véritable diversité et d'y reconstituer un tissu urbain afin d'en faire des

"morceaux de ville" désenclavés, équilibrés, revalorisés et viables pour le long terme, la révision des C.O.S. semble devoir être sérieusement envisagée.

La dédensification est-elle vraiment la panacée?

La densité est elle vraiment la cause des déséquilibres et n'est-elle pas plutôt une des conditions de la diversité urbaine?

Densification et échelle

Une certaine densification par apport d'un "socle" de bâtiments à hauteur limitée (R+1 ou 2), en complément aux tours et barres (abruptes et massives) va-t-elle modifier la densité perçue par le piéton, acteur de la ville, rétablir une échelle plus "humaine", un rapport différent avec le bâti, par l'apport de volumes moins écrasants s'interposant visuellement et favorisant l'orientation et l'appropriation (réseau de rues, ruelles, places et placettes...)? Peut-on ainsi obtenir, par une certaine densification réelle (apport de m2 construits) une diminution de la densité perçue?

Densification et variété

La perception négative de la densité est-elle liée à l'absence de variété?

Cette perception sera -t-elle améliorée par l'apport à cette cité dortoir d'un bâti supplémentaire abritant des fonctions complémentaires favorisant:
- un équilibre habitat-emploi
- une certaine mixité sociale
- la fixation de commerces en relation directe avec l'espace public, commerces qui bénéficieront de clientèles complémentaires?

Dans son ouvrage "The Death and Life of great American Cities", Jane Jacobs procède à une analyse fine des mécanismes sociologiques, économiques et culturels de la ville. Elle a défini quatre conditions de la diversité urbaine:

a/ Polyfonctionnalité diffuse des quartiers de ville, de nature à garantir une animation à toute heure par des usagers présents pour des raisons diverses (habitation, travail, commerces, culture, loisirs...) et donc la fixation d'un commerce de proximité qui sécurisera à son tour l'espace public.

b/ Les pâtés de maisons doivent être de dimension limitée pour offrir des **parcours urbains variés**, favorisant les échanges, la communication.

c/ Les quartiers doivent inclure des bâtiments **anciens et nouveaux** dans une imbrication étroite pour une réelle mixité sociale.

d/ Une **densité** suffisante est nécessaire à travers **toutes les fonctions**.

Il est intéressant d'évaluer la prise en compte (ou non prise en compte) de ces conditions dans les "grands ensembles" issus de la Charte d'Athènes et dans les tentatives diverses d'en amorcer l'évolution.

L'absence de diversité sociale et fonctionnelle n'est-elle pas la cause réelle des déséquilibres?
Et comment réintroduira-t-on cette diversité?

Faut-il des "zones de développement économique" séparées ou un **tissu urbain mixte**? Comment ce tissu urbain mixte et continu peut-il s'obtenir? Quelles fonctions peut-il intégrer?

Le retour à la table rase est il souhaitable ou doit-on plutôt rechercher des **solutions d'imbrication de l'existant avec un bâti complémentaire neuf** (hypothèses morphologiques) ?

Quelles sont les conditions d'un engagement réel des investisseurs et comment utiliser au mieux l'atout du foncier déjà rentabilisé?

Quelles sont les options réellement susceptibles d'entraîner une évolution puissante de ces quartiers?

Devant l'importance de l'enjeu et la gravité de la situation, n'y aurait-il pas lieu de remettre en cause certaines routines confortables et petites féodalités dèrisoires (la tour d'ivoire institutionnelle...), certaines idées reçues, d'explorer des voies nouvelles de concertation, des stratégies nouvelles?

Les recherches actuellement soutenues par les divers organismes nationaux et développées par universitaires et spécialistes divers sont généralement ciblées sur des aspects partiels ou de détail et ne débouchent le plus souvent pas sur des options multicritères viables pour faire face à l'urgence d'une nécessaire évolution favorable des "grands ensembles": l'opérationnel, qui se développe à l'échelle des communes, sur des bases programmatiques incertaines et dans le cadre de consultations trop hâtives des équipes de conception, reste malheureusement entaché d'approximation, superficiel, et donc voué à l'échec.

Il paraît donc indispensable de mener, en amont, avec un soutien national, un effort de synthèse, une analyse fine des options morphologiques possibles et des stratégies d'évolution réelle de ces quartiers pour leur réintégration dans l'urbain. Une telle démarche d'amont, d'un état responsable ne

se dérobant pas derrière le prétexte de la décentralisation mais favorisant la recherche et la réflexion, ne saurait priver les municipalités de leurs prérogatives d'aval en matière d'urbanisme opérationnel: elle leur fournira les outils indispensables.

LES MOYENS

3. 1

De telles restructurations sont réalisables, sans pour autant imposer de trop lourdes charges à l'état ni aux municipalités. A cette fin, des conditions devront être réunies, de nature à favoriser la participation d'investisseurs très divers, dans le cadre de projets spécifiques d'optimisation multicritère des quartiers, avec un parcellaire redessiné à l'échelle de la ville (**composition urbaine**).

Une approche trop exclusivement institutionnelle

Les villes ne se sont jamais développées qu'avec l'engagement actif d'une multitude d'investisseurs privés, dans le cadre de projets urbains d'ensemble (composition, parcellaire, cahier des charges urbain..). Sans un tel engagement, les efforts de l'état et des municipalités restent voués à l'échec car évidemment incapables, par eux seuls, d'entrainer une évolution réelle.

L'état et les municipalités devraient donc s'efforcer de réunir les conditions qui favoriseront une dynamique d'investissement privé.

Certaines municipalités se méfient de l'investissement privé dans des quartiers dont elles tiennent à souligner la "vocation sociale". Une telle attitude ne peut que pérenniser les ségrégations sociales et fonctionnelles, aggraver à terme les déséquilibres en bloquant toute évolution vers la diversité urbaine et donc le bien-être des populations concernées. La Ville entiére nous semble avoir une évidente vocation sociale et non pas telle ou telle enclave artificielle, insupportable ghetto de fait. Un tel aveuglement nous rappelle que *"l'enfer est pavé de bonnes intentions"* .

L'investissement privé n'est pas à craindre mais à utiliser pour faire évoluer les quartiers, dans le cadre d'une véritable composition urbaine, avec cahier des charges précis et détaillé. Toutes les innombrables et magnifiques villes européennes ne se sont pas faites autrement, à travers l'histoire. Il est vrai qu'on **composait** les villes et que l'on ne se contentait pas des vagues "plans-masse" d'un académisme "moderne", dogmatique et bureaucratique.

Lire par exemple l'ouvrage de Camillo Sitte: "L'art de Bâtir les villes", ou dans "Renaissance, baroque et classicisme" de Jean Castex, les chapitres consacrés aux *formes urbaines de l'Italie entre 1500 et 1600,* aux *formes de la ville: tracé romain de Jules II à Sixte Quint,* aux *places royales et nouveaux quartiers: le développement de Paris sous Henri IV et Louis XIII,* et aux *nouvelles formes urbaines: Charleville, Richelieu, le quartier Mazarin d'Aix et la ville neuve de Versailles.*

Il faut donc réaprendre à composer la ville et à "négocier" constructivement avec les forces vives d'un pays, dans l'interêt commun et dans l'interêt de chacun.

3. 2

La redéfinition de l'espace public en réseau composé (**composition urbaine**...) de rues et places, plus propice que l'inutile béance actuelle du "plan masse", dégagera un important foncier déjà rentabilisé, susceptible de recevoir un bâti diversifié, nécessaire aux équilibres sur le site (à condition, bien entendu, qu'un accord de tous les acteurs, bailleurs et municipalité, résolus à agir ensemble, autorise une révision des C.O.S. et la définition d'un nouveau parcellaire...).

La crise du foncie

Le développement du logement social se heurte à une **crise du foncier:** comme on ne souhaite heureusement plus construire, comme dans les années 60, de nouveaux ghettos sociaux dans des situations extra-urbaines, il faut des terrains mieux intégrés à l'ensemble urbain, donc trop chers... Cette difficulté du foncier a compromis et annulé de nombreuses opérations pour lesquelles les financements étaient pourtant programmées et disponibles, paralysant ainsi l'activité-bâtiment.

Il existe poutant dans les "banlieues" un trésor de foncier déjà rentabilisé, sous employé, à gérer de façon nouvelle et plus pertinente pour une renaissance de la Ville, une relance de l'emploi et une solution à la crise du logement.

Le développement de ce bâti complémentaire (R+1, parfois R+2...) sera donc fortement stimulé par l'**incidence foncière réduite** qui devra rendre accession ou location très attrayantes.

3. 3

On pourra ainsi obtenir, par le libre jeu de l'offre et de la demande, et à l'échelle de l'ensemble du quartier:

3. 3. 1

une **mixité fonctionnelle** par l'apport de locaux professionnels compétitifs pour activités diverses, bureaux en unités éclatées mettant à profit les nouvelles technologies pour se rapprocher des endroits ou se trouve la main d'oeuvre, création d'entreprises, équipements et services, commerces, loisirs (l'éventail de fonctions le plus ouvert possible...).

Zones d'activités ou tissu urbain mixte?

Les fameux douze "Grands Projets" de la D.I.V. (Délégation Interministérielle à la Ville) pour les quartiers en difficulté sont, de l'aveu du Délégué Adjoint Mr. André Pollet, avec qui nous nous sommes entretenus récemment, dans une impasse quasi totale. Une approche fondée sur le concept dépassé du zonage (anti-urbain) s'avère absolument insuffisante à entraîner une évolution favorable de ces quartiers: dans un entretien publié par "Le Moniteur" du 25/2/94, Mr Francis Idrac, Délégué Interministériel à la Ville, parlait encore de "zones de développement économique" à associer aux quartiers en difficulté, alors qu'une telle conception ne peut qu'aggraver l'enclavement des grands ensembles en créant des coupures, zones mortes en dehors des heures de travail.

(Les véritables "GRANDS PROJETS" seront d'ailleurs ceux qui réussiront à engager une

dynamique de participation réelle de l'investissement privé, pour une évolution puissante des "quartiers en difficulté").

Plutôt que de regrouper les activités à l'écart, dans des lotissements extra urbains, il nous paraît nécessaire de les intégrer, de même que les équipements et les formes différentes d'habitat souhaitables (maisons de ville...) dans un **tissu urbain mixte et continu** qui viendrait désenclaver et revaloriser les ensembles résidentiels.

De nombreuses activités sont parfaitement compatibles avec un tel tissu urbain mixte; ce sont d'ailleurs celles qui sont susceptibles du meilleur développement, à l'ère de l'informatique et des nouvelles technologies de communication, alors que l'on constate un déplacement général de la main d'oeuvre, des activités de production vers les activités de service.

"..le rôle du télétravail ... me semble très important pour l'avenir. Du fait de la part de plus en plus faible des activités de production et du développement des activités de service, on devrait en effet s'orienter dans le futur vers des lieux de travail de plus en plus éclatés. Je ne pense pas que les gens vont travailler chez eux mais il va y avoir un déplacement des unités de travail vers les endroits où se trouve la main d'oeuvre...."

Claude Levy-Leboyer - Vice-présidente de l'université de Paris V, professeur de psychologie du travail, directrice du Laboratoire de psychologie appliquée de l'Unité de recherche appliquée en psychologie de l'environnement de cette université.
Article paru dans le JOURNAL DES PSYCHOLOGUES, n° 103, janvier 1993.

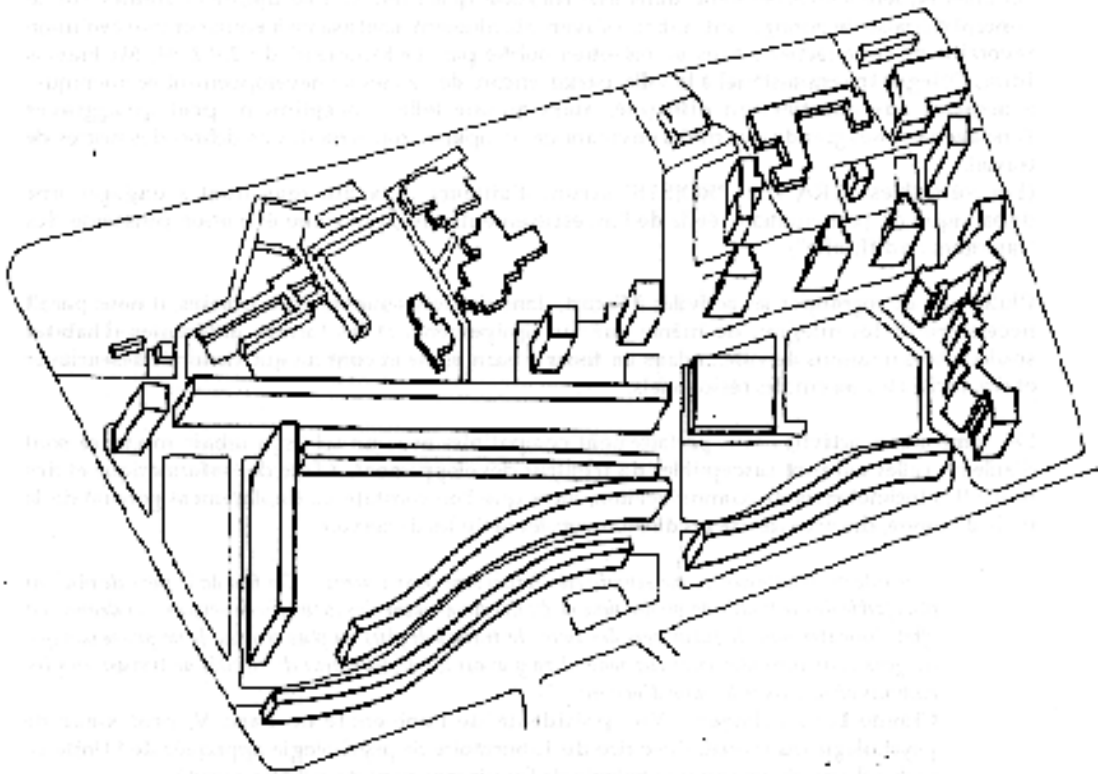
Seule la création de ce type de tissu urbain mixte (avec l'éventail de fonctions le plus ouvert possible...) pourra réintégrer les immeubles de logement dans la ville et favoriser, par la présence simultanée de clientèles complémentaires, la fixation d'un commerce de proximité actuellement absent et pourtant si nécessaire à la sécurisation de l'espace public et à la convivialité.

Tout le bâti nouveau, de hauteur limitée, complémentaire aux tours et barres abruptes, sera alors au service de la ville, en contribuant par ses façades à en définir l'espace public.

La présence d'emplois sur le site limitera les migrations quotidiennes, l'engorgement des transports en commun aux heures de pointe, et la pollution atmosphérique par les voitures particulières. Les habitants auront plus de temps à consacrer aux devoirs et aux fréquentations de leurs enfants souvent livrés à eux-mêmes pendant de longues heures, après leur sortie des établissements scolaires et avant le retour des parents, ce qui favorise échec scolaire et délinquance. La présence d'activités dans le quartier multipliera les opportunités en créant, grâce à cette mixité nouvelle, un réseau local convivial et diversifié encourageant l'insertion des jeunes.

3. 3. 2

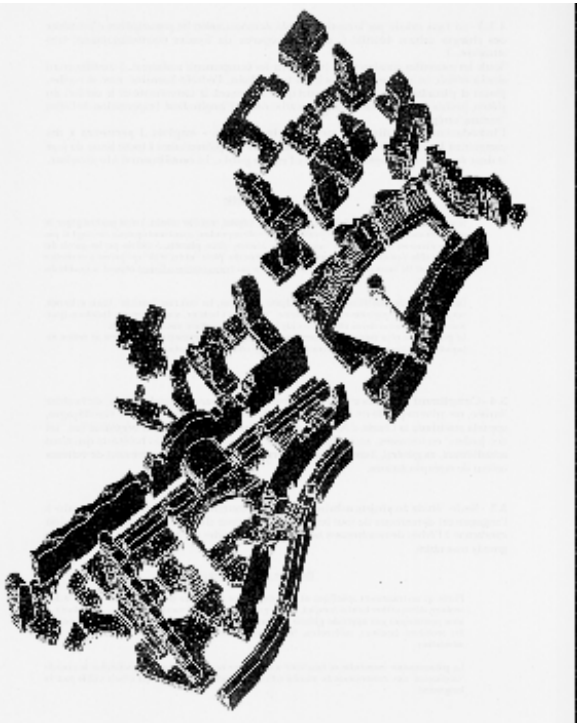
une **mixité sociale** grâce à une diversification des types d'habitat comme "maisons de ville" en duplex avec garages et jardins privatifs, et petits "intermédiaires" en accession bénéficiant de l'incidence foncière réduite. Le désir des occupants actuels d'accéder à la propriété de leurs logements sera stimulé par la revalorisation d'ensemble du quartier. Des dispositions claires devront favoriser cette accession.



QUARTIER DU LUTH - GENNEVILLIERS

Ci-dessus: Etat actuel de cette cité dortoir monofonctionnelle. Non définition d'un espace public résiduel, entre tours et barres.

Ci-contre à droite: Esquisse pour une évolution par rééquilibrage des fonctions urbaines et definition de l'espace public urbain, avec morphologie combinant le neuf et l'ancien.



un **tissu urbain** par le continu du bâti nouveau, selon les prescriptions d'un cahier des charges urbain détaillé (juste contrepartie du foncier économiquement très attrayant...).

Toute les nouvelles constructions (y compris les équipements scolaires!...) contribueront ainsi à définir un espace public varié, de type urbain, d'échelle humaine: rues et ruelles, places et placettes avec arcades et portiques favorisant la convivialité et le confort du piéton, jardins de proximité soignés, et stationnement longitudinal (suppression de l'effet "parking"en épi...).

L'introduction de la diversité fonctionnelle (habitat + emplois...) permettra à des commerces de proximité de bénéficier de clientèles complémentaires à toute heure du jour et donc de se fixer: **en contact direct avec l'espace public, ils contribueront à le sécuriser.**

L'espace public:

Si son traitement de détail (dallages, revêtements, végétal, mobilier urbain...) n'est pas à négliger, la définition essentielle de l'espace public urbain reste cependant avant tout spatiale: ne s'agit il pas d'un volume en négatif, "pièce" urbaine (rue, avenue, place, placette...) définie par les parois du bâti? La ville n'est elle pas une imbrication continue du "plein" et du "vide" qui jouent à se révéler l'un l'autre? De la continuité et de la finesse de ce jeu (composition urbaine) dépend la qualité du tissu urbain.

Dans les grands ensembles issus de la charte d'Athènes, les volumes "positifs", tours et barres,

voulus comme de parfaites et indépendantes "machines à habiter", sont largement distribués (plan masse...) dans ce qui devait être un parc idyllique: ils ne se prêtent pas au jeu urbain.
Le parc s'est le plus souvent transformé en "parking", béance menaçante et informe au milieu de laquelle les bâtiments sont isolés (enclavés), image minérale de l'exclusion.

3. 4

Complément aux tours et barres massives, ce bâti nouveau, "socle urbain" de hauteur limitée, ne privera pas leurs occupants actuels d'ensoleillement ni d'une vue dégagée, apports positifs de la Charte d'Athènes. Ce socle pourra être largement végétalisé (un "art des jardins" en terrasses, accessibles ou non...) pour l'agrément des habitants qui n'ont actuellement, en général, à contempler de leurs fenêtres qu'un enchevêtrement de voitures autour de rares plantations.

3. 5

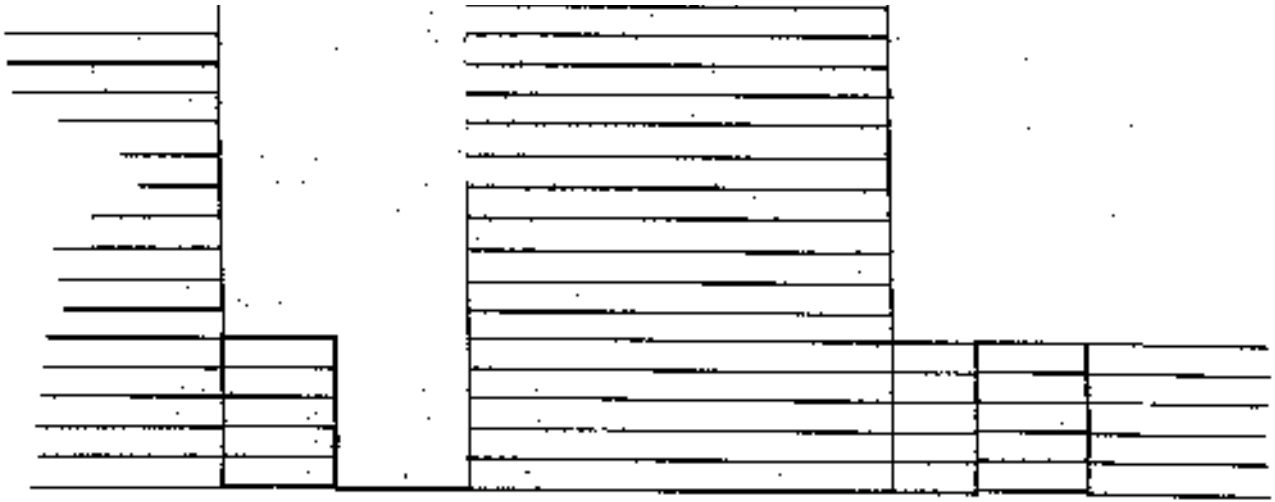
Seule l'étude de **projets urbains d'ensemble** fournira la **masse critique** nécessaire à l'engagement dynamique de tous les acteurs. L'absence d'une telle masse critique a déjà condamné à l'échec de nombreuses tentatives, trop timides ou partielles, de mutation des grands ensembles.

Pour une approche globale

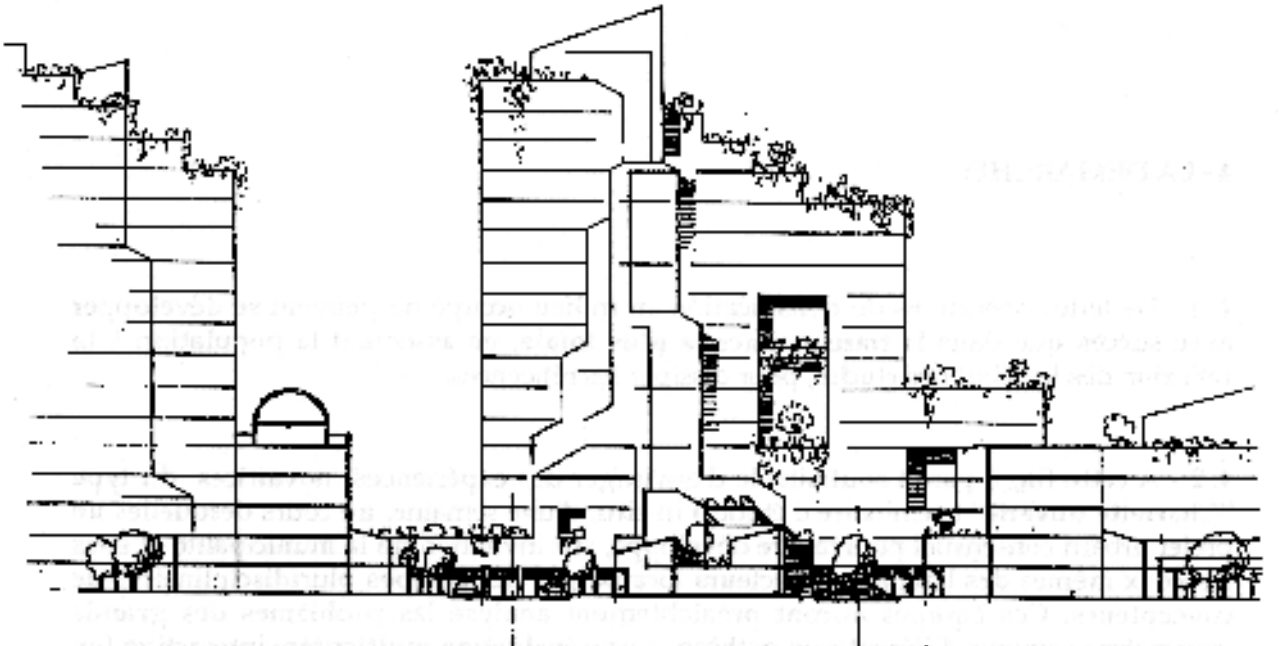
Plutôt qu'un traitement spécifique et isolé de chaque symptôme de déséquilibre urbain (échec scolaire, déséquilibre habitat/emploi, chômage des jeunes, sentiment d'exclusion, vandalisme...) nous préconisons une approche globale prenant simultanément en compte toutes les dimensions du

problème (sociales, culturelles, économiques, écologiques...) dans leur variété et leur interaction.

La préoccupation essentielle de faisabilité économique nous conduit alors à rechercher la zone de "confluence" des mécanismes du marché (offre et demande) avec un projet urbain viable pour le long terme.



Etat actuel: espace public surdimentionné, bordé de caves, donc privé d´animation, de convivialité.
Bati abrupt et monotone.



Une alternative: coupe de principe avec rues et ruelles bordées de maisons de ville, bureaux, commerces et équipments avec arcades protégeant des intempéries et favorisant la convivialité.

La déstructuration du tissu urbain (consécutive à la Charte d'Athènes), les ségrégations fonctionnelles (zonage, cités dortoir) et sociales (ghettos de fait) nous semblent devoir se traiter simultanément avec l'objectif ultime d'un rééquilibrage urbain profond. En dehors d'une telle approche globale, chaque mesure isolée (saupoudrage...) relative à tel ou tel symptôme pourra avoir des effets pervers et entraîner tel autre symptôme préoccupant.

De plus, le traitement isolé des symptômes peut paraître d'une difficulté insurmontable: on vous dira, par exemple, qu'il est impossible de prévoir des PLI dans tel quartier, et cela est probablement vrai dans les conditions actuelles. Faut il pour autant renoncer à promouvoir la mixité sociale et rétrécir ses objectifs comme une peau de chagrin?

Nous pensons qu'il est possible de réintroduire non seulement des PLI mais aussi des "maisons de ville"(en duplex, avec jardin et garage privatif) dont les façades continues définiront des placettes et ruelles agréables pour contribuer à restructurer l'espace public sur tel ou tel quartier, dans le cadre d'une véritable composition urbaine. Le foncier déjà rentabilisé est un atout puissant pour la réussite d'une telle entreprise dont bénéficieraient, non seulement la ville et l'ensemble de ses habitants, mais également la cause générale de la sortie de la crise par la reprise de l'activité bâtiment (quand le bâtiment va...)

De même, locaux d'activité, équipements et commerces devraient trouver leur place dans un quartier transformé ou il serait désormais possible de faire beaucoup de choses et de rencontrer ses concitoyens (sortir de l'isolement): encore faut-il rompre le carcan néfaste du zonage qui au nom d'une rationalisation simplificatrice (réductrice) prévoit de regrouper tous les emplois à l'écart du centre

urbain ("zones d'activités") , de développer, toujours à l'écart, des lotissements qui accentueront les clivages sociaux au détriment de la Ville, etc....
Les commerces de proximité qui pourraient contribuer à sécuriser l'espace public sont les premières victimes du "zonage" qui les prive des clientèles diversifiées et conplémentaires dont ils ont besoin.

3. 6

Plutôt qu'un retour à la "table rase" pour tenter de substituer à l'existant une nouvelle création à la perfection tout aussi illusoire, recherchons une diversité urbaine obtenue par le processus de **"sédimentation"** (imbrication du neuf et de l'ancien) qui a donné leur forme aux villes, à travers l'histoire.

4 - LA DEMARCHE

4. 1

De telles opérations de densification en milieu occupé ne peuvent se développer avec succès que dans la **transparence la plus totale**, en associant la population à la réflexion dès le début des études, pour dissiper les réticences.

4. 2

A cette fin, il parait souhaitable d'envisager des expériences novatrices du type **"Charrette**

ouverte" (séminaire d'étude **)** in-situ, d'une semaine, au cours desquelles un projet urbain consensuel pourra être développé, sur invitation de la municipalité et sous les yeux mêmes des habitants et acteurs locaux, par des équipes pluridisciplinaires de concepteurs. Ces équipes auront préalablement analysé les problèmes des grands ensembles et soumis différentes hypothèses à une **évaluation multicritère interactive** (un soutien doit être prévu pour cette indispensable recherche d'amont...).
Elles étudieront tous les aspects du projet, et de ses implications sociologiques, culturelles, techniques, juridiques, économiques et écologiques. L'étude comportera la définition d'un plan directeur de **désenclavement** et de **composition urbaine**, le détail du parcellaire et du cahier des charges urbain proposés, ainsi que des différents types de bâtiments envisagés et de l'aménagement paysager.

4. 3

*La Charrette donnera à chacun, concepteur, responsable ou membre de la population, l'occasion d'**élargir son point de vue** dans le cadre d'un débat libre, clair et ouvert sur les enjeux et les moyens.*

4. 4

L'intervention de nombreux concepteurs travaillant en équipe, apportera au projet une **diversité dans l'unité** que les villes n'acquièrent en général qu'avec le temps.
Deux maquettes de l'ensemble seront construites, de l'état actuel et de l'état après restructuration, pour examen comparatif détaillé par tous les acteurs et participants.
Les résultats seront présentés au cours d'une conférence, avec projection par diapositives des documents graphiques produits au cours de la "Charrette", et présentation des études prospectives sociologiques, techniques, économiques et de marché.

4. 5

Le projet obtenu à l'issue du séminaire d'étude ne sera pas figé. Il n'engagera la municipalité qu'a titre "d'option" à considérer, évaluer et développer, et de "référence" permettant de poursuivre la réflexion et le dialogue vers l'opérationnel.

4. 6

Etant donnée la nécessité d'options urbaines viables pour ces quartiers en difficulté, options qui seront autant d'outils propres à éclairer les choix dans la planification et l'aménagement urbain et territorial, tant à l'échelle locale qu'à l'échelle nationale, de telles expériences devraient recevoir des soutiens multiples, publics et privés, locaux, régionaux et, nationaux

A la croisée des chemins

Une évolution puissante des quartiers en difficulté pourrait être une chance :

- scénario heureux: la solution à la crise du logement et la relance de l'emploi sortiront d'un même mouvement: une **campagne de rééquilibrage des banlieues** qui nous paraît être le type de réponse visionnaire et créative appropriée, avec une véritable re-valorisation de ces quartiers "défavorisés" par la VILLE-AGORA, lieu de mixité sociale et fonctionnelle. En effet, les nouvelles technologies, une stratégie pertinente et nouvelle pour une **meilleure**

gestion du foncier et la participation d'une multitude d'investisseurs de toutes tailles, sont à même de recréer cette mixité qui faisait, en Europe, la richesse de nos villes anciennes si appréciées.

- scénario catastrophe: les errements de la politique de la Ville, dus à des conceptions erronées, routinières, et à des demies mesures timides, se poursuivent, ainsi que la montée menaçante de l'exclusion, de la délinquance et de l'intolérance. Parallèlement à cet échec de la Ville, l'urbanisation étalée (mitage et lotissements) se généralise avec des conséquences préoccupantes pour l'environnement:
- La consommation d'une large part du territoire par le mitage pavillonnaire et les dessertes automobiles,
- La multiplication des migrations quotidiennes et la pollution atmosphérique,
- L'imperméabilisation des sols,
- La disparition de l'espace public urbain, lieu de rencontre, d'échange, de culture et de communication.

Les conséquences ultimes de ce scénario catastrophe peuvent s'examiner de nos jours au Etats-Unis, ou s'instaure maintenant le couvre feu dans les ghettos urbains en ruine et ou se généralisent les milices privées dans la MEGA-SUBURBIA.

5 - CONCLUSION

5. 1

Ainsi, le rééquilibrage de la Cité ne dépendra plus uniquement d'hypothétiques subventions ou de mesures ponctuelles manifestement insuffisantes. Son succès sera assuré par la **prise en compte des mécanismes du marché** et par un projet viable, motivant tous les acteurs, publics et privés.

La Ville s'est toujours constituée, dans l'histoire, par un processus de sédimentation et d'imbrication du neuf et de l'ancien. Pourquoi les "Grands Ensembles" devraient-ils rester figés immuablement dans leur morphologie abrupte et leur fonction unique, ou disparaître en gravats? L'apport d'un bâti neuf complémentaire, à échelle humaine, pourrait être l'occasion d'y redéfinir spatialement l'espace public, d'y recomposer un tissu urbain favorable à la convivialité. L'atout du foncier déjà rentabilisé devrait motiver des investisseurs divers à y réintroduire, sous certaines conditions (composition urbaine d'ensemble, avec parcellaire nouveau, cahier des charges urbain et recherche d'un effet de masse critique favorisant une dynamique...) les fonctions et les types d'habitat diversifiés nécessaires aux équilibres.

En entraînant une **reprise de l'activité bâtiment** (actuellement freinée, de l'avis de tout les acteurs, par une crise du foncier ...) une telle campagne de rééquilibrage des banlieues favorisera également la **sortie de la crise** et le **recul du chômage,** cause d'exclusion.

"Du Grand Ensemble à la Ville", Groupe d'Analyse et de Prospective

Jean Msika, architecte-urbaniste, mandataire,

Juillet 1995

ANNEXES

• Traduction par J. Msika de "CHARRETTE", extrait de "TOWNS AND TOWN-MAKING PRINCIPLES", d'Andres Duany et Elizabeth Plater-Zyberk.

• Esquisse de désenclavement et de réequilibrage de la "Cité Joffre", au Pontet (84), avec bâti complémentaire aux tours et barres, et tissu urbain mixte.

• Esquisse pour l'évolution des "Courtilières", à Pantin (93), avec inclusion des tours et barres dans une composition rétablissant une échelle et une diversité urbaines.

Recherches de l'ATELIER D'ARCHITECTURE ET D'URBANISME JEAN MSIKA sur des morphologies urbaines permettant le développement de l'architectecture bioclimatique en milieu urbain dense, pour les économies d'énergies et la protection de l'environnement:

• LA PORTE DES ARTS. Projet d'aménagement pour l'ancien dock des alcools, à Ris-Orangis, Essonne.

• Proposition pour Paris Seine Rive Gauche: LA VILLE SOLAIRE ET ORGANIQUE. Coupe de principe, avec étude d'ensoleillement et de masques

"LA CHARRETTE" (*)

Le processus d'élaboration de projets d'aménagement urbain d'ensemble, au cours de "charrettes" d'une semaine, a commencé à l'occasion de l'étude sur la ville de SEASIDE.
Cette première tentative de créer une ville complète au lieu d'un simple aménagement mixte, a impliqué des participants nombreux.
Par la suite, alors que les projets urbains devenaient de plus en plus grands et compliqués, nécessitant

souvent des processus complexes d'approbation administrative et juridique, la "charrette" a procuré une structure de concertation grâce à laquelle tous les acteurs depuis les élus et responsables locaux jusqu'aux citoyens motivés peuvent participer au processus de conception.
La "charrette" permet :

- d'éduquer, d'informer les participants
- d'incorporer leur contribution
- de vérifier et de valider les choix
- de limiter les obstacles au processus d'approbation

La "charrette" comporte l'installation sur le site d'une équipe de 5 à 20 personnes comprenant un noyau de concepteurs expérimentés travaillant avec des architectes locaux, des paysagistes, des économistes et des spécialistes en études de marché.

La "charrette" commence par une journée de visite sur le site et dans les agglomérations voisines qui pourraient servir de références et par un exposé aux participants des principes généraux de l'aménagement urbain. Les jours suivants, l'équipe à laquelle se joint le maître d'ouvrage, travaille jour et nuit, rencontrant fréquemment les responsables municipaux et les associations locales, et étudiant tous les aspects urbanistiques, depuis le plan de masse d'ensemble jusqu'aux bâtiments les plus significatifs, en passant par les aspects règlementaires et l'aménagement paysager.

Les concepteurs abandonnent une part de leur qualité d'auteur du projet en échange d'un surcroit d'authenticité et de pertinence d'insertion et de caractère que d'ordinaire seule l'histoire peut procurer par sédimentation : des individus différents se succèdent sur les études variées et y combinent leur réflexion et leur effort. Les résultats, présentés au cours d'une conférence avec projection de diapositives,

peuvent comporter jusqu'à 40 dessins.

(*) - "THE CHARRETTE", page 23
Extrait de "TOWNS AND TOWN - MAKING PRINCIPLES" d'Andres Duany et Elizabeth Plater-Zyberk, édité par Harvard University Graduate School of Design, (Rizzoli, New-York) 1992.
Traduction: Jean Msika.

Jean MSIKA

Born 1940, Tunis (Tunisia).

Studies of architecture and sculpture at Ecole des Beaux-Arts, in Paris.
- Prix Mar

Practice as a visual artist:
- Commissioned outdoors sculptures and murals for public buildings in France.
- Shows in France, Italy, Holland, USA.

1991, Ecole d'Architecture de Paris - La Villette: Dipl. Architect (dist.).

Architectural and urban design competitions:

- La "Maison Janus" in Reggio Emilia, Italy.
- "L'ardoise d'or": Boussy St. Antoine (91) - low-rise welfare housing development with a focus on public space (60 apartments).
- Le "Caveau des remparts" in Aigues Mortes (30).
- City of Paris International Contest for Innovative Concept of Civil Engineering Structures Bearing Green Spaces and of Underground Civil Works Close to Planted Areas: honorable mention.
- Berlin: "Spree-Insel".
- National Museum of Korea, in Seoul.

Projects in progress:

- Experimental environmentaly friendly house, Marseille (13).
- Solar house: Lachelle (60), near Compi
- Colony for artists: several "folies" on a historical site, in 's-Gravenwezel, Belgium.
- Residence on a wooded site: Brasschaat, Belgium.

Urban design research:

- International Symposium "La Ville et l'Ecologie Urbaine", Paris-Conflans :
Prix de l'Acad
- Symposium "Architecture (bio)climatique" in Sophia Antipolis:
Le bioclimatique en milieu urbain dense - a proposal for Paris-Seine-Rive-Gauche.
- Urban morphology research for the evolution of welfare projects:
Pantin (93): Les Courtili
Gennevilliers (92) : Le Luth.
Sarcelles (95).
Clichy-Montfermeil (93).
Le Pontet (94): Cit

The ATELIER D'ARCHITECTURE ET D'URBANISME JEAN MSIKA, develops simultaneously research
and practice, with a focus on the urban and environnemental relevance of the project.

Le Sens de la Ville : approche ethnographique de l'euphorie et de la dysphorie urbaines

Projet de recherche-action

Porte-parole responsable :

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Laboratoire d'Anthropologie de la Communication

1. LA VILLE : ENTRE EUPHORIE ET DYSPHORIE

Le projet que nous présentons ici relève de l'anthropologie urbaine. Rien n'est aussi pratique, pensons-nous, qu'une bonne théorie. Nous puisons librement dans les travaux du sociologue Erving Goffman (1973), de l'anthropologue Ulf Hannerz (1980) ou du philosophe Jean-François Augoyard (1984). Mais, contrairement à un phénoménologue comme Pierre Sansot (1984), nous allons "sur le

terrain" en l'occurrence, à Liège. Nous observons les pratiques urbaines, nous écoutons les habitants parler, nous discutons avec eux. Et nous tirons de ces explorations ethnographiques des propositions concrètes d'action.

Notre question essentielle est empruntée à Goffman (1953) : quelles sont les configurations publiques qui rendent les citadins heureux d'être en ville (c'est ce que nous appelons l'euphorie urbaine) et mécontents, sinon malheureux (c'est la dysphorie urbaine). La question semble très psychologique, et les réponses qu'on pourrait y trouver pourraient a priori paraître aussi nombreuses que les citadins impliqués dans la recherche. Nous posons qu'il existe un certain nombre de paramètres objectifs qui, incorporés par les acteurs urbains, produisent soit plutôt de l'euphorie, soit plutôt de la dysphorie. Pour tester notre hypothèse, nous allons examiner trois configurations publiques relativement complexes — ou plutôt nous allons examiner comment les usagers de ces configurations les appréhendent, à la fois spatialement (dans leur comportement même : les évitent-ils, les traversent-ils sans s'y arrêter, etc.) et cognitivement (dans leur discours, en tant que celui-ci reflète leur pensée : les apprécient-ils, les détestent-ils, en ont-ils peur, etc. ?). Ces trois configurations sont les suivantes :

1)La place Saint-Lambert. Les habitants de Liège adoraient cette place — c'était leur Agora, lovée dans le quartier historique de la ville. Mais, depuis trente ans, la Place est un immense chantier. Tout se passe comme si les autorités publiques avaient voulu procéder à une opération chirurgicale à cœur ouvert — et n'avaient pu mettre que des parkings à la place du cœur. Les Liégeois pestent mais la Place reste inutilisable. De l'euphorie, on est passé à la dysphorie — tout en promettant le retour à l'euphorie. Mais plus personne n'y croit vraiment...

2)Le quartier Sainte-Marguerite. Le quartier, jadis florissant, commercialement et humainement, a été coupé en deux par une autoroute urbaine. Nombre de petits commerces se sont éteints; nombre d'habitants sont partis. D'autres populations sont arrivées, qui ont transformé profondément la physionomie du quartier. La population ancienne admet mal la nouvelle : histoire classique. L'euphorie a fait place à la dysphorie, et rien ne semble indiquer une amélioration de la perception. Et pourtant, tous les signes sont là, qui indiquent un renouveau possible. Si les habitants veulent les voir et y croire.

3)Les terrasses de Liège. Les Liégeois adorent leurs terrasses. Ils y sont dès le premier rayon de soleil printanier et s'y accrochent jusqu'au coucher du soleil automnal. C'est la configuration euphorique par excellence. Il faut l'étudier dans son évanescence même : ce sont des gestes, des sourires, des poignées de main. Mais ces micro-événements nous paraissent essentiels dans la co0nstruction et le maintien d'un rapport intime entre la Cité et ses habitants.

En étudiant ces trois hauts lieux de la vie publique liégeoise, en dégageant les paramètres qui les rendent sympathiques ou antipathiques aux Liégeois, nous ne prétendons pas proposer des "recettes de bonheur". D'ailleurs, la notion d'euphorie chez Goffman ne signifie pas l'allégresse mais le simple bien-être, le confort dans la relation à soi-même et aux autres. Nous cherchons seulement à montrer que

1)même une vieille ville industrielle un peu sinistrée comme Liège peut offrir des sites et des poches de "bonheur urbain" à ses habitants;

2)il existe des "technologies douces" de repérage de ces sites et poches, à Liège comme dans toute

autre ville;

3)les recherches-actions urbaines ne devraient pas être exclusivement consacrées aux déviances, aux crises et aux tensions. Il faut développer une attitude à la fois plus sereine et plus ouverte, afin de renouveler peu à peu le sens de la ville.

Ce programme mis en place, il nous faut maintenant préciser comment, par quelles "technologies", nous allons l'aborder, avec toute l'empathie nécessaire pour aimer et se faire aimer de la ville.

2. UNE TECHNOLOGIE DOUCE

La technologie que nous nous proposons d'utiliser repose sur la démarche **anthropologique**. Il s'agit d'une technologie ancienne, lente et laborieuse, mais respectueuse des milieux de vie où le chercheur se glisse :

L'observation participante est traditionnellement l'approche privilégiée de l'anthropologie. Un carnet, un crayon, beaucoup de ténacité et de patience, et surtout la volonté de tout voir avec un œil toujours "à l'affût", de tout noter jusque dans les détails qui ne sont jamais insignifiants, voilà tout ce qui est a priori nécessaire au chercheur pour "faire" de l'observation participante, pourvu bien sûr qu'il soit nourri aussi de bonnes lectures. Telle est la première démarche que nous voudrions mettre en œuvre.

La seconde technique que nous envisageons est celle de l'entretien. Celle-ci aussi est aussi

relativement bien connue. A vrai dire, elle est corrélative de l'observation participante et elle engage surtout le second terme de cette dernière expression. Pour rappel, l'entretien comporte diverses formes ou phases.

1)Le chercheur se mêle aux acteurs du terrain; il partage des moments et des lieux avec eux; il leur parle — et eux répondent dans le vif de l'instant —; il réalise ainsi un "entretien libre" ou non directif (Blanchet, 1985);

2) A d'autres moments, il prend du temps pour poser des questions précises qu'il a préparées au préalable; il interroge, et insiste au besoin, jusqu'à obtenir des réponses centrées sur le thème prévu; c'est l'"entretien semi-dirigé";

3) Enfin, ses interrogations se focalisent davantage encore, et il prépare à nouveau un questionnaire qui n'exige cette fois le plus souvent que de courtes réponses, parfois simplement affirmatives ou négatives; ici, le chercheur a effectué un "entretien dirigé".

On le voit, l'entretien est une technique polymorphe, mais dont l'objectif essentiel reste, quelles que soient les phases, quelles que soient les formes, de rendre compte du discours des acteurs. Intégrer la perception des citadins liégeois, telle qu'elle peut s'exprimer notamment dans leurs discours, nous paraît une dimension incontournable du travail que nous espérons réaliser. Nous ne voudrions en aucun cas nous priver des ressources de l'entretien (plus particulièrement sous ses formes "libres" et "semi-dirigées").

La troisième technique que nous emploierons, et que nous allons expliciter avec un peu plus de

détails car son principe est peut-être moins clairement perçu, consiste en la réalisation de cartes cognitives par les acteurs eux-mêmes.

Le processus de perception est un agent intermédiaire entre l'homme et l'environnement et il paraît utile de connaître la façon dont chacun perçoit l'espace. L'urbaniste Kevin Lynch est parmi les premiers à s'être penché sur le problème de la perception de l'environnement. Pour lui, ce sont les expériences perceptives qui permettent de construire des images mentales. A partir de cette notion d'image mentale, Lynch a eu l'idée de faire représenter l'environnement par des cartes cognitives. (Lynch, 1960)

Cette méthode permet de rendre compte de la façon dont l'individu se représente l'espace à partir de la "carte qu'il a dans la tête" et de saisir ainsi la relation qu'il établit entre les données physiques de l'environnement, de même que l'importance qu'elle revêt à ses yeux. Il s'agit donc de demander à différents sujets de dessiner leur ville, leur quartier ou encore leurs déplacements. Par cette technique, on conçoit d'appréhender le sentiment des personnes sollicitées.

La carte cognitive traduit la représentation d'un espace subjectivement perçu, vécu et maîtrisé. Jean Morval a notamment expliqué que la carte cognitive est "un processus composé de séries de transformations psychologiques par lesquelles une personne code et emmagasine l'information ayant trait aux positions relatives et aux qualités des phénomènes se déroulant dans son cadre de vie"(Morval, 1981 : 51) .

La carte cognitive paraît donc être un outil intéressant, car, en l'employant, on peut arriver à se donner quelques idées-force sur la façon dont l'individu s'oriente dans la ville ainsi que sur sa

représentation globale de l'espace urbain. La carte cognitive est à la fois informative (elle désigne, définit, décrit et classe), évaluative (elle permet d'apprécier) et prédictive (elle offre la possibilité de prévoir, d'inférer ou encore d'anticiper).

Notre technologie, très particulière sans doute, mais très appropriée à la fluidité de la ville, va nous permettre d'entrer sur nos trois terrains.

3. TROIS TERRAINS URBAINS

A . LA PLACE SAINT-LAMBERT

Liège a connu une longue période de stagnation dans le domaine de la promotion immobilière et de la construction (période correspondant à une dégradation de l'économie de la ville et de l'image de Liège). Même si une reprise du marché semble aujourd'hui s'amorcer (grâce notamment à une série de projets nouveaux), c'est encore et toujours autour de la place Saint-Lambert que se cristallisent les débats essentiels sur l'avenir de la ville. Dès lors, on comprend aisément que l'aménagement de la place Saint-Lambert et de ses abords constitue un élément essentiel de l'épanouissement de la Cité. En un mot comme en cent, la place Saint-Lambert est l'Agora de Liège.

Cette place, sujet de nombreuses polémiques depuis presque vingt ans, n'a pas encore vu son aménagement se réaliser définitivement. Trente ans de discussions, de projets et de contre-projets, de démolitions, de travaux et de chantiers à l'arrêt, trente ans de querelles politiques, de conflits entre pouvoirs nationaux, régionaux et locaux, d'oppositions entre "technocrates" et citoyens, de

polémiques entre architectes, urbanistes et archéologues. Mais aujourd'hui, où en est la situation ? Et quel sera l'avenir de cette place, et à travers elle, celui des Liégeois ? Beaucoup de questions, peu de réponses à ce jour...

La place Saint-Lambert, lieu traditionnel de sociabilité urbaine, est réduite aujourd'hui aux dimensions d'une voie de passage pour les autobus, les automobilistes, ainsi que pour quelques rares piétons qui jamais ne s'y attardent. Qu'est-elle devenue maintenant alors que les grues s'en sont emparées, l'évidant de tout son sol, griffant son patrimoine et, par conséquent, son passé ?

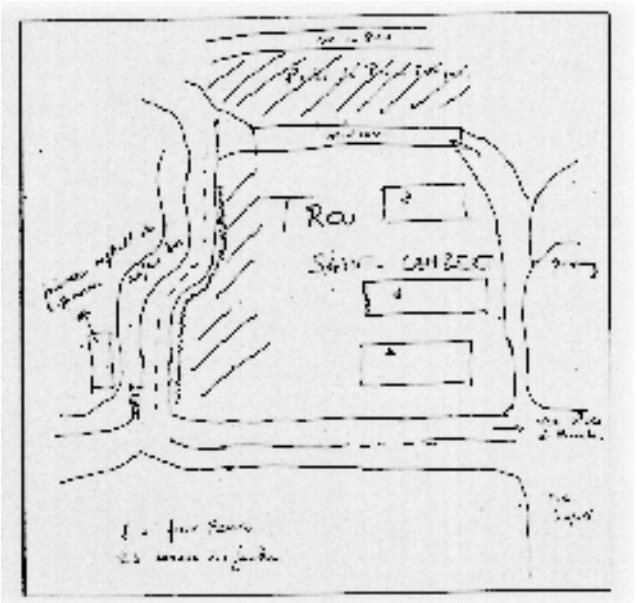
Pourtant bien des Liégeois conservent le souvenir plus ou moins précis de l'époque où cette place faisait pour eux figure d'Agora. Ils se souviennent et parlent, avec cette sorte de nostalgie dont les accents sont si particuliers, de ce temps où "c'était quand même autre chose" et où il faisait bon "être place Saint-Lambert" et tous de décrire un moment de vie sur la place, réel ou "reconstruit".

De part ce passé historique d'ailleurs, la place Saint-Lambert n'est pas seulement un symbole. Elle est aussi, depuis plus de trente ans, un lieu emblématique des conséquences, directes ou indirectes, que peuvent avoir sur un centre-ville les grandes options d'une politique des transports au niveau d'un territoire bien plus vaste que la ville elle-même.

Photographie panoramique de la place Saint-Lambert telle qu´elle s´offre á la vue des Liégeois depuis de nombreuses années (Photo: La Meuse).

Nombreux sont les intervenants concernés par cet aménagement (les architectes, le Ministère de l'équipement et des transports de la Région Wallonne, l'Urbanisme de la Ville de Liège, les archéologues, la population, etc.). Par conséquent, les discours apparaissent quelques fois divergents. En fait, chacun s'investit à sa manière pour que le cœur de la Cité Ardente[1] batte à nouveau. Mais différents points relatifs à l'aménagement de la place Saint-Lambert irritent certaines des parties, ceci entraînant diverses tensions entre les groupes concernés. Bien entendu, les différents acteurs arrivent quelques fois à des compromis, ce qui permet une certaine évolution du chantier en question. Mais au total, on observe cycliquement le même phénomène : une Agora qui implose, qui provoque des conflits, et qui, chaque fois, demande à renaître...

1. Nom, presque mot tendre, sous lequel Liège est connu en Belgique et qui ne témoigne pas seulement des feux de son idustrie lourde, mais aussi bien de l'intensité de sa vie urbaine, jour et nuit



Carte cognitive de la place Saint-Lambert desineé par un habitant du quartier de Pierreuse, qui jouxte le périmétre en reconstruction. C´est la béance qui en constitue toute la spécificité. Seuls quelques circulations automobiles sont mentionnées autour du “trou”.

Dès lors, nous pouvons nous poser les questions suivantes : les projets les plus récents d'aménagement de la place Saint-Lambert correspondent-ils aux attentes des Liégeois ? De quelle façon est-ce que les chargés de l'urbanisation ont appris et pris en compte les propositions des Liégeois ? Recréeront-ils une Agora où les Liégeois aiment à se promener, à se donner des rendez-vous, à être là pour le plaisir d'y être, bref, à actualiser leur sociabilité ? Et c'est à ces questions que nous proposons de répondre.

B. LE QUARTIER SAINTE-MARGUERITE

La percée d'une voie rapide au milieu du quartier millénaire de Saint-Marguerite, il y a de cela vingt-cinq ans, a eu des implications importantes au niveau de la perception du quartier par les habitants, implications dont la portée et la nature sont différentes selon les groupes considérés.

De mémoire d'homme, le quartier Sainte-Marguerite a été un quartier commerçant. Aujourd'hui, il est toujours considéré comme "pôle commercial de premier ordre" par l'Echevinat des Affaires Economiques et du Commerce de la Ville de Liège[1]. Le fait est pourtant que le nombre des commerces est en chute libre. En 1952, on en comptait près de 400 dans le quartier, pour moins de 200 aujourd'hui.

Ainsi, le quartier s'est engagé dans un processus de détérioration : au fur et à mesure que les habitations du vieux noyau urbain sont abandonnées par leurs occupants, elles sont réaménagées par

1. Liège, ville de commerces, dossier de presse diffusé par l'Echevinat des Affaires économiques en juin 92.

les propriétaires et divisées en appartements plus petits, qui permettent d'obtenir un rendement supérieur en multipliant le nombre d'occupants. D'autre part, ces propriétaires cessent fréquemment d'effectuer les réparations nécessaires, car — du moins tout le laisse à penser — ils ont plutôt avantage à accélérer le processus de détérioration. Il semble y avoir une double raison à cet état de fait : d'une part, le prix de l'immeuble est en relation de plus en plus défavorable avec le prix du terrain dont la valeur augmente elle-même en fonction de la rareté croissante des logements disponibles dans le centre-ville; d'autre part, étant donné que les nouveaux occupants ont un choix limité, le propriétaire est assuré de trouver toujours suffisamment de locataires. Ce mode d'occupation et de gestion du logement accélère le processus de détérioration physique des immeubles.

Par ailleurs, l'abandon du quartier par la classe moyenne et son remplacement par les strates sociales et ethniques moins "favorisées" conduit aussi à la disparition du tertiaire pré-existant et à son remplacement par un tissu commercial notamment axé sur les "loisirs". Les nouveaux occupants sont en majorité des membres de minorités ethniques défavorisées, pour la plupart candidats réfugiés politiques, logés en nombre dans des immeubles à la limite de l'insalubrité. Il en résulte des tensions au niveau des repères identitaires et il est notable de constater qu'on retrouve ces tensions dans les variations de perception de l'espace.

Plusieurs exemples nous sont fournis par les travaux de l’anthropologue Edward T. Hall, qui montrent que la perception de l'espace varie selon les cultures. Hall — qu'on nous permette d’entrer dans quelques détails — a notamment comparé les modes d’organisation spatiale propres à différentes cultures nationales et il a ainsi démontré que l'espace et son aménagement ne répondent pas à des normes universelles. L’ignorance des variations culturelles dans la perception et l'usage de l'espace

entraîne régulièrement un certain nombre d'incompréhensions interculturelles, parfois assez saisissantes. (Hall, 1966)

Pour mettre à jour ces aspects trop rarement pris en compte que sont la perception et l'usage de l'espace par ceux qui y vivent, il faut susciter la parole, écouter les habitants et reconstituer ainsi leur vision du monde, ou plutôt la vision de leur monde. Voici quelques extraits d'entretiens significatifs :

"Sur le dessus, je ne sais pas si on peut dire que c'est toujours le quartier Sainte-Marguerite. Au dessus de l'autoroute, ça change beaucoup. Les maisons sont plus belles, il y a moins de commerces, moins d'écoles."

(Homme, 55 ans, d'origine italienne, célibataire)

"Quand on dit le quartier Sainte-Marguerite, on parle d'un endroit où on peut déambuler, regarder les vitrines, etc. Sur l'autoroute, je ne te conseille pas de déambuler!"

(Femme, 42 ans, mariée, un enfant, commerçante)

"On est arrivé dans le quartier dans les années septante. On a repris une papeterie avec ma femme et ça a bien marché. A l'époque c'était très différent. Les gens venaient de partout pour faire leurs courses dans le quartier. C'était agréable, les gens se baladaient, comme maintenant dans le centre-ville. Il y avait la place avec tous les cafés autour. Aujourd'hui, c'est la voie rapide qui est là."

(Homme, 68 ans, belge, marié, cinq enfants, ancien commerçant)

A travers ces extraits, on constate notamment que certains sujets ont subi ce que l'on pourrait appeler une "désorganisation perceptive de l'espace" et ceci endéans même les limites de leur environnement le plus quotidien. Ces données illustrent bien le type de problématiques auxquelles les acteurs se heurtent quotidiennement au sein du quartier Sainte-Marguerite. La dysphorie semble dominer leurs rapports interpersonnels; comment amener jusque dans ces quartiers l'euphorie des terrasses ?

C. LES TERRASSES

Les terrasses liégeoises — et, pour autant que nous puissions en juger, de nombreuses terrasses dans nombre d'autres villes — se donnent à voir dès l'abord comme des lieux agréables, consacrés à la détente et au loisir, au sein même du tumulte de la vie urbaine.

Ce sont bien des lieux d'euphorie. D'ailleurs la terrasse de café est fréquemment représentée sur des documents tels que cartes-vue ou dépliants touristiques pour figurer cette joie d'être en ville. Ainsi, dans la légende d'une toute récente carte de Liège[1] , axée précisément sur les loisirs, le tourisme et le divertissement, on lit : "Installez-vous à une terrasse et vous comprendrez le sens du mot convivialité ." La terrasse a le pouvoir d'évoquer un certain bien-être qui se vit non seulement individuellement, mais aussi collectivement.

En proposant un tel terrain, largement éclaté dans l'espace urbain, nous pourrons effectivement

1. Publiée à l'initiative de l'Echevinat des Affaires Economiques

approfondir la réflexion sur le concept d'Agora — une Agora ici toute ponctuelle, décentralisée, et tout cas démultipliée. D'ailleurs, l'approche préalable que nous avons déjà effectuée a d'ores et déjà permis d'aboutir à une première hypothèse de travail. En bref, celle-ci mène à penser que la terrasse offre à voir, induit et reproduit ce que l'on pourrait appeler les formes d'une sociabilité urbaine harmonieuse, c'est-à-dire les formes de l'urbanité.

Soit la "photographie verbale" suivante, qui résulte de notre observation participante à une terrasse liégeoise, un jour d'été...

Autour de la place de la Cathédrale, le centre de Liège présente un réseau assez étendu de rues, de ruelles et d'espaces réservés aux piétons. Nombreux sont les commerçants établis dans ce périmètre qui profitent de l'espace ainsi gagné sur le trafic des voitures pour l'investir de "dépendances" extérieures. Notamment, les cafetiers — moyennant le paiement d'une taxe — disposent volontiers des tables en plein air. Autant de terrasses, aux dimensions et aux formes variées, qui parfois voisinent avec tant de proximité qu'il faut se donner un peu de peine pour identifier les établissements auxquels elles sont respectivement attenantes. L'observateur exploite ces proximités qui lui permettent de se poster à sa guise et d'étudier, de près, les comportements des consommateurs.

Marc et Christophe , la trentaine l'un et l'autre, ont marché côte à côte. Côte à côte, les mains dans les poches d'amples pantalons de toile, ils ont parcouru la rue Saint-Paul, qui les a menés jusqu'au Quartier Latin. Là, de conserve, ils marquent une pause. Marc désigne de la main une table à proximité. Christophe jette un rapide coup d'œil sur cette table, puis, d'un geste du bras, montre une autre table, plus en retrait. Une négociation a lieu, brève et tout à fait muette.

Sans se consulter, ils contournent la table, Marc par la gauche, Christophe à droite. Encore debout, ils aménagent l'emplacement. Ils s'emparent chacun d'une chaise et, spontanément, les placent l'une à côté de l'autre, "en ligne", adossées à la vitrine du café. Marc dépose un trousseau de clés sur le plateau de la table et s'assied, suivi de peu par Christophe. Bientôt, Marc étend les jambes sous la table. Il pose les mains et les avant-bras sur les accoudoirs de son siège, le haut du dos s'appuyant à l'extrémité supérieure du dossier.

Christophe est plus lent à trouver la pose. D'abord, il se tient très droit sur sa chaise, le dos sans appui au dossier, les jambes repliées sous le siège et les paumes posées sur les cuisses. Son regard se pose tantôt sur les tables voisines, furtivement, tantôt sur des points plus lointains de l'espace. Puis il considère avec plus d'intérêt une zone située aux alentours du cendrier posé au centre de la table qu'il partage avec Marc. Zone à laquelle ce dernier consacre d'ailleurs toute son attention depuis le premier moment.

Christophe se détend peut-être. Du moins allonge-t-il lui-aussi les jambes. Il pose également les mains à plat sur les accoudoirs de son siège. Son buste bascule en arrière, jusqu'à venir se bloquer sur le haut du dossier. A cet instant, les postures de Marc et Christophe apparaissent identiques et presque parfaitement symétriques par rapport à la médiane du plateau de la table.

Durant un moment, l'observateur perd de vue Marc et Christophe.

Marc et Christophe sont toujours assis côte à côte. Cependant, la pose évolue. Marc se renverse "de côté". Il pose en appui son avant-bras gauche sur l'accoudoir correspondant, penche le buste vers la gauche et replie les jambes "en équerre" sous le siège. Christophe quant à lui, s'incline sur la droite

de son siège, dans une position "en miroir".

A quelque distance, l'observateur note que les silhouettes de Marc et de Christophe dessinent une manière de voûte surplombant l'espace qui sépare leurs deux chaises. La conversation se poursuit. Christophe appuie ses phrases de mimiques et de gestes discrets. Marc a des hochements de tête approbatifs. Christophe écoute Marc à son tour et opine du chef lui aussi. A deux ou trois reprises, la discussion a pris un tour plus tourmenté. Alors, la voûte a tremblé. Christophe a pris un peu de recul et s'est à nouveau tenu très droit sur son siège. Marc s'est montré plus distant et a croisé les jambes. Puis la conversation a changé de sujet et la voûte s'est peu à peu recomposée.

Il ne s'est rien passé et pourtant "il n'arrive jamais que rien n'arrive", selon un vieux principe anthropologique. Dans ces gestes, dans ces regards, ces paroles, c'est toute l'urbanité qui s'exprime, c'est-à-dire tout l'art d'être un urbain qui jouit de son milieu de vie. Tous comptes faits, rares sont les études du plaisir d'être (de l'euphorie). Les travaux scientifiques portent le plus souvent sur les problèmes, les conflits, les dissonances. Nous essayons d'inverser cette tendance, que rien ne justifie, sinon l'équation sérieuse et morosité...

4. UN SENS RENOUVELÉ POUR LA VILLE...

Nos précédents développements ont sans doute manifesté à suffisance tout l'intérêt que nous portons aux aspects les plus concrets des usages (effectifs ou projetés) dont sont investis les différents terrains envisagés. On nous objecterait aisément qu'il y a là beaucoup d'énergie dépensée pour décrire

des choses qui, somme toute, "vont de soi" et, qu'à tout prendre, on pourrait aussi bien entamer la réflexion en se haussant d'emblée à un plus haut niveau de généralité.

Nous pensons au contraire qu'aucun trait un tant soit peu tangible de ces usages ne peut être indifférent. L'anthropologie entend précisément évacuer les préjugés du "ça-va-de-soi". Elle systématise même une sorte particulière d'inconvenance qui consiste à "mettre sous examen" des objets profondément inscrits dans la quotidienneté citadine et, en ce sens, ses prémisses se situent tout en bas de l'échelle des généralités.

La recherche urbaine n'est pas, dans notre perspective, une pure spéculation intellectuelle, mais bien plutôt un travail empirique — et donc nécessairement patient — qui s'entame par l'observation minutieuse des échanges les plus banals et les plus familiers du citadin avec son environnement humain et matériel. Ceci ne revient pas à dire que l'on devrait à tout jamais se résigner à n'aboutir qu'à des conclusions fragmentaires, mais, à notre avis, il n'en est pas moins vrai qu'un savoir nouveau et véritablement utile sur l'urbanité ne peut se construire que pas à pas, d'induction en induction.

Dans le même ordre d'idée, nous pouvons sans doute faire une nouvelle fois référence à l'œuvre d'Erving Goffman qui a diversement amplifié une conception selon laquelle l'"ordre de l'interaction" est une des modalités de l'ordre social global. (Goffman, 1988) C’est le monde social tout entier qui se donne à voir et s'actualise dans les rencontres et les échanges de tous les jours.

La sociabilité urbaine n'est à tout bien considérer qu'une abstraction qui ne prend forme elle aussi que dans des interactions toujours ponctuelles. Ainsi, si l'on s'en remet à Goffman, étudier des terrains urbains, même circonscrits, équivaut à se donner les moyens de pénétrer l'ordre global de l'urbanité.

L'étude que nous proposons de mener à Liège se voudrait applicable à d'autres milieux urbains en, mais aussi en dehors de l'Europe.

Nous pensons qu'à travers l'étude de la place Saint-Lambert, par exemple, nous pouvons montrer l'importance d'un espace central urbain dans les rapports que le citoyen peut entretenir avec sa ville. Le cas de Liège fait émerger les problèmes qui peuvent survenir en cas de déstructuration totale et durable du centre-ville, de la place qui tient lieu d'Agora.

L'approche du quartier Sainte-Marguerite pourrait quant à elle mettre en évidence une série de facteurs. Par exemple, l'influence que peuvent avoir des travaux urbanistiques importants dans la vie d'un quartier, qui peut s'en trouver parfois totalement bouleversée. Ou encore le rôle du rapport du citoyen à l'espace dans les relations multiculturelles qui peuvent se nouer dans un quartier très hétérogène comme Sainte-Marguerite.

Enfin, à travers l'étude des terrasses de Liège, nous croyons notamment pouvoir mettre en évidence les formes simples (en apparence) d'une harmonie urbaine qui se vit un peu comme Monsieur Jourdain faisait de la prose — qu'on nous permette cette image — mais dont, précisément, cette soi-disant simplicité révèle simplement la prégnance au sein des usages citadins.

5. BIBLIOGRAPHIE

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BLANCHET, Alain & al. (1985), L'entretien dans les sciences sociales, Paris, Editions Dunod, publié avec le concours du Centre National de la Recherche Scientifique.

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LYNCH, Kevin (1960), The Image of the City, Cambridge Massachusetts/London, The MIT Press (Trad. fr. : Image de la Cité, Paris, Editions Dunod, 1969).

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SANSOT, Pierre (1984), Poétique de la ville, Paris, Klincksieck.

Tous ces facteurs que nous pensons pouvoir éclairer sous un jour nouveau débordent largement du cadre de la ville de Liège. Aucune ville d'Europe ne peut engendrer de relations totalement harmonieuses envers l'espace urbain si son cœur est déstructuré pendant plusieurs décennies. De la même manière, toutes les villes d'Europe connaissent le cas de quartiers pluri-ethniques ou pluri-culturels, et la vie sociale de ces quartiers peut être problématique, ou au contraire peut se développer d'une manière harmonieuse. Il n'est pas également une ville qui ne soit confrontée au problème de l'incidence que peuvent avoir des projets urbanistiques sur la vie de ses habitants. Quant aux terrasses, elles contiennent un enjeu qui, s'il prend place sur une échelle plus réduite, ne met pas moins en scène la qualité de la vie sociale d'une ville.

La recherche que nous proposons est certes ambitieuse, mais en cela, elle n'est qu'à la mesure des vrais défis urbains d'aujourd'hui: c'est l'étude d'une ville pour donner un sens renouvelé à la ville...

UNIVERSITE DE LIEGE, BELGIUM

FACULTE DE PHILOSOPHIE ET LETTRES

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RESEARCH INTERESTS AT THE LAC

The Anthropology of Communication Unit is based on the principle once offered by Ward Goodenough that culture is everything one has to know in order to become a member. The unit focuses on the reconstruction of micro-cultures (professional cultures, institutional cultures, cultures of urban public places, etc.), i.e. on the elaboration of the implicit social codes one has to incorporate to be culturally competent. The procedure is essentially ethnographic, as understood by contemporary anglo-saxon anthropology : mapping, behavioural observation, in depth interviews with the different agents. The goals of the unit are consciously interdisciplinary, insofar as the unit is a research base for people trained either in communication sciences, animal and human ethology, or various philologies. But a single principle underlines the entire body of research projects : an essential tension between theoratical demands and empirical necessity.

RESEARCH TOPICS

•Ethnographic approach to the social construction of national boundaries (Tomke Lask)
•Anthropological analysis of intercultural relations (Christiane Paulis)
•Ethological approach to analogical communication (Véronique Servais)
•Anthropological approach to emotional displays on stage (Christine Sumkay)
•Creolization as collective representation and identification (Guy Massart)
•Comparative analysis of images and usages of university campuses (Pierre Frankignoulle, Tomke Lask, Yves Winkin)
•Socio-economic analysis of the production and promotion of books (Yves Winkin).
•Sociological analysis of the producers of symbolic goods — journalists, editors, public relations workers (Yves Winkin)
•Ethnographic approach to interaction rituals in Western urban environments (Yves Winkin)
•Social history of the social sciences in the USA since 1945, especially communication sciences (Yves Winkin)

1.

CURRICULUM VITAE (Septembre 1995)

1. ETAT CIVIL

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Etat-civil : célibataire

2. ETUDES SUPERIEURES

Diplômes universitaires

1. Candidat en philosophie (U.Lg., juin 1974, GD-GD)
2. Licencié en Information et Arts de Diffusion (U.Lg., juin 1976, GD-PGD)
3. Master of Arts in Communications (U. of Pennsylvania, Annenberg School of Communications, décembre 1979)
4. Docteur en Information et Arts de Diffusion (U.Lg., 5/2/1982, PGD).

Titre de la thèse : La communication : de l'interaction à l'institution. Approche ethnographique d'une Maison Internationale d'étudiants aux Etats-Unis.

3. DOMAINES DE RECHERCHE

- Approche ethnographique des rites d'interaction en milieu public et semi-public urbain;
- Histoire sociale des sciences sociales aux Etats-Unis depuis 1945 (spéc. sciences de la communication, sociologie, anthropologie);
- Analyse sociologique des producteurs de biens symboliques (spéc. éditeurs, relations publiques).
- Analyse anthropologique des représentations et des usages de l'espace collectif (spéc. musées, résidences universitaires et campus).

4. EVOLUTION DE LA CARRIERE PROFESSIONNELLE

- Octobre 1984 - septembre 1992 :

Chercheur qualifié, Fonds National de la Recherche Scientifique (poste à durée indéterminée).

- Octobre 1985 - septembre 1992 :
  Chargé de cours, université de Liège (temps partiel).
- Octobre 1992 - décembre 1993 :
  Chargé de cours, université de Liège (temps complet).
- Octobre 1990 - septembre 1994 :

Chargé de cours invité, université de Louvain
Cours : Tourisme, culture et communication (30 h)

- Depuis le 1er janvier 1994 :
  Professeur, université de Liège, Service d'anthropologie de la communication
  Titulaire des cours suivants :
  -Théories de la communication (30 h)
  - Introduction aux politiques de la culture (30 h)
  - Anthropologie de la communication (30 h)
  - Relations interculturelles et processus d'acculturation (30 h)
  - Exercices d'anthropologie de la communication : les aires sociales (30 h)
  - Analyse anthropologique des relations publiques et de la publicité (30 h)
  - Questions approfondies d'anthropologie de la communication (30 h)
  - Sociologie de l'espace urbain et rural (30 h)
  Suppléant pour les cours suivants :
  - Socio-économie des circuits du livre (30 h)
  - Méthodologie du travail de terrain : les aires sociales (30 h)
  - Analyse sociologique de la société américaine (30 h)
  - Pratiques de la communication interpersonnelle (30 h)

5. PRIX ET DISTINCTIONS SCIENTIFIQUES

- Ministère de l'Education Nationale : lauréat du "concours des bourses de voyage" 1976.
- Université de Liège : "Prix des Amis de l'U.Lg.", 1982.
- Center for Advanced Study in the Behavioral Sciences (Stanford, Palo Alto) : Junior Fellowship Candidate List (1984).
- Harvard University : Andrew J. Mellon Foundation Faculty Fellowship Final List (1992).

6. BOURSES

- Belgian American Educational Foundation : C.R.B. Honorary Graduate Fellowship, 1976-77.
- I.T.T. International Fellowship, 1976-77 et 1977-78.

7. PRINCIPAUX SEJOURS D'ETUDES OU DE RECHERCHE

Séjours d'études à l'étranger

- University of Pennsylvania, Annenberg School of Communication (M.A. Program), 1976-1978.
- Ecole des Hautes Etudes en Sciences Sociales, Séminaire de Sociologie de l'Education et de la Culture (Dir. : P. Bourdieu), 1978-1981.

Séjours de recherche à l'étranger

- Visiting Scholar, Annenberg School of Communications, 1980, 1981, 1985, 1986.
- Directeur d'études associé, Ecole des Hautes Etudes en Sciences Sociales, 1984-85, 1985-86.
- Chercheur associé, Centre National de la Recherche Scientifique, 15 septembre-15 décembre 1986.
- Maître de conférences invité, Ecole des Hautes Etudes en Sciences Sociales, Paris, 1989-90.
- Visiting Scholar, University of Pennsylvania, Dpt of Landscape Architecture and Regional Planning, Printemps et Automne 1991.

- Professeur invité, Ecole des Hautes Etudes en Sciences Sociales, Printemps 1992.
- Directeur de recherches associé, CNRS, automne 1994.

Séjours d'enseignement à l'étranger

- Fulbright Scholar-in-Residence, University of Wisconsin-Parkside, Dpt of Communications, Automne 1983.
- Professeur invité, Université du Québec à Montréal, Dpt des Communications, janvier 1984.
- Chargé de conférences, Ecole des Hautes Etudes en Sciences Sociales, 1986-87.
- Visiting Associate Professor, University of California-Berkeley, Dpt of Sociology, Printemps 1987.
- Maître de conférences associé, Ecole des Hautes Etudes en Sciences Sociales, 1987-1988.
- Visiting Professor, Massey University (Palmerston North, New Zealand), Dpt of Social Anthropology, Eté 1989.
- Professeur invité, Université de Genève, Département de Sociologie, mars 1992.
- Professeur invité, Université Mohammed V, Faculté des Lettres et des Sciences humaines, Rabat, mars 1992.
- Directeur d'études invité, DEA "Communication, technologies et pouvoir", Département de Science Politique, Université de Paris I (Panthéon-Sorbonne), depuis le 1er octobre 1994.
- Professeur invité, Institut d'Etudes européennes, Université de Genève, Automne 1994.
- Professeur invité, Département d'Anthropologie, Université fédérale de Rio de Janeiro, avril-mai 1995.

8. PARTICIPATION, SUR INVITATION, A DES COLLOQUES, CONGRES OU REUNIONS SAVANTES (1)

- 1991 : -"Tendances actuelles de la recherche en communication aux Etats-Unis", conférence à

l'Université de Montpellier-III, 1er février 1991.

-"Pour en finir avec la communication non verbale. Eléments pour une formation anthropologique au mouvement scénique", communication au colloque "Par-delà Stanislavski", Saintes, 7 avril 1991.

-"Erving Goffman : Outline of an Intellectual Biography", exposé dans le cadre des colloques de l'Annenberg School for Communication, Université de Pennsylvanie, 22 avril 1991.

-"Pourquoi l'interaction ne fait-elle plus d'histoire ?", rapport auprès de l'atelier "Aspect cognitifs et sociaux de l'interaction", colloque "L'analyse des interactions", Université d'Aix-en-Provence, 13 septembre 1991.

-"Erving Goffman : a geographical/social/intellectual itinerary", conférence à l'Université Rutgers (New Jersey), 11 décembre 1991.

- 1992 : -"When the Faculty meets on April Fool : "Arts and Sciences of Communication" at the University of Liège, communication au colloque Understanding Broadcasting : Media Education Across Europe, Université de Bilbao, 6 mai 1992.

-"Introduction à l'ethnographie urbaine", communication à l'Université de Montpellier-III, 15 mai 1992.

-"Eléments pour une histoire sociale de l'expression "communication interculturelle"", communication au XIVème Congrès de l'Association internationale des sociologues de langue française, Université de Lyon-II, 7 juillet 1992.

- 1993 : -"Readability in the Human Sciences", communication au colloque "The Human Sciences in the Age of Theory", Centre for the Study of Theory and Criticism, University of Western Ontario (London, Canada), 2 avril 1993.

-"Approche ethnographique de la sociabilité urbaine : les terrasses de Liège et de Rabat", communication à la "Première Rencontre interuniversitaire maroco-belge", Rabat, 9 avril 1993.

-"L'ethnographie de la communication : théories et terrains", séminaire du groupe PRISME, Centre national d'études des télécommunications, Paris, 21 juin 1993.

-"L'ethnographie : histoire, principes, terrains", séminaire de recherche, Institut de Recherche sur le Maghreb Contemporain (IRMC), Rabat, 28 octobre - 2 novembre 1993.

- 1994 : -"L'éthique de la communication en milieu médical", conférence à l'hôpital Necker (Paris V) dans le cadre du DEA en Ethique médicale, 14 février 1994.

-"Media Education : an ethnographic approach", Yarmouk University, Irbid, Jordanie, 12 avril 1994.

-"Media Education : a challenge to the traditional university system ?", communication au séminaire Mediernas roll i ett fromtida Europa, Université de Karlstad (Suède), 24 mai 1994.

-"La communication des identités en Europe : des travaux en cours à la réflexion prospective", CNRS, Assises de la communication, 1er juin 1994.

-"The Potential of International Collaboration : the Erasmus Case", Speech Communication Association, Convention annuelle, La Nouvelle-Orléans, 19 novembre 1994.

-"A tribute to Ray Birdwhistell", Speech Communication Association, Convention annuelle, La Nouvelle-Orléans, 22 novembre 1994.

- 1995 : -"L'émergence des sciences de la communication aux Etats-Unis : éléments pour une histoire sociale", Paris, séminaire du Laboratoire "Communication et politique" (CNRS), 17 février 1995.

-"Du bon usage de la communication en psychiatrie : un éclairage anthropologique", Séminaire de Psychiatrie, Psychologie médicale et Psychosomatique de l'Université de Liège, 23 février 1995.

-"L'arrangement entre les sexes selon Goffman", colloque international de recherche, "Femmes, hommes, identité, égalité, différence", Paris, Palais du Luxembourg, 6 mars 1995.

-"Bourdieu et la Sociologie du sport", remarques de clôture au colloque "Sports et Médias",

Université catholique de Louvain-la-Neuve, 8 mars 1995.

-"L'espace public : des philosophes aux urbanistes et retour", introduction de la journée d'études "Espace(s) public(s)/espace(s) privé(s)", Paris, séminaire du Laboratoire "Communication et politique" (CNRS), 13 mars 1995.

-"Portée et limite de la 'nouvelle communication'", intervention au "Troisième cycle inter-universitaire de Sociologie de Suisse occidentale", Université de Genève, 19 juin 1995.

-"Towards a MA in Border Studies ?", remarques de clôture au colloque "Identities without Borders : Constructing a Future Europe", Marche-en-Famenne (co-organisation : Universités de Coventry, Liège et Louvain), 9 juillet 1995.

9. SOCIETES SAVANTES

- Société Européenne de Culture
- American Anthropological Association
- American Sociological Association
- Speech Communication Association
- International Communication Association
- Société Française d'Histoire des Sciences Humaines
- Association pour la Recherche Interculturelle
- European Association of Social Anthropologists
- Royal Anthropological Institute

10. AUTRES ACTIVITES SCIENTIFIQUES

Direction de centres de recherche

- Co-fondateur et co-directeur du "Centre de Recherches sur les Arts de la Communication" (CRAC), Université de Liège (1980).
- Fondateur (1985) et responsable (1985-1990) de la Cellule des Relations extérieures du

C.H.U. de Liège.
- Fondateur du "Centre d'Etudes du Livre Contemporain" (CELIC), Université de Liège (1988).
- Fondateur de la cellule "Recherche et Développement en Communication " (R/D Comm), Université de Liège (1988).
- Co-fondateur et membre du Conseil d'Administration du "Centre d'Etudes Japonaises de l'Université de Liège" (CEJUL), asbl, 1991.
- Co-fondateur du "Centre de Recherches et d'Etudes sur les Modes de Représentation des Institutions" (CREMRI), asbl, 1992.
- Membre fondateur du "Groupe européen de Communication" (consortium de départements de communication réunis au sein d'un réseau ERASMUS).
- Membre du Conseil d'Administration de "Recherche et Formation Théâtrales en Wallonie", asbl; Président du C.A. depuis mai 1993.
- Membre du Conseil d'Administration de l'"Agence de Coopération au Développement par les Sciences et les Techniques" (A.C.D.S.T.), Liège, asbl.
- Membre du Comité directeur du "Centre européen pour l'Etude de l'Argumentation", U.L.B., Institut de Philosophie.
- Membre du Comité directeur du "Laboratoire d'Etudes des Migrations, de l'Ethnicité et du Développement" (LEMED), Université de Liège.

Direction de recherches sous contrat
- "L'édition belge d'expression française" (1986 et 1987, Ministère de la Communauté française),
- "Les besoins et ressources de la Communauté en matière de terminologie et néologie des langues de spécialité" (1988, Ministère de la Communauté française).
- "Eléments pour une ethnologie de la communication politique belge : José Happart et les

Fourons" (1990, CNRS).
- "La promotion du livre belge d'expression française" (1992, Ministère de la Communauté française)
- "Ethnographie des musées liégeois" (1992, Ministère de la Communauté française)
- "Histoire intellectuelle des sciences de la communication aux Etats-Unis" (1992, CNRS)
- "Approche anthropologique des rapports entre l'espace construit, ses concepteurs et ses usagers" (1993-95, FNRS).
- "Communication interculturelle, multiculturalisme et métissage" (1994, CNRS).
- "L'édition littéraire en Communauté française de Belgique" (1994, Ministère de la Communauté française).

Activités éditoriales
- Co-éditeur responsable du magazine trimestriel de l'Université de Liège, Liège Université et du périodique bimensuel interne, Le Quinzième Jour, depuis 1986-1987.
- Editeur responsable du magazine trimestriel du FNRS, La Lettre du FNRS, depuis 1989-1990.
- Co-fondateur (1988) de la collection" L'Homme/l'Etranger" aux Editions De Boeck (Bruxelles).
- Lecteur pour les Editions du Seuil (Paris) et les Editions De Boeck (Bruxelles).
- Membre du secrétariat de rédaction de la revue Hermès (CNRS, Paris).
- Membre du conseil scientifique des Cahiers internationaux de psychologie sociale (U.Lg.), Etudes de Communication (U. de Lille-III), Research on Language and Social Interaction (USA), Recherches en Communication (UCL), Quaderni (U. de Paris-I).
- Lecteur auprès des revues Actes de la recherche en sciences sociales (EHESS/Collège de France),Technologies de l'information et société (U. de Liège/UQAM), Theory, Culture and Society (Londres).

Association aux activités de centres de recherches étrangers

- Chercheur associé au Centre de Sociologie Européenne (Collège de France; dir.: P. Bourdieu).
- Chercheur associé au Centre de Sociologie de l'Education et de la Culture (Ecole des Hautes Etudes en Sciences Sociales, dir. : M. de Saint Martin et J.-C. Combessie).
- Chercheur associé au Laboratoire CNRS "Communication et Politique" (Dir. : D. Wolton).
- Coordinateur scientifique (avec D. Dayan) du pôle "communication interculturelle et identités en Europe" du Programme de Recherches sur les Sciences de la Communication du CNRS.

Commissions et expertises

- Représentant du FNRS auprès du "European Science Communication and Information Network".
- Membre de la Commission d'Aide à la Diffusion, Ministère de la Culture de la Communauté française de Belgique.
- Membre du Groupe multilatéral "Information Scientifique et Technique" de l'AUPELF/UREF.
- Expert auprès du Comité national d'Evaluation (des universités françaises) pour les Sciences de la Communication.
- Expert auprès de la CEE, "Projets pilotes européens pour l'évaluation de la qualité dans l'enseignement supérieur".

11. PRINCIPALES PUBLICATIONS

A. Livres

1. La Nouvelle Communication, Paris, Editions du Seuil, 1981, 384 p., 1989

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2. Erving Goffman : les moments et leurs hommes, Paris, Editions du Seuil et Editions de Minuit, 1988. Traduit en espagnol (Madrid, Paidos, 1991).

B. Direction d'ouvrages collectifs

1. Pragmatique et discours : actes du colloque "Langage et Ex-Communication", Louvain, Cabay, 1982 (avec Ph. Dubois).
2. Rhétoriques du Corps, Bruxelles, De Boeck, 1988 (avec Ph. Dubois).
3. Gregory Bateson : premier état d'un héritage, Paris, Editions du Seuil, 1988.
   Traduit en espagnol (Buenos Aires, Ediciones Nueva Vision, 1991).
4. Abdelmalek Sayad : L'immigration ou les paradoxes de l'altérité, Bruxelles, De Boeck, 1991 (avec M. Boudoudou).

C. Direction de numéros de revues à thème

1. "Langage et Ex-Communication", Degrés, 1981 (avec Ph. Dubois)
2. "La synchronie interactionnelle", Les Cahiers de Psychologie Sociale, n° 29, janvier 1986.
3. "La Communication interculturelle", Les Cahiers Internationaux de Psychologie Sociale, n° 2, Automne 1989 (en collaboration avec J.-P. Gaudier).
4. "Europe : la cohabitation", Hermès (à paraître), en collaboration avec D. Wolton).
5. "Frontières visibles et frontières invisibles", Quaderni (à paraître, en collaboration avec T. Lask).

D. Articles

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3. "L'édition belge de jeunesse en langue française", in coll., Littérature belge de jeunesse en langue française, Bruxelles, Ministère de la Culture française, 1976, pp. 36-41.

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1. (avec Monique Maraite), La radio des 15-18 ans : une enquête exploratoire, Liège, Centre RTBF-Liège, 1979 (35 p).

2. "L'édition belge francophone à l'âge des petits-enfants de Buddy Longway", in coll., L'Avenir culturel de la Communauté française de Belgique, Charleroi, Institut Jules Destrée, 1979, pp. 95-107.

3. (avec Luc Boone), "Le gatekeeper et la sélection des nouvelles", in coll., Information et Média, Bruxelles, Cahiers JEB, 1979, pp. 103-123.

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5. "Variétés de langue dans la Communauté française de Belgique. Propositions pour une ethnographie de la communication", Les Dossiers Wallons, 1979, tome 3, pp. 39-51.

6. "Ethologie humaine et communication sociale. A propos du livre de H. Montagner, L'enfant et la communication", in Les Cahiers de Psychologie Sociale, n° 2, 1979, pp. 30-32.

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1. (avec Philippe Dubois) "Un colloque sur une particule", Langage et Ex-communication, Université de Liège, Section Information et Arts de Diffusion, 31 janvier au 3 février 1980.

2. (avec Stuart Sigman) "Review of H. Gobard's L'aliénation linguistique", in Language in Society, vol. 9, n° 1, 1980, pp. 100-102.

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1982

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2. "Communication non verbale et expression faciale des émotions : une note critique sur les travaux de Paul Ekman", Le Langage et l'Homme, n° 49, mai 1982, pp. 16-23.
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5. (avec Philippe Dubois) "Une particule paradoxale", in Ph. Dubois et Y. Winkin, éds., Pragmatique et discours sociaux : actes du colloque de Liège (II), Louvain-La-Neuve, Cabay, 1982, pp. 5-10.
6. "Une famille cybernétique", postface à J. De Decker, Epiphanie, Bruxelles, Editions du Cri, 1982, pp. 77-81.

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1. "The French (Re)presentation of Goffman's Presentation and other books", Theory, Culture and Society, vol. 2, n° 1, 1983, pp. 47-55.
2. "Eating Topics and Talking Food : Conversational Rules in a Multicultural Residential Organization", Le Langage et l'Homme, n° 51, janvier 1983,
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1984

1. "Eléments pour une histoire sociale des sciences sociales américaines", Actes de la recherche en sciences sociales, n° 52/53, juin 1984, pp. 108-110.
2. "Education et ethnographie de la communication", Actes de la recherche en sciences sociales, n° 52/53, juin 1984, pp. 115-116.

3. "Entretien avec Erving Goffman", Actes de la recherche en sciences sociales, n° 54, septembre 1984, pp. 85-87.
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5. "Travail ethnographique et objectivation", Actes de la recherche en sciences sociales, n° 55, novembre 1984, pp. 41-45.
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4. "'Communiquer' et 'communication' : un retour aux sources", Questions de Logopédie, n° 11/12, 1986, pp. 11-27.
5. "Mémoire collective et métaphores", in coll., Droit à l'information, droit à la formation : quelques aspects de la communication à l'aube du XXIe siècle, Liège, CLPCF, 1986, pp. 275-276.
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7. C.R. de J. Cosnier et A. Brossard, eds, La Communication non verbale, in Cahiers de Psychol-

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3. "Goffman à Baltasound", Politix, n° 3/4, 1988, pp. 66-70.
4. (avec Martine van Zuylen) "Edition plurielle, éditeurs singuliers", Cahiers du Cacef, n° 131-132, 1988, pp. 61-69.
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2. (avec W. Leeds-Hurwitz) "Eléments pour une histoire sociale de la communication interculturelle américaine : la mission du Foreign Service Institute", Les Cahiers internationaux de Psychologie Sociale, n° 2, Automne 1989, pp. 23-41.
3. "Les relations publiques : rituels du pouvoir et pouvoirs du rituel", Lettre Science Culture, n° 40, mars-avril 1989, pp. 7-8.

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5. C.R. de M. Elkaïm, Si tu m'aimes, ne m'aime pas. Approche systémique et psychothérapie, in Les Cahiers internationaux de Psychologie Sociale, n° 2, Automne 1989, pp. 205-207.
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6. "Marabout : entre la province et le monde", in coll., Marabout, Mons, "Série B" Editeur, 1990, pp. 9-10.

1991

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4. "L'ethnographie en éducation aux Etats-Unis : une première cartographie avec une ébauche de projection sur la Belgique", postface à M.F. Degembe, Odyssée dans un archipel scolaire, Namur, Ed. Erasme, pp. 129-152.

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matiques de l'interethnicité et de l'interculturalité" (10-12 mai 1993), Université du Québec à Chicoutimi, pp. 33-50.

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E. Rapports pour colloques et pour contrats de recherche

1. (avec M. van Zuylen) Editeurs singuliers, édition plurielle. Un rapport sur la production du livre en Communauté française de Belgique, Bruxelles, Ministère de la Communauté française, 1987 (210 pages).

2. Besoins et ressources de la Communauté française en matière de terminologie et de néologie des langues de spécialités, Bruxelles, Ministère de la Communauté française, 1988 (140 pages).

3. (avec A. Nivarlet), Eléments pour une ethnologie de la communication politique belge : José Happart et les Fourons, Paris, CNRS, A.S.P. sur les "Aspects contemporains de la communication politique", 1990 (130 pages).

4. (avec P. Durand et M. Minon), La promotion du livre en Communauté française de Belgique, Bruxelles, Ministère de la Communauté française, 1992 (170 pages).

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F. Traductions et vidéogrammes

1. Traductions de textes américains en sciences sociales (Birdwhistell, Goffman, Sigman, Leeds-

Hurwitz) publiées dans divers ouvrages (La Nouvelle Communication, Gregory Bateson : premier état d'un héritage ; Erving Goffman, les moments et leurs hommes) ainsi que dans Actes de la recherche en sciences sociales et Les Cahiers internationaux de psychologie sociale entre 1983 et 1993.

2. Ensemble de cinq vidéogrammes de 30 minutes réalisés avec la "Télé-Université du Québec" (TELUQ) en 1984/1985 sur le thème de "La Nouvelle Communication".

G. Sous presse

1. "Approche ethnographique de la sociabilité urbaine : les terrasses de Liège et de Rabat". Actes de la première rencontre interuniversitaire maroco-belge, Rabat, Université Mohammed V, à paraître en 1995.

2. "Les formes vertes : figures de pensée, enjeux de pouvoir et métamorphoses prochaines", Actes du Colloque "Villes et Jardins", Liège, CEJUL, à paraître en 1995.

3. "Media Education : a Challenge to the Traditional University System ?", Karlstad, A.M. & G. Anders Foundation, à paraître en 1995.

4. "Erving Goffman : what is a life ? The uneasy making of an intellectual biography", à paraître in G. Smith, ed., Goffman's Patrimony : Studies in a Sociological Legacy, Londres, Routledge, à paraître en 1995.

5. "De l'Utopie au Non-lieu. Genèse d'un campus : le 'Domaine universitaire' du Sart Tilman" (en coll. avec Fabienne de Smet et Pascal Durand), dans Espaces et Sociétés, à paraître en 1995.

H. Livres en cours de rédaction (contrats signés)

1. L'Anthropologie de la communication : de la théorie au terrain, à paraître aux Editions De Boeck (Bruxelles).

2. Erving Goffman : a biography, à paraître chez Macmillan (Londres).

3. Histoire de la démarche ethnographique, à paraître aux Editions du Seuil (Paris).

4. Pierre Bourdieu : a way of seeing, à paraître chez University of Manchester Press (Manches-

ter).

(1) Seules les invitations à l'étranger des quatre dernières années ont été recensées.

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Professional Formation

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Title of the Master Thesis

"Ordem e Progresso : a estrutura de poder na 'Cidade Operária' da Companhia Siderúrgica Nacional em Volta Redonda (1941-1964)" (Order and Progress: the power structure of the Companhia Siderúrgica Nacional's "Working Town" Volta Redonda (1941-64)), Post-Graduate Program of Social Anthropology (PPGAS) of the National Museum of the Federal University of Rio de Janeiro (UFRJ), Brazil, 29/09/91, 234 pp.

Title of the Doctor Thesis

"Identité et frontière : analyse interdisciplinaire. Le cas de Leidingen/Leiding en Sarre-Lorraine" (Identity and boundary: interdisciplinary analysis. The case of Leidingen/Leiding in Saar-Lorraine), Department of Philosophical Sciences and Communication Sciences at the Université de Liège, Belgium, 23/05/95, 351 pp.

Professional Activities

1) 1985-87 : Brazilian government student fellowship as research assistant of Dr. Regina Lúcia de Moraes Morel in the research project "Organisation of Work and Formation of the industrial Workers: a case study of the 'Companhia Siderúrgica Nacional'", Federal University of Rio de Janeiro (UFRJ).

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3) 1993-95 : Research fellowship of the European Commission in order to achieve a doctor's degree at the University of Liège.
4) Together with Prof. Yves Winkin from University of Liege, organisation of one volume of the French Revue QUADERNI about the anthropological notion of boundary; to be published in autumn 1995.
5) 1992-93, 1993-94 : Regular teaching participation in the course "Intercultural relationship and the process of acculturation" at the University of Liège.
6) 1994-95 : Organisation and teaching of the course "Intercultural relationship and the process of acculturation" for the graduate course "Licence spéciale en gestion du développement" at the University of Liege.
7) 1993-94 and 1994-95 : Teaching participation in courses concerning intercultural relationship of the "Diplôme Européen de Psychologie Sociale appliquée" (D.E.P.S.A.) at the University of Liege.
8) Together with Dr. Marco Martiniello (Senior research fellow at the Fond National de la Recherche Scientifique (FNRS) organisation of the first French translation of a selection of Fredrik Barth's texts, to be published in 1996.

Conferences, Seminaries and Congresses

1) 29/03/1994 : "Bouffeurs de baguette et Casques à pointe — Essai de conscientisation aux idées européennes dans une école allemande" ('Baguette Heads' and 'Spiked Helmets': attempt to make school children aware of the European Construction), during the annual conference program Faculté ouverte at the University of Liège.
2) 29/09/94 : "La renégociation des identités nationales dans le processus de l'européanisation" (Re-

negociation of national identities during the process of europeanization), 5th International Congress of ARIC (Association pour la Recherche InterCulturelle) in Saarbrücken, Germany (26-30/09/94).
3) 16/11/94 : "A renegociaç_o das identidades nacionais no processo de europeanizaç_o"(Renegociation of national identities during the process of europeanization), Rockfeller Foundation/ UFRJ, during the program for the "National week of black consciousness" at Rio de Janeiro.
4) 21/11/94 : "Problemas metodológicos da pesquisa antropológica na fronteira franco-alem_" (Methodological problems of fieldwork at the German-French border), at the Post-Graduate Program of Social Anthropology (PPGAS) at the National Museum of the Federal University of Rio de Janeiro (UFRJ).
5) 24/11/94 : "A política francesa de língua e a identidade : um estudo de caso na regi_o do Saar e da Lorena (1945-95)" (French language policy and identity : a case study in the Saar-Lorraine region), annual congress of Social Sciences (ANPOCS) in Caxambú, Brazil, (23-27/11/94).
6) 2/12/94 : "Influence of Geopolitics on the formation of national Identity : a case study in the Saar-Lorraine region", at the session "History, Power and Identity in the construction of a New Europe" during the annual congress of the American Anthropology Association (AAA) in Atlanta, (29/11/-5/12/94).
7) 13/03/95, "L'espace public en géographie : genèse de la notion de frontière chez Ratzel et Vidal de la Blache" (Public Space in Geography : genesis of the border notion in Ratzel's and Vidal de la Blache's Work) during the journey Espace public — Espace privé in Paris, organised by Centre National de la Recherche Scientifique (CNRS).
8) 26/04/95 : Conference/Course about intercultural relationship during the admission program for staff officers at the Institut Royal Supérieur de Défense in Brussels.
9) 29/06/95 : "Identité et frontière : le cas Sarre-Lorraine" (Identity and borders : the Saar-Lorraine case) at the 18th meeting about regionalism, transnational culture and cooperation in St. Vincent,

Aosta-Valley, Italy organised by the Institut Européen des Hautes Etudes internationales (29 of June — 1st of July).
10) 08/07/95 : "L'Europe sans frontières ? Un état des lieux à la frontière franco-allemande" (Europe without Borders ? An Inventory at the German-French Border) in Marche-en-Famenne (Belgium), organised by the European Group of Communication Sciences (collaboration between the University of Coventry (UK) and the University of Liège (Belgium)), (7-9 of July).

Published papers

— "'Baguette Heads' and 'Spiked Helmets': Children's Constructions of Nationality on the German-French Border" in Border Approaches, Thomas M. Wilson/ Hastings Donnan (eds.), University Press of America, 1994, pp. 63-74.
— "Bouffeur de baguette et casques à pointes, essai de conscientisation aux idées européennes dans une école allemande", in Cahiers de Clio, Departement d'Histoire de l'Université de Liège, vol. 117-118, spring-summer 1994, pp. 55-70.

Papers to be published

— "Création et Entretien de l'identité nationale dans un village franco-allemand" in Frontières, Journal of the Collège de France.
— "Les professionnels de la frontière : les douaniers" in QUADERNI, journal in communication of University of Paris I, autumn 1995.
— "Grenze/frontière : le sens de la frontière" in QUADERNI, journal in communication of University of Paris I, autumn 1995.
— "Intégration européenne et renégociation des identités nationales, le cas de Leiding/Leidingen, village « bilimitrophe » en Sarre-Lorraine" in HERMES, journal of CNRS

Professional Association's Membership

—Associaç_o brasileira de Antropologia (AbA) (Brazilian Anthropological Association), since 1987.

—Association Suisse de Sociologie (ASS) (Swiss Association of Sociology), since 1993.
—American Anthropology Association, since 1994.
—Society for the Anthropology of Europe (SAE), since 1994.
—European Association of Social Anthropologists (EASA), since 1995.

Language Knowledge

German : native speaker
Portuguese : fluent (written and spoken language)
French : good (written and spoken language)
English : good (written and spoken language)

Myth of the City: identity, planning, culture

Dr.Hatto Fischer

The Weatherscreen is not something we endure,
for we face decisions that make us hurry through space
as if love is not the upkeep of a certain pace
in favour of life giving all it can to make us human.

HF

Introduction

When making the tender for ACT-VILL, certain experiences defined our approach to the key problem, namely how to proceed "*Towards a Better Liveable City*". Aside from the various professional ones such as planning in the United States and Europe (in particular the difference between Eastern and Western Europe) and personal ones by having lived in countless cities, there was a common experience. For most of the tender group participated in the Fifth Seminar, "***Culture, Building Stone for Europe 2002***" held in Athens, June 3-5, 1994 during the Greek presidency of the European Union. The seminar was not only a response to the fact that the term '*culture*' received a first consideration by the Maastricht Treaty, but also the result of an initiative by the Flemish community in Belgium wishing to preserve '*cultural diversity*' in Europe while convergence and integration continues to shape the relationships between member states as well as the prevailing conditions within Europe.

Even before receiving reply from Brussels as to our tender made with regards to Action 1 of ACT-VILL, we decided to continue within our network the discussions started by the Fifth Seminar and to try to shape our research work around nine questions, in order to clarify decision making processes and planning procedures within European cities. The aim is to establish a heuristic framework by which studies of different planning experiences and concepts can be made on a truly comperative basis. For in particular workshop 1 of the Fifth Seminar indicated that European programmes tend to

be conveyed by a group of transnational experts remaining in their own language ghettos; when it comes to the application of these programmes, then the translation into the particular cultural context will be partial and not anymore within the recognition of common experiences made with regards to the programme designed originally to improve practical conditions while contributing to European integration, e.g. the structural fond and overcoming of inequalities between regions and specific cultures.

This analytical concern was complemented by a wish to find a continuation for the Poetry Festival held in Kamilari, Crete. That festival searched for '***Voices in European Poetry***' in relation to mythology, in order to express the common root of European Cultures while allowing for the articulation of cultural differences. In a discussion after these events with the Irish poet **Brendan Kennelly**, the idea prevailed to try and to bring together poets and analytical experts, in order to discuss together under the theme '***Myth of the City***' the prevailing conditions of life in European Cities. Two literary aspects come herewith into play: the connection between Homer and James Joyce is that European Civilization has forced man into a voyage through the urban grid comperative to Odysseus' voyage for more than twenty years before returning home; by '***Myth of the City***' not only positive attitudes are meant, but those expressing hate of the cities and preferring to live in villages, that is with 'images' helping to cope with a complexity no longer to be dealt with in adequate, that is human terms, the skyscrapers of New York or the business buildings in the City of London certainly beyond all proportions.

Our tender to ACT-VILL was, therefore, the outcome of these two different approaches to life in cities: the analytical and the artistic, that is poetic one. What will follow is a short review of the Fifth

Seminar, in particular what contents thereof pertain to the discussion here, and then some reference will be made to the more recent conference "***Myth of the City***" held September 9 - 15th 1995 in Crete.

Regional/Urban Planning and Culture

It would be too much here to mention all of the proposals made for cultural actions so as to safeguard cultural diversity in Europe at the Fifth Seminar in Athens (1994), but one of the ten workshops dealt with the topic "***Regional/Urban Planning and Culture***" chaired by **Anna Arvanitaki**. The recommendations from experts like **Phil Cooke**, Cardiff, Wales or **Michael Parkinson**, Liverpool all pointed in the same direction:

- unliveable cities means really a threat to the social cohesion in Europe;
- there is a danger that cities no longer contribute to an 'industrial excellence' at regional level;
- discriminatory measures, such as transportation prices, can make cities become undemocratic entities no longer offering equal accessibility to all.

The first aspect, presented mainly by **Michael Parkinson**, relates really to the key issue of '*culture*' and policy (programmes) as initiated by the European Commission. Until Maastricht cultural factors were not considered at the overall European level since they were not only regarded as sovereign rights of the member states, but also a matter of compensation for giving up sovereign rights in the fields of economics and politics. This has turned out to be a huge mistake. By neglecting culture as a

supportive system working in daily life for European integration, the abstract concept of Europe let merely economic and political factors dominate. Nowadays it has become clear that this technocratic approach cannot bring simply people together. There is more to integration than installing merely market mechanism equally applicable in Portugal, Germany, Greece or Sweden. There has to be achieved a true cultural understanding of the Europe to be shaped altogether. It goes without saying that this means clearly a vision which is accepted by all people and not just a formula worked out behind closed doors by the major leaders of Europe. One prime indication of that will be to what extend public participation will have an impact upon the redraft of the Maastricht Treaty. This itself will reflect what will become of Europe: a continent which will be dominated by the technocratic spirit inclined to favour such solutions that burden even more European societies or else a historical landscape shaped by a movement of cultural diversity with cities alive and such institutional mechanisms installed as to off-set the negative impacts of mere technocratic procedures. It goes without saying that the prime aim to achieve the latter depends upon attaining a '*cultural consensus*' which as a third force besides the executive decision making process of the European Commission and the legal and democratic ruling of the European parliament would gurantee a minimum of 'social cohesion' in Europe.

One reason for having neglected cultural factors all along, that can be partially explained, but not be justified by the historical situation Europe faced after two disasterous World Wars. As one bookstore keeper expressed it 1971, Germans themselves rebuild their houses very quickly, but their bookshelves remained empty for a long time. Expediency over culture is in the long run always a mistake; the shortcomings in living possibilities will catch up eventually and the outcome, including

unhappiness and dismal living conditions for the many nothing to be proud of. In the end it amounts to social tensions especially between those who just make it in society and those who have everything more than in abundance. Neighbourhoods like those many social housing projects converted into private estates in London turn not only into unfriendly, but even hostile environments.

Basically the thesis of the Berlin architect **Juergen Eckhardt** is the following, that all along planning of cities has been overdemanded when it comes to resolve the 'social question'. Most of the architects involved never concerned themselves even with the question of overextension, that is when a city grows beyond all proportions and thus demands both in the physical and social sense quite a different approach than what has become schools of thoughts since the 19th century and at the beginning of this century.

Furthermore, adding to the tension is that nowadays European integration faces even more so not the task of rebuilding economies destroyed during Second World War, but rather the challenge on how to fit itself into a complex, highly competitive world. Thus the economic arguments in favour of a single market along with a mobile labour force are not convincing enough in the light of such challenges as faced by contemporary life in European cities. Obstructions to life come above all from environmental damages. As **Yannis Phillis**, president of the Technical University in Chania said to the participants of the conference "***Myth of the City***", "more wastage is produced than what can be sustained as we go up the scale of activities; sustainability becomes therefore the question on how to improve our living conditions and not how to achieve economic growth".

In other words, it no longer suffices to steer the European Union towards a cohesive whole if the process does not allow for cultural adaptation. The latter is, if philosophically understood, really the prerequisite for innovation and open societies willing to change. Of interest is, therefore, that the DG XII has initiated among other things research programmes which will prepare the grounds for a new urban policy and urban planning procedures. It can be interpreted as a significant signal for a wish to no longer exclude cultural factors from especially an epistemological point of view even though the call for tender underlines the need for 'holistic concepts'. The latter aspect needs further discussion since 'holistic concepts' have been disreputed in the fields of philosophy of knowledge, foremostly by Karl Popper but also others, including the German philosopher Th. W. Adorno. Nevertheless ACT-VILL marks an interesting departure point by stressing the need for a new terminology when it comes to urban planning. It reflects the need to readdress the major issues of Europe in such a way that the full cultural dimension can be articulated and enhanced through decisive programmes, including a new approach to urban policy and planning.

The second aspect was stressed by the regional planner **Phil Cooke**. He is interested to locate cities within regions which represent a cohesive whole, economically as well as culturally speaking, e.g. Wales, Baden Wuerttenberg, Baveria, Catalonia, Scotland, Flanders etc.. Some of their specific successes can be appraised in terms of common values prevailing in such regions so as to ensure '*industrial excellence*': a positive reinforcement of values contributing towards quality work, values which are shared by all due to a larger cultural consensus. It is most important that culture seen in such operational terms stems from a keen observation as to what contributes towards 'good work' for even how people talk about their work is a measure of excellence. The unemployed in a ghetto will not be

able to offer themselves anything but a lack of perspective. **Phil Cooke** developed this notion further at the conference '***Myth of the City***' by outlining some of the cultural activities needed if the linkage between region and city is to be a profound one in the sense of achieving '*industrial excellence*', for the new production and hence organizational methods require among other things trust and external innovative producers, reducing the engineer dominated industry of the past to a power to be shared with others which is only possible if there is created a '*culture of recognition*', that is one which has the ability to not only recognize new and good ideas, but also to give such a decisive support that the question as to the future of the city is touched upon in a most substantial way.

The third aspect stems really from a series of observations about planning in cities and the practical outcome thereof. For instance, the regional planner **Pavlos Delladetsima** would stress that there is too much vested interest, a coalition of landowners, speculators etc. so that planning becomes ineffective while the real issues are covered up by a specific '*rhetorics*', its new, equally fashionable term being that of '*sustainability*'. At the same time, the future of cities will be decided upon not only by how they shall face the huge financial, legal and economic problems, but what measures are introduced to rectify these severe situations. There is a danger that measures meant to alleviate traffic problems will produce counter-effects, that is anti-democratic ones since only those who can afford it will find accessibility to the core of city centres. That will be further enhanced by the scale of activities going up due to the introduction of new technologies. As a particular city begins to unfold due to its overall position in the region, European Union and world economy, this question of accessibility will become even more crucial to define and to retain the democratic sense of what it means. Brussels is but an excellent negative example of how huge social and economic discrepancies converge upon the urban

grid and make it into a place of many contradictions. Especially when it comes to the price system related to airplane, hotel and food, the conditions for those wishing to gain access from outside has become extremely severe, while at the same time a great deal of the local population lives in dismal housing, working and living conditions with hardly an income to sustain itself.

The fact that many people have to pay a high price in order to live in cities is reflected in the countless masses either already out on the streets or at the border of bare existential minimum, and given the damages inflicted upon public health and personal safety, the '*well being of the citizen*' (**Voula Mega**) is hardly guranteed. Indeed, this has become an alarming state of affairs. Basically this paper is a call for changes in planning the future developments of cities so as to ensure public participation, that is a move in the direction that includes creative solutions offered by everyone. A citizen retains a '*civic pride*' of the place where he or she lives if there is something like 'poetic tension' in the air or when the 'myth of the city' turns as a practice of human encounters the urban society into very good human relationships.

It was thus almost a natural step to follow up the Fifth Seminar preceeded by the XVIth European Poetry Conference on the theme '***poetry and mythology***' held in Kamilari, Crete and Athens May/June 1994 with a conference on the theme '***Myth of the City***'. To this idea of bringing together poets and urban/regional planners, architects, art historians, philosophers etc., Voula Mega, research manager of the European Foundation for the Improvement of Living and Working Conditions responded as follows in a letter dated 19 June 1995:

> "I do believe that planning systems need to improve their imaginative capacity to envisage a better future. I also believe that each citizen

can be a little poet and contribute to the planning systems if there is a context of effective participation and co-decision."

She went on to say that the purpose of such a conference should be to enhance "the enlightening abilities of planners (who in continuation will enhance the context and substance of citizens' participation)." Important here is the ability to enlighten: a movement of thought having affected Europe not really in equal terms, its failure often not understood or misunderstood, as shown by the still prevailing notion in Northern European cultures that Enlightenment and Myths are opposites, the former being rational, the latter one merely irrational. The purpose of the "Poetry and Mythology" conference in conjunction with the Fifth Seminar was, therefore, already an intended confrontation with these different notions. This was done in the belief that cultural premises, even misunderstood ones, have serious implications on how concepts are used and what governs as a result our relationships to reality. There is afterall that terrible slogan of Hegel, namely 'if reality does not fit the concept, too bad for reality'. It made Dostoevsky oppose any planned approach.

The reflective framework of the Fifth Seminar: "Culture, Building Stone for Europe": City as a 'culture of ambivalence' (André Loeckx), the Securalization of Culture as part of a seperation of culture and state (Liana Sakelliou-Schultz) and the Myth of Europe (Hatto Fischer)

These three aspects were illuminated upon within the overall reflective context of the Fifth Seminar. Again only some of the major contributions can be cited here to give an idea of how the responses to the question of culture in diverse fields of human activities shaped the subsequent discussions and finally our approach to the call by DG XII for tenders under the code word ACT-

VILL. For especially those attending Workshop 2 dealing with "***Regional/Urban Planning and Culture***" formed the tender group for ACT-VILL (with the exception of **Michael Parkinson** who participated already in another tender and the newcomer **Sue Tilden**, Planning Expert from the United States). The fact that we received a high evaluation and hence are invited to present our viewpoint at this European Conference in Berlin honours us. It gives us the feeling that the European Commission is very open minded to different approaches to the same question, a concern for all of us, and equally energetic in trying to find solutions for current problems faced by both member states and European cities. Hopefully some alternative financing will be a first positive result of this conference in Berlin, in order to ensure that studies like ours can continue to make its contribution to the overall debate about planning procedures and how to proceed when it comes to making European Cities liveable.

In reference to the discussion at the Fifth Seminar, three major themes guided our considerations when making finally in the shortest possible time (although we had asked for the detailed information about the tender in July, we received finally the application forms only in September, that is we had merely ten days to make our proposal for the tender before the deadline expired) a possible suggestion for an approach to this question in a way which had not been tried before. Before stating them in terms of how cities can be viewed nowadays in relation to identity, what culture is about and how to proceed to planning if there prevail certain myths about and in cities, it should be mentioned that our proposal is linked to the key concept of a 'cultural action'. It should become in due time a self-understood concept for the complexity and nature of modern life in cities requires more than just empirical research. Life is not only measurable in statistical categories, but there must be developed an ability to listen to the problems people have and face daily. Indeed, people have to confront the hard lived

reality even if they do not like it from an aesthetical point of view. But as the Hungarian writer Konrad warned rightly so, it is one thing if someone constructs something ugly or does something wrong, it is quite another matter if everyone considers what everyone else does and builds as being beautiful when in fact it is ugly. That goes hand in hand with a loss of democratic values, the strength of which lies precisely in the ability to critize rather than to rationalize what is going on, taking shape or else distorting life, but in the belief nothing an be done about ending up in supporting deeply cynical attitudes and viewpoints. The life in cities has become that much harder as a result of that. Thus an approach taking all of this into account, and it means including philosophy, art historical studies, descriptions even on walls for they are coded messages, must bring about an acceptable method, organization of discourses, for examining lifes in cities and by conclusion come to some suggestions as to what could make European cities liveable again. A lot seems to depend on how the problems are described and hence faced. Thus to communicate some basic understanding of our major premises, three aspects dominated in our minds prior to making the application:

Aside from the ten workshops, the Fifth Seminar had four plenary sessions which included three major speeches by **André Loecks**, **Liana Sakelliou-Schultz** and **Hatto Fischer**. While **André Loeckx** talked about cities, **Liana Sakelliou Schultz** referred to culture as a secular term and **Hatto Fischer** discussed the role of myth when it comes to European integration or to the vision of Europe.

1. **André Loeckx** spoke about "***Urban place and flow / Towards a culture of ambivalence***" in which he clarified the notion of city. The main points are as follows:
   - European cities are a synthesis of European culture based on difference despite all sorts of possible influences; they affirm a "oneness rooted in

centuries old history" within the category of 'urbanity': "Such cities cannot rely upon the status of hallowed monument to past glories./ They can only survive as a dynamic continuum being constantly repudiated, reinvented and constructed."

- the historical city with a definite core no longer exists; the pressures to modernize have become too great. Instead there has come about the 'fragmented city' with partially preserved cores, suburbs and many meaningless spaces, undefined and ill planned, oscillitating between centre and activities relocated to the periphery; one way to describe this state of affairs is a prevailing 'ambivalent urbanity' resulting in changes in exchange, connections and networks. They alter how roads connect the town or city to the periphery and what dialogue rests upon centrality and networking, that is, "a matter of place and flow" which together contribute to the "flourishing of the city".
- when it comes to urban identity, **André Loeckx** resorts to some key concepts as articulated by Aldo Rossi (1966) in 'Architettura della Città'. In it he explains how durable forms (stones) of a city guranteed "continuity, its slowness" and brought order into the chaos. **Loeckx** states that "for Rossi, the identity of a city not only refers to the unique objectives course of events the city went through but even more to the resulting history, selected and remembered in its actual urban form". Historic urbanity according to Rossi is linked to memory which over time creates different layers making possible as much individual future practices as much as that "the collective built memory enables or resists future urban interventions".
- thus deeper disturbances to urban identity can already be anticipated when the character of these interventions changes to such a degree, that they

can no longer be resisted and break as a consequence the urban fabric; reformulated in the language of **André Loeckx** in reference to Rossi and Derrida the city becomes "a cultural enterprise which obviously never reaches an end but presents an absent utopia that motivates constant deconstruction and reconstruction". "Thus emerges in an interplay between differential identity formation and multiple but localised context, the historical city as mimesis of European culture".

- obviously the historical city no longer is able to sustain itself; it comes with what **André Loeckx** calls a "decline of place culture". Ambivalence between rule and freedom increases as the "space of flow", the "non-place urban realm", in short the modern 'metropolis' begins to make its appearance as quite a different mode of urbanity. Quite emphatically he spells out the major implication: "In the European context the 'space of flow' glides without consideration over and through the historical urbanity and the rural landscape.....Metropolitan urbanity is 'instant city', a city of speed, change and transience. / The City that has no time, not even for types and analogies. A city that prefers functions to forms. / In the metropolis functions do not appropriate places but rent and vacate them." In short, life takes on superficial appearances lacking really in depth, that is the ability to take on an identity over time. Between abuse of historical space and temporary solutions emerging as fashions quickly spilled away with the next wave of sensations the city is transformed radically without the citizen ever capable of correcting mistakes of the past while shaping not a wild, but an ordered intermediacy between living, working and urban conditions. Conscious language seems in such places of ambivalence to be displaced by "a momentary functional display" of uselessness nevertheless

powerful for the moment since it is capable of occupying and exploiting all places. The outcome is really "desurbanisation and suburbanisation".

- it would be too much here to give a full account of **André Loeckx**'s descriptive analysis of the emerging urban conglomerates. He is most perceptive in what drives people out of cities: "more and more people reject the city as valuable place for inhabitation, driven out by urban land and building prices, frightened by inner city deterioration or simply seduced by the suburban ideal home". Accessibility becomes all of a sudden contingent upon having a car or not, finding a parking space etc., while 'accessibility' means all of a sudden for companies no longer having the main office in the centre of the town, but close to motor ways. It is an absurd sort of reasoning which defines and determines in turn 'accessibility'". The city becomes "a vague space full of loose urban fragments" so that this "hybrid and fragmented space no longer performs as a mediating scale" between different types of activities. The fragmentation spoils everything, including rural space.
- the moment there is a break down in mediation, scales of activities cannot be assessed at the human level; instead more violence is the outcome of a loss of language, the prime source of mediation between the conceptual level of a thinking person and the reality to be faced. The escape to the 'safe' suburbs but one of the best examples of the new illusions created by fragmented space. As **André Loeckx** would express it, all of a sudden "difference becomes disturbance, even a potential danger". Even more serious is in his mind the fact that "the process of formation of a differential personal identity, a basic dimension of urban culture, is broken".
- given this state of affairs (and the way to describe urban conditions is already a reflection of means of perception available nowadays to architects, planners,

sociologists etc.), there emerges out of this ambivalence between the old historic centre and the newly recreated sub- and deurbanized spaces the "Edge City" (Joel Garreau). Again **André Loeckx** describes it in the most plastic terms: "There seems to be no limit to the sprawl of small business, mass distribution centres, leisure palaces along aterial roads and turn-offs. / Gradually a vast regional constellation is created that offers an unprecedented amount of services, sensations and potentials within the reach of one hour car driving on the condition that one disposes of the necessary mobility, time, health, information and financial means to gain access to it. / Others, children, elderly, low income groups, less mobile people, less informed, less integrated in the logics of flow economies, have to rely upon the remains of the declining urban or rural place economies."

- remarkable in this new situation of the Edge City is a redefinition of needs; it has altered the question of 'accessibility' to the point that there seems no longer any need for public space, but merely privately accessibility. André Loeckx describes the dilemma as follows: "The extensive roadwork cuts the landscape into pieces, countless islands where suburban dwelling dreams are cultivated in residential estates of all sizes and statuses, monofunctional and socially distinctive./ The little villa at the end of the tidy driveway, surrounded by its safe and surveyable lawn is apparently satisfied with the simplicity of the edge city./ The house does not need a boulevard, a park or a square, nor a café or a threatre./ Videogames bring adventure straight into the living-room and cable television replaces the public forum."
- exactly these changing needs redefine the need for accessibility; it becomes even more evident with the increase of modern communication technologies replacing visible distances, a walk around the corner to the grocery store, with

invisible distances covered differently, that is per computer/modum/internet, all leading to new communication forms.

- The outcome is disturbing at several levels: "The old retail business cannot compete with the commercial violence of the new periphery". This is but one example. Other levels are visible for the one who looks: hastily build housing estates to cope with the influx of newcomers into the city are deteriorating at a faster pace than what money is available for the upkeep of the place. Other symptoms can be mentioned.
- one of **André Loeckx** most powerful thesis is about forgotten urban spaces reflecting those who wish for their cars to have open space, privacy and access by car only, leaving behind those areas which seem almost forgotten: "The better-off, job-secure inhabitants move out or refuse to move in. / Newcomers who are non-native, poorer and have less job security fill the empty places. / These new urban dwellers unfold the ingenious and tenacious survival strategies typical of their society of origin: informal business, close networks of community life and mutual aid, exclusive solidarities. / They again switch the city lights on and keep the street life going. / However, the aeging and impoverished native dwellers see themselves competing with active, resourceful and forever young foreigners over the ever shrinking inhabitable urban places. / The familiar neighbourhood suddenly seems to be threatened territority. / The mediating scale stops functioning, the ecology of fear takes over. Distrust, isolation, intolerance, racism, violence."
- out of all these observations follow naturally some conclusions important for both how we perceive European cities and policy possibilities (including planning procedures). First of all, it is important that **André Loeckx** departs from the usual notion of planning as being an abstract ordering of time and space, a city

as a conglomerate of things not easily ordered and assessed according to its emancipatory potentialities. Then, it is true in the 'flow economy' that there will be such massive interventions as that little can be done to rectify the social fabric prior to the urban grid being in place. The notion of 'unlimited accessibility to services, information and pleasure' has also to be questioned, since most of it will be lost to spoliation and marginalization.

What **André Loeckx** is getting at, and this is most relevant for the linkage between hard facts and possible reflections, is to transform the "internal contradictions of flow economy/culture" into a stimulation of "emancipatory forces ready to counteract destructive actions". There should be no illusion about the effectiveness of 'cultural actions' within the 'Edge City': **prior to undertaking actions it should be realized that a very difficult debate lies ahead before attention can be given to what has and still retains potentialities of developments**.

- the difficult debate includes efforts to make alternatives to current practices be understood, but also a reflection be known that due to the break-down in communication, there can be really no 'discursive practice' (M. Foucault). In his own way, André Loeckx sums it up as follows:

> "Although people often identify the city with its historical centre, the latter occupies a relatively modest surface of the global urban congromerate. Not only in popular memory and tourist publicity but also in current urban policy the powerful image of the radio concentric city shape persists. Concepts such as city centre, ringroad, belt,

periphery, suburb still relate to the image of a sacred nucleus served and potected by profane belts. The metaphor is however completely deficient in grasping the reality of desurbanisation and the non-place urban realm. The flow city needs other key metaphors."

- Indeed, when it comes to creating a new terminology to be used in future by urban planners throughout Europe, then stress has to be put not only upon linking the quest for liveable cities to the AGORA concept as proposed by the ACT-VILL initiative, but also upon the metaphors to be used to describe life in cities. It goes without saying that especially poets as carriers of metaphors are very much suited to bring about new or more reflective considerations of urban life. The search for a new terminology must be placed within the context of a philosophy of knowledge (Popper, Adorno, Kuhn, Lakotosh) while retaining above all a humanistic perspective (**Brendan Kennelly**).

André Loeckx suggests as a solution:

"A key metaphor is a heuristic frame that in its way of looking and naming already reshapes a formless and nameless reality. The global conglomerate can be looked at as a grid or, to put it better, one can seek out its grid-like qualities. A grid redistributes hierarchy and centrality. A grid is made up of connections, junctions and fields which are, though in theory different, of equal worth and accessible from several sides.....The grid is the logic of the open city, a structure superposed upon flow. Maybe one could, just like Walter Benjamin did in the historical Grossstadt, delightfully wander in the grid."

He comes to the potentialities of cities having been fragmented, for edges of ambivalence mean on the one side there are still preserved street blocks while already around the corner the noise of the freeway dominates. The theoretical perception is, therefore, decisive as to what kind of 'cultural actions' can beundertaken despite massive interventions way beyond the control of anyone, so as to ensure the realization of some positive potentiality of life in cities. It follows that the very concept of 'life in cities' must be discussed. In short, the question of identity relates to a different discourse about life in cities; different needs have sprung up and not all can be sustained by the 'historical' nor by the 'fragmented city'. This is where the question of the 'edge city' enters the picture and what prevails in urban life despite major interventions. Clearly a conscious terminology is respectful of the resistance of life against these imposed solutions or interventions from above. There are many shortcomings, but also great potentialities which add up to a confusion about possibilities in life. This idea relates not only exclusively to cities, but the majority lives and experiences life in urban environments; solutions like 30KM zones, pedestrian walks, new codes for parking spaces, etc. reflect some kind of administrative attempt to order life, but they only add to a higher degree of artificiality without being really convincing as to what can sustain life. After all this is the most pertinent question still beckoning for some answer.

Before illuminating upon the two other aspects, it might be useful to point out already here some practical consequences for subsequent debates about cities or the thoughts behind our tender. By stressing the need of metaphors like the grid or 'web', we feel that such terminology needs to be

discussed in conjunction with not only local authorities, decision makers, city planners, but also with all sorts of observers of life in cities, foremostly poets and the youths of European Cities.

2. At the Fifth Seminar, there spoke also **Liana Sakelliou-Schultz** about a new phenomena touching upon matters of culture. She talked about the 'effect of increasing internationalization: the separation of culture from State'. Most important in her contribution to the Fifth Seminar was this introduction of a notion of the securalization of culture. Like religion was increasingly separated from the state and hence daily political affairs, so she sees that likewise the state no longer can use so easily culture as a mask of identity, in order to sustain a way of life, of looking at things, even on how to present ideas within a structured international world. Rightly **Liana Sakelliou-Schultz** points out that with the increasing internationalization of culture, there will be created a 'cross-cultural identity'. It would be a mistake if states try to reinforce single identities which ignore modern living conditions, mix marriages and different life styles. Nevertheless we experience very much nowadays trends opposing this multi-cultural, pluralistic notion of life possibilities as offered in the past by cities like Beirut before they were bombed and cleansed of all international elements. This is not completely 'ethnic cleasing' in terms of aliteral assertions about a single identity which some forces suggest should apply to one single city, state or affairs in general, but rather a cover-up for something else. At the Fifth Seminar, Prof. **L. Baeck** from the University of Leuven spoke about an 'ethnic assertiveness' which tries to do away with complexity of life, hence the multi-cultural dimensions of cities like Sarajevo. **Liana Sakelliou-Schultz** has an important thesis about such phenomena,

namely as soon as culture is wrested away from the state, the state feels terrorized. She expresses this as follows:

> "For the last three centuries state power has used its culture as a mirror, a way to know its identity, as a child only comes to form a self when it can recognize itself in a mirror and answer to its name."

Immediately this involves the usage of 'myths' to "anchor the existing political structure". She cites the example of America and its revolutionary origin which has found its way into the myth of independence. Hence

> "If cultural symbols - means of both personal identity and community membership - are taken away, the state may face a terror like immanent death, the terror of not maintaining its own unity and not being able to differentiate itself from other states."

She goes on to say that

> "In the twentieth century nations redefined the relation of culture to the state. In Nazi Germany, culture and state became identified as they had never been before. The consequences limited human freedom, just as the identification of church and state had done centuries before. The disastrous, self-destructive, extreme nationalism used its people's myths to unify the nation against others. For the first time in human history mass political rallies used traditional cultural symbols and ritual to erase ideological differences for the sake of a new national identity, the people of the Third Reich. The Nazis experienced their own kind of terror in the persona of the Jews, who traditionally rejected the idols and beliefs of others, rigorously maintaining their own symbols, their own autonomous community within a community."

Liana Sakelliou-Schultz makes then a most significant statement about current

state of affairs:

> "There is much evidence to allow me to declare an emerging change in human society and its political organization; *culture is becoming more and more separate from state*. In this process, sacrifice's of the state's culture will have to be made if the increasing internationalism is to develop peacefully; sacrifices of language, religious intolerance, unit of money, and national everyday customs. Ideas about identity will sometimes have to become relativized and the national interests subordinated to the international. A new and higher political morality is needed to accept the new and higher responsibility for the entire earth's environment, or for the new problems of the global economy, or for the other international problems. This trend parallels the separation of church from state a few centuries ago, when human beings began to enjoy more freedom through higher moral insight. But the fact that culture is becoming separated from the state does not guarantee the road to a better world will be peaceful."

It is doubtful if this 'higher moral insight' will prevail at all times; many cities undergo enormous pressures to conform to the demands of producing single identities loyal to the state despite the increasing pressure to internationalize all activities. The philosopher **Bart Verschaffel** calls these 'local worlds' cut off completely from any international contact, while the international world cannot be represented solely by CNN. As a result both sides lack experiences on how to mediate between place and time ('of the flow economy': **André Loeckx**) or how to handle 'cultural conflicts'. For the separation

of culture from the state, so her main thesis, leads to "the splitting of the sense of political identity, which was based on the fusion - or perhaps confusion - of culture and state". As a solution she offers or suggests ideas like "cultural dialogues and international cultural projects so that the sense of cultural co-operation works as a vaccine against its destructive differentiating power." Yet precisely due to different experiences at city level, and here **Bart Verschaffel** compares the degree to which city can cope with the need for cultural management available in cities like Berlin, Paris or London, but not in Antwerp or other smaller cities, it is known that at the root of a city's reputation lies the ability to remain indifferent to the images pressed upon it by the planners and media and thus remains alive in an independent way. For freedom to live means cannot and should not be reduced to a dependency upon a single company. No city is just a mere enterprise attempting to sell its commodity, mainly 'life in that city', in order to sustain itself by obtaining foreign investments, touristic activities, cultural events, economic developments and sound political leadership. For this reason it is interesting to note that the ACT-VILL action programme calls really for a connection to be made between something called 'AGORA' and the GOVERNABILITY of a city. While the former has to be understood more as a concept (and not as a mere myth projected back upon Ancient Greece when accessibilities have altered so drastically), the latter should not be reduced to a mere management of resources, since values of the citizens prevailing in a particular city will have an impact upon both the management of resources and the political handling of conflicts (including cultural ones) and decisions to be made (**Voula Mega**). Sue Tilden has made always this point while drafting our tender: the example of the Master Plan of Chicago was accepted by a broad majority of people because it was

well ahead of its implementation discussed even in schools so that children could grow up with a notion that is 'their Chicago', one whose shoreline will not be build upon as an expression of one common value premise. These values have to be related consequently with a vision both the people and the planner have when going ahead with their decisions, and always it will be be possible to explain why things are done in a certain way and not in another.

- The relationship between concepts depending upon a rational terminology and the type of government attempted in European cities rests thus upon values derived among other things from the 'myth of the place and of the times lived in'.
- Consequently attention must be given to how 'myths' are exploited by all the European cities. Especially once the neutral stance of analytical approaches is left and an argumentative line becomes evident in what has began to manifest itself as concepts for European Cities as a result of European integration, then doubts about such single identity labals as 'Eco-City', 'University City', 'the Healthy City' replacing as it were the old categories like the 'Frontier' or 'Harbour City' must be articulated. Certainly from the programmatic point of view such labels reflect not only the financial possibilities from a justification angle, but also the latest developments linked to the technical options cities have at the end of the twentieth century and to the types of programmes being offered.

3. At the poetry conference in Kamilari, Crete, the poets expressed already concern on how 'myths' can be misused by those in power; however, any misusage destroys very quickly the 'power of the myths': part of which is a 'collective wisdom' reaccounted in many oral traditions, even though changes in civilization have altered their dispositions. As **Hatto Fischer** explained at

the Fifth Seminar, the German philosophers Th. W. Adorno and M. Horkheimer pointed out in their '***Dialectic of Enlightenment***' that Homer's 'Odysseus' was already the first manifestation of Enlightenment, pushing as it were the myths into the darkest corners of caves near areas, places and seas which they used to dominate until Odysseus came along. This is most important for societies in transition, e.g. from the hunting to the agricultural one, have to adapt to new values, skills and means of survival, the skills of the hunter replaced by that of the knowledgeable farmer. Times and rhythms change. Cassirer pointed out in his essay on '***Myth and Religion***' that religious myths of the Roman Empire were helpful reminders when it was time to plant the seeds or else start with the harvest.

Before turning our attention to what 'myths' in a modern and post-modern sense dominate possibily cities, the life within them and equally the life without them, it has to be mentioned that features like the seperation of work and pleasure existed already prior to the entertainment industry and the 'leisure society'. As a matter of fact, Adorno and Horkheimer point out that Odysseus was the only one who could listen to the enchanting song of the sirens, while his crew rowed on not hearing the songs for they had wax in their ears. This 'division of labour' has become a dominant feature of not only organizations of work, but also of place. The industrial cities of the nineteenth century reflect that most clearly. Since the loss of Fordism and the introduction of new management concepts, i.e. Lean Production, quite different organizational patterns have emerged and left their impact upon forces affecting cities struggling to survive economically. The 'logic of survival' is not at all easy to discover or to find out. Clearly 'privatization' is but another version of

an almost myth like struggle with what seems not to lend itself so easily to the economization of resources, including the upkeep of infrastructures like bridges, roads, canals, sewage systems etc. while making possible the modernization of the households, that is the living conditions of the city's inhabitants.

It goes without saying that a city has lost already its substance if it struggles merely to maintain an imagine along the lines of Hollywood and thus enters politically sanctioned the '*culture of manipulation*'. Differentiation sets in when other possibilities to exist become visible, that is when other things matter than the mere conformity to the usual trend to give in to a highly abstract ordering of things linked to a '*culture of consumption*'. Precisely the city of Berlin with its many ups and downs can like others examplify how responses to the international competition for obtaining the Olympics can draw resources into the wrong direction, that is at the cost of those living in Berlin. The role of images or even '*myths*' - and Berlin held once a huge conference on 'Mythos' of which many said afterwards that it was a huge failure - becomes therefore all the more crucial to understand as to what will shape in future the behaviour of citizens and of the city as an overall entity. Definitely the critical turning point in a city's development comes when its 'urbanity' is sacrificed for the sake of mono-cultural manifestations and enforced integration policies at the exclusion of multi-cultural forces which could bring about quite other identities, as the case in Berlin West since 1981 and in Berlin overall since 1989, that is reunification. The difficult debate in this sense is that the cultural looses are hardly understood while the prevailing

powers of the day want to stamp upon the city their identities, in order to reduce the city to a single advertisement agency in favour of that particular system component, e.g. the car industry and even more so one manufacturer. (Along those lines there was published in the German newspaper 'Die Sued-deutsche' (23./23 September 1995) the interesting article "Weg mit dem Schmuddel-Image" - "Away with the Murky Image" by Ekkehardt Baumgartner who discusses efforts by the city of Oberhausen to leave behind its history as a coal and steel town with smoking cimneys described by the poetess Annette von Droste-Huelshoff as 'having driven away nature' and the new project as financed by Edwin D. Healey from Great Britain which seeks re-investments comparable to the project around the Potsdamer Platz in Berlin; the image used to attract money, including Arnold Schwarzeneggers Californian restaurant chain called "Planet Hollywood" suggests the simple logic being applied: only big money attracts more big money - it is the myth of 'Rodea Drive' selling not clothes nor cars but money itself, transforming thereby the place into a consumption of money, with all possible consequences for it is the manifestation of the "leisure society" which has to be confronted with a demand for equal values between work, life and enjoyment.)

Myth of the City: identity, planning, culture

In our application to the tender these considerations of the Fifth Seminar have a definite meaning to us as a tender group. They shaped accordingly our concept of 'cultural actions' in need to be undertaken, so as to develop a rich enough terminology. It is more a combination of cultural events,

scientific research, consultations, practical fact findings, debates with decision makers and a continual learning process than a single defined activity. The exposure to a lack of self-knowledge when talking to the planner or to a poet is a cultural risk everyone must undertake, so that uncertainty and doubt next to clear analysis can make time and space for human relationships to develop.

Such a cultural action we have already realized despite the fact that we did not get the tender, that is any financial support from the European Commission. This cultural action has been our recent conference in Crete around the theme "***Myth of the City***" held 9.September until 15.September 1995. Fifteen poets and fifteen architects, urban and regional planners went to both the cities of Heraklion and Chania and two villages, namely Kamilari by Phaistos and Milia in the mountain range of the region Kissamos with Castelli being its regional capital. The aim was to implement our concept in response to the call for tenders by DG XII.

Indeed, we feel that the problems of European cities are most urgent especially at a cultural level. One of the most pertinent questions is indeed, 'what drives life out of cities?' Answers must be found if life is to be sustained in the near future. Certainly the first answer must be a 'moral commitment to improve life in cities'. This implies consensus between the different authorities and a clarification of the system components to the whole, in order that not one component, e.g. the car industry, drives the entire city in one direction.

Our interpretation of the call for a tender by DG XII was most positive, because members within our group and network of poets believe strongly that the terminology used defines the problems and subsequently the solutions. Thus, we linked not only the concept AGORA to the question of

accessibility or not, but also to the original context such a concept enjoyed in Ancient Greece. Indeed, epistemological studies (from Popper to Michel Foucault) reveal that each meaningful concept appears in a constellation of a defined set of values and hence describes how life can be sustained by the adherence to certain rules, laws and accustomized behaviours; e.g. ladies first into the bus. Thus the AGORA concept implies not only an accessible meeting ground for all, a market where things can be purchased, but also the place where laws are announced not as something final, but as something to be discussed prior to application. This original meaning is completely lost in a market system which sets prices without any prior discussion, let alone where law and price are brought into a conscious reflection of prevailing conditions, e.g. the neglect of social costs due to profit seeking motives leaves developments at the mercy of highly exploitive measures having little to do with considerations of impact, but all the more with what **André Loeckx** has called the 'hard interventions of the flow economy'.

Furthermore, we stressed in our tender that the AGORA concept by itself would not be complete, if it does not include the theatre and the sports! The latter two demonstrate morality and consequences thereof if broken, while sport was in Ancient Greece not only the athletic definition as well known through the Olympics, but had very much to do with the question of sexuality. To understand this, it might be useful to extrapolate for a moment and contemplate the kind of life as was organized in China during the 15th and 16th century when literature started to record the habits of people, for they were still governed by Yin and Yan. In that specific context, the two different sexes were allowed to come only together after the harvest was done. In other words, cities and interwoven societies with their specific networks are dependent upon certain rhythms, and the key question to be examined is

this: what sustains, what destroys life and what can be done so that poets do not come to the conclusion, that an urban citizen lives faster and relates quicker than ever before to his other human beings, e.g. via Internet, but his true life will be less lived than a man still plowing the fields and enjoying a sun set while marvelling at the sight of a world he hardly comprehends, but just lives, breathes, feels and touches. If senses invoke intellectual thoughts all the better.

This idea provoked our approach to modern city problems, for there is the low and the high touch, the down-to-earth kind of approach to City Planning, if at all needed, and the highly sophisticated, technical solution offering so many varieties, but none of them ever having been tested if liveable. That after all is not just an experimental question, but a rather huge question and maybe none of us may like the answers we are getting to hear once we ask this question honestly. It means confronting analytic concepts with poetic observations of life in cities.

For our '*cultural action*' in Crete a technical manual which includes aside from all contributions a heuristic framework on how to approach the various situations/questions/problems of local and urban developments) was produced in advance of the conference itself. They were made available to all participants as a sort of '*imaginative map*' as we made not only this 'voyage through Crete', but also through the 'mind'. Several stations stand out in this map:

1. When faced with the future of European Cities, how can technology and culture be brought together, in order to face that 'uncertain future'? While the Greek poetess **Katerina Anghelaki-Rooke** described her feelings of living in a city, Athens in her particular case, as one of duality, for she lives also since her childhood in Aegina, **Sophia Yannatou** described Athens from another poetic angle, namely as 'the strange place it has become'.

For people have to cope with both this duality, love-hate relationship and with changes occuring so fast, that the place one used to know as a child no longer exists. Stability and continuity of urban forms is a thing of the past. The future of the city is shaped by innovation and adaptation (**Phil Cooke**).

2. Local Developments differ according to responses to present needs described as differences between cities and villages, land-inbetween and the need to reflect upon such relationships as between urbanism and tourism, '*cultural tourism*' a key term when extended beyond mere cultural heritage and cultural protection of historical or ancient sites; as a matter of fact, identity cannot be secured in that manner if it is not connected to the present, that is to a rational accessible continuity between the past and the present, in order to have a vision of the future.
3. The reason for the destruction of cities in history have to be discussed in order to understand what internal, what external conditions can bring destruction upon cities; from earthquakes, e.g. Phaistos to war, e.g. Sarajevo, even though these apparent factors are not sufficient to grasp all the forces of destruction. It seems most clear to participants of the conference '***Myth of the City***' that much more must be done in order to comprehend the path from 'stone to cement', the latter building material holding a grip on the minds due to its myth of being cheap. This term of cheap is ambivalent since it is at one and the same time one of the most expensive building materials ever used in history and still in combination with steel grids suggests that constructions can be completed very fast and equally allow for suspended vaults, huge free suspensions etc. as a vague reminder of the temples in Ancient Greece - a modern perpetuation of the myth of classical antiquity (**Juergen Eckhardt**). With the coming of cement, however, a further aspect

has started to thwart life in cities; it is called by the Irish poetess **Paula Meehan** the loss of the wild in favour of the tamed. In other words, cities and the process of urbanization not only within cities, but throughout the land are risking the loss of any wild nature, that is untamed or not touched by man's hands, the litter in forests but just a mild form of pollution of until the beginning of Second World War still unspoiled land, lakes, mountains. Today even a toilet is needed on top of the Mount Everests and firms are contemplating on how to deal with the wastage left behind by all these climbers aspiring to catch a glimpse of wild nature.
Combined with this loss of 'untamed nature', and an example in Berlin would be Gleisdreieck, a former railway junction closed after the wall was constructed and thus allowed an unusual flora to develop due to many seeds having been brought by the freight trains and diposited there, the question is whether the law for land usage and economic exploitation give value to land not used and leave it as it were untouched. Especially a city like Berlin has radically transformed itself through the opening of the wall, but these unused spaces of land, forgotten after the war, they were like pores of the human body, places to breathe despite being in the city. Their closure reflects a misconception of what cities need even if objects of fevers of speculation.

Then, there is the psychological fundament like the 'firmaments of stars' above which had still a meaning to Beethoven and those growing up in times when electricity did not blend out the night sky. Ancient Greece and its philosophy of wonder is unthinkable without this experience of

the night sky. Today it is blended out completely by the lights of the cities, as if there is fear of darkness. Thus the psychological fundament becomes a question do citizens of that city still believe in that city; it was interesting to hear during our discussion in Phaistos on how Greeks having grown up in Athens no longer can stand their city, while visitors having come from outside to that city love its complexity, indeed chaos with its rich intermingling of formal and informal activities so that no mono-functional spaces such as here the work, there the sleeping places prevail. It makes the city both alive and safer than most European cities despite its bad reputation and real problem due to the 'Nefos', the cloud of the past having been transformed in meaning into evidence of massive air pollution. Naturally, the forest fires in Pentelli during the summer 1995 has altered radically the air and thus living conditions in that city; what used to be a hot, but dry climate has been transformed into a humid holocaust. People climbing up stairs get easily into a sweat, a case to observe for it was not so in the most recent past, that is before the fires destroyed most of the green lungs around the sprawling city of Athens. It was even interesting to hear the dispute between the reporter in the helicopter flying over the fire zones and the editor at the news desk for all of a sudden these arial pictures revealed that what had been thought to be a forest area had been transformed into an densely planned urban grid for the wealthy wishing to have their 'villas of privilege' in the green. The editor at the desk did not want to focus so much attention upon that, but rather in general terms merely upon the fire, the technical problem of planes not able to fly due to the strong winds, etc.. In other words, a crisis became an embarrassing

encounter with the public eye as to what has been going on during the last five to ten years. This corrosion of illegal building speculations may be a unique Greek problem, but how to deal with it, that was always in the back of the minds of those who know not only Greece, but also Europe.
That is to say, when talking about problems of life in European cities, then it is immediately linked to the observation on how much nature is being destroyed yearly and daily as a result of technical means easily outpacing the time needed for trees to grow and to grip the soil before it is washed away by torrent rains.
The same applies when looking out the bus window while travelling through a landscape for even the stretch between Chania and Castelli has been altered due to touristic developments making a once beautiful sea side into an urban conglomeration par excellence, that is without ending for there is really no longer any knowing where there is the beginning of the city.

4. The nine questions both poets and planners dealt with as a starting basis for their 'cultural action' to be taken in due time to other European Cities after this initial experience in Crete, are the following:
    1. does there exist at all any city planning / who are the real decision makers / first evaluation of planning versus non-planning situations and assessment of what the European Commission in its call for tenders to ACT-VILL even called the 'city's behaviour'?
    2. what evaluation methods are used to establish the current state of affairs?
    3. what technical options are available?

4. what constraints have to be faced when making decisions? (aside from financial constraints)
5. what unresolved problems exist in the urban environment?
6. what are the values in the city?
7. how does the city compare itself to others, establishes linkages or networks on the basis of similarities or differences?
8. what conceptual solutions have been offered and tried so far?
9. do there exist liveable solutions, if at all?

These questions were discussed in the context that the '***Myth of the City***' has been largely destroyed especially due to the '*Culture of Consumption*', thus the mystery is gone and hence the qualities to be experienced when living in that city. **Bart Verschaffel** showed in a film prepared for Antwerp '93 what forces of argumentation prevail in Paris nowadays. He goes so far as to argue that the city as a historical category no longer exists. In terms of 'myth' it means no one has anymore the time to go and live there, in order to experience life in that city as a unique place for developing an identity in tune and in contradiction with historical developments. This discussion continues really the debate of Walter Benjamin about what is happening to cities and which was perceived in the films of Bunel. **Baptiste Marrey** from Paris claims as a poet that the mystery of Paris is gone due to the places of childhood having disappeared. Instead overall planning schemes and a city of the consumption have externalized everything: les Halles or the central market, the poor and the rich people, the industrial productions, etc. along with the motorways, all these things can be found outside of Paris.

5. The sad story of cities is that many of them have lost their multi-cultural, historical roots. **Nikos Stavroulakis** pointed out that cities like Saloniki, Jerusalem, Sarajevo of the present and even Chania, Crete make impossible the love for life since the challenges of the others to speak another language, this quality of life as being 'urbanity' has been reduced to mono-cultural forces trying to impose a single identity upon everyone, and if they do not accept this 'ethnic cleansing', then they are driven out or even shoot. There are many more problems to city life if there is not any love prevailing, for then the worst things can happen. This starts with the central market being transformed into touristic and junk shops selling 'kitsch', the aesthetical cement of modern societies and an impediment to any kind of innovation. Then to the usual forms of pollution there are added noise, air, and visual forms of pollution, the dominance of advertisement irrespective of historical buildings but an example of the screaming consumer society which wants to make its name felt at all costs. This one-sided approach to life is what is costing cities so dearly in terms of both resources made available and life in cultural terms.

6. The break-down of the city as a place of mediation between different cultures, individuals and groups leaves needs undecided upon and thus unresolved. In its wake show-cases of violence develop models for what is still to come. The problem of violence in cities is equally a violence against cities, its human and social fabric which had been developed over years and suddenly can be destroyed by rent controls lifted in order to give way to market forces.

Conclusion

In our tender we did tried to anticipate the difficulties of developing a rich enough terminology so that cultural adaptation possibilities to technical options could be included in future by town planners in their concepts. Certainly the AGORA concept is a powerful stimuli to rethink and to redrawn the lines of decision making processes. It would be a mistake to ignore, however, the city from its cultural point of view both as a potentiality and a real lived reality; i.e. which city has the management capacity to facilitate cultural events, which ones don't as well as which city retains trust in the world, which one has lost it (**Bruno Kartheuser**)? It is clear that any terminology to be used in future must deal firstly with the pertinent questions pertaining to culture.

Since the tender group has decided to go ahead to implement through a 'cultural action' the questioning as to which concepts are applicable for future urban planning, the findings of our conference held in Crete, 9.9.-15.9.95 around the theme 'myth of the city' must be evaluated and reviewed in terms of what contributions can be made to the overall concern for future urban planning steps. Poets and architects, planners, philosophers discussing this subject matter in reference to concrete cases like the cities and villages in Crete is but a beginning of more than just another interdisciplinary concept of a conference. In particular, the linkage between identity, planning and culture is a matter of a philosophy pointing to the future.

Efforts are made already to secure the continuity of this particular 'cultural action', for it is the aim to take the same group of people to other European Cities, including Berlin, Antwerp, Dublin, Paris, Milano etc.. The conference '***Myth of the City***' in Crete was made possible due to many decentralized forms of support. We collaborated with seven different local authorities, two universities, the Bishop of Kissamos and the developmental agency ANETEK in Castelli. The efforts had the support of the Cultural Relations Committee of Ireland and both the German and Irish Embassy in Athens. We are indebted to the many other forms of support we obtained, in particular the people of the village

Kamilari, the FORTH Foundation of Heraklion and especially Yannis Phillis, president of the Technical University of Chania. In the end, there was a sort of break through in our contact with the municipality of Chania as the first discussion about violence in the city meant really a new approach to especially the youth in an effort to involve them in workable solutions of the future.

It goes without saying that this was a most enriching experience with the evaluation yet to be done.

We have at the moment no financial means to secure the publication of the Technical Manual nor the evaluation report. This paper is, therefore, a kind request to the European Commission for not only support in this direction, but equally to ensure that our 'cultural action' can be taken to other European Cities for only in the continuity of work can be made possible a systematization of the knowledge gathered and experiences made. First attempts in this direction are made with regards to Irish Cities, Towns and Villages, while efforts are under way to establish contact with Antwerp, Paris, Berlin and the Italian cities of Milano, Rome, Napoli and Palermo. Hopefully it will be a modest contribution to the overall debate as intended by DG XII of the European Commission when initiating this ACT-VILL action programme.

Project: SUSTAINABLE HILLTOWN IMPLANTATION / VIENNA

By: Arbeits Gemeinshaft Stadthügel/ Sustainable Hilltown Partnership:
Oikodrom - Vienna / Center for Sustainable Cities - Lexington, Kentucky, USA
Principals:

Dr. Heidi Dumreicher

Prof Richard S. Levine

The Sustainable Hilltown Implantation Project for Vienna ties together two streams of research, culminating in a proposal for a major urban project for Vienna. The first stream is the modern theory of the sustainable city. As developed over a period of years by the Center for Sustainable Cities and now ratified as the underpinning of the European Charter of Cities and Towns Toward Sustainability, this theory presents a process for negotiating the sustainable city of the near future. Although it develops from a strong technical and technological basis, the theory of the sustainable city sees sustainability as a largely cultural question. The technological underpinnings serve two roles. The first is to provide the tools and processes that establish the material possibilities in a modern economy. The second is to make available the participatory process by which citizens may negotiate amongst

themselves, how they would chose to afford to live. This informed decision-making process is conducted within a systems dynamics/ urban metabolism model. This model permits citizens to experiment with many different possibilities, to try different ideas and express different needs within a sustainability balance-seeking process. This process is conducted within the limits of available economics, available technology and within the limits of nature. The framework that establishes the nature of this balance-seeking process is contained in the Centerõs paper, ò Five Operating Principles for Sustainable Cities.

While the first stream of the Vienna Sustainable Hilltown Project emanates from philosophical and theoretical sources, the second stream comes from a new urban design model,- the Sustainable City-as-a-Hill. This model, inspired by the best characteristics of the superb urban centers of medieval Europe, also utilize the most supportive aspects of modern technology to create a dense new urban organism. This generates a compact pedestrian city designed to human scale. Instead of the medieval city on a hill, the proposal of a city-as-a-hill creates the possibility of multiplying available real estate by locating large scale industrial, commercial and institutional activities within the hill, organized around tall, daylit gallerias. The design of the city and its economic and industrial basis is negotiated by the citizen stakeholders through the sustainability balance-seeking process. This process may constitute the first major example of citizens coming together to negotiate their desired way of life tempered by the non-negotiable necessity for sustainability.

This project, sponsored by the city of Vienna is now in its second phase of development. A specific site, the Westbahnhof rail yard, has been selected as a case study and as the possible location of an actual development project. A detailed design of a Sustainable City Implantation on this site is

nearing completion. An essential characteristic of the urban system is a high degree of variety, and flexibility through its partially interchangeable urban modules. This permits the overall urban design model together with the systems dynamics model and the library of interchangeable urban/ architectural modules at different scales, to being applied to a wide variety of alternative locations.

OIKODROM - Forum Nachhaltige Stadt

The Sustainable Hilltown Implantation/ Vienna Project is being conducted under the auspices of the Arbeits Gemeinshaft Stadthügel/Sustainable Hilltown Partnership, which itself is formed by the partnership of two organizations; Oikodrom in Vienna and the Center for Sustainable Cities in Lexington, Kentucky, USA. Oikodrom is a Clearinghouse for Sustainable Cities. It publishes a quarterly journal called Stadtplle cities from many points of view including theory and practice, the relationship of the city to its surrounding landscape, multidisciplinary perspectives, the writings of Austrian and International experts, city administration, architecture and urban design, and philosophical and cultural questions. Oikodrom is also engaged in a variety of cultural activities including, Oikodrom am Lido Stadtnischen for a sustainable culture, avant garde and hands-on activities. In relation to this work, Oikodrom develops tools for consciousness raising including games, computer and multimedia installations, and other participatory techniques. In addition Oikodrom organizes and assists in the organization of conferences of which the Conference of the City of Linz on Sustainable Cities (u.a. Ulrich von Weizs.)

The founder and director of Oikodrom, and the Editor-in-Chief of Stadtplr. Heidi Dumreicher. Dr.

Dumreicher is a social scientist with a specialization in communications. She works professionally as a radio journalist for ORF,- the Austrian Broadcasting Company,- reporting on the humanities and natural sciences, future studies, ecology, artificial intelligence, alternative economy and sustainability.

THE CENTER FOR SUSTAINABLE CITIES

The Center for Sustainable Cities is a multidisciplinary consortium of experts from a variety of disciplines including architecture and urban design, the humanities, natural and social sciences, engineering, agriculture and economics. It is affiliated with the University of Kentucky and also coordinates the work of other centers at other universities. The Center has worked on a variety of projects in the US and in Europe. It won an international award for a sustainable city project in Italy. The Center has developed a comprehensive theory of the sustainable city which presents a well developed process for implementing sustainability as a central principle of urban governance. Major aspects of the Centerõs theory have been incorporated in the European Charter of Cities and Towns Towards Sustainability which was ratified in Aalborg, Denmark in 1994.

The director of the Center for Sustainable Cities is Professor Richard S. Levine. Levine is an award winning architect and urban designer who for many years has done pioneering work in solar energy and alternative technologies. He has published over 100 papers and books covering a range of topics from architectural and urban theory, engineering structures, medieval towns, solar energy and

sustainable cities. He is the founding director of the Sustainability Division of the American Solar Energy Society.

Urban Utopias: Le Financement des Grands Projets d'Amènagements Urbains

Didier Bernateau

A- SYNTHESE

Contexte

La cité est un organisme vivant, dont la complexité s'est accrue à l'époque contemporaine. Un "malaise urbain" semble s'installer, nourri par l'impression d'une qualité de vie qui se dégrade, de la difficulté de gouverner les ensembles urbains, et des tentatives insatisfaisantes de produire un tissu urbain adapté et nouveau.

Une "nouvelle donne" récente, nouvelle surtout par son caractère étendu, encadre la réflexion: l'économie de marché, ou libérale; ceci siginifie: des acteurs non hiérarchisés et le libre échange, notamment de l'information.

Une analyse théorique

Peut-on s'interroger sur ces dysfonctionnements urbains en invoquant l'égoisme des acteurs, limités à leur satisfaction immédiate, qu'il faut corriger par "mieux" d'Etat (plutôt que "plus" d'Etat)? Ou bien ceci n'est-il que l'insuffisance de ce fluide essentiel du système libéral: l'information. La chute des systèmes administrés semble provisoirement clore le débat, et polariser les réponses.

"L'information": cela signifie

1. une topologie et des concepts communs, adaptés aux échanges entre acteurs,
2. les outils et la logistique pour la diffuser
3. l'intelligence et les technologies pour la traiter.

Cela suppose aussi une reconnaissance des acteurs urbains et de leurs motivations.

La recherche d'un optimum local de cette satisfaction qui soit aussi global, appliqué à l'espace, au temps et aux acteurs eux-mêmes, dans une structure libérale - qui pourrait être traitée par une sorte d'information - semble offrir une perspective technique fructueuse, sous réserve de reconnaître la prédominance du fait économique. Une telle simplificatíon de la complexité est-elle légitime?

Les temporalités

Il s'agit d'identifier la satisfaction des acteurs par un procédé extérieur: la conception du "temps

acceptable“, et de la comparer aux autres cycles des projets urbains, de la ville, de l’économie.

Parler de ”développement durable“, c’est analyser et comprendre ces différentes temporalités.

Cette analyse montre un gisement de solution possible dans les différentes logiques de financement.

Approche pragmatique du financement

Le problème du développement urbain, notamment de la réalisation de grands projets urbains en tissu existant commence par le financement.

En France, par exemple, la reconstruction d’après-guerre, puis les Villes Nouvelles, ont été financées soit par des subventions, soit par le recours à des financements à long terme dont le coût (le taux d’intérêt) équivalait à une subvention, du fait de taux inférieurs à l’inflation, et ce pratiquement jusqu’au milieu des années 80.

Pendant les cycles à forte inflation immobilière, le dynamisme spéculatif a pu permettre de motiver suffisamment des acteurs privés pour contribuer à ces projets: ce n’est plus le cas, de façon générale.

Dans le même temps, l’autorité publique - tant sous sa forme étatique que locale - prend conscience de la rareté des ressources et de leur coût. La tendance est alors de chercher un partenariat avec le secteur privé, qui résout ce problème de ressources à la fois financières et opérationnelles: des montages en concession sont donc recherchés, ainsi que du financement de projet.

Si aucun acteur privé n’est suffisamment motivé pour entreprendre de grands projets urbains dans

un tel contexte, il reste à recourir aux ”externalités“, c’est-à-dire aux plus-values périphériques (dans le temps et dans l’espace) créées par le projet lui-même, et qui échappent au périmètre du projet et de ses acteurs.

Une solution, rarement utilisée en France, et qui est cohérente dans le jeu des temporalités, consiste à destratifier les trois logiques financières (spéculation, financier, patrimoine) à associer des acteurs différents à ces logiques, et surtout à permettre d’accéder à la plus-value des externalités via la logique patrimoniale, long terme, et généralement utilisée par l’acteur public exclusivement.

Plusieurs exemples sont décrits: Grand stade en Ville Nouvelle, Eurodisneyland, reconstruction de Beyrouth.

Conclusion partielle

Une réponse simplifiée permet certes d’aborder un élément de l’ensemble de cette problématique urbaine: la clarification des règles du jeu entre acteurs répond à une forme de production urbaine, le remplissage, mais il n’est pas sûr qu’elle réponde au problème clé de ce qui est structurant.

La ville ”glocale“, ou plutôt ”fractale“, du nom de la famille de courbes mathématiques complexes (aux caractéristiques locales et générales similaires), engendrée par des ”lois“, est un sujet complexe, qui, comme tel, ne peut pas être ” résolu“.

I. PREAMBULE

Cette réflexion s'est cristallisée à partir de l'énonce d'un constat dans les termes de références d'un appel d'offres de la DG XII à la Communauté Européenne, concernant le thème de la ville, de ses problèmes, et des pistes de solutions qui étaient suggérées (1994).

Elle a ainsi permis de regrouper plusieurs axes de réflexions et de recherche, et d'expériences urbaines accumulées depuis une vingtaine d'années: planification urbaine en Amérique latine (La Paz - Bolivie - 1976), transports structurants (métro du Caire - Egypte - 1981-86), expérience d'aménagement opérationnel (Ville Nouvelle de Marne-La-Vallée: 1988-91), adossement des expériences opérationnelles à l'organisationnel, au financier, à l'institutionnel (Coopers & Lybrand: reconstruction du Centre ville de Beyrouth - Liban - 1993-95; Euroméditerranée - Marseille - France: 1994; etc). Il s'agit d'une mise en perspective intermédiaire, dans un processus d'appréhension et de restitution continu, à partir de la forme particulière de cet appel d'offres déjà mentionné.

Le malaise urbain

Le constat posé par ce document est celui du "malaise urbain".

La ville est un organisme vivant dont la complexité ne cesse d'augmenter. Un constat double s'établit: dégradation de la "qualité de vie", difficulté d'organisation et de gouvernement de la ville.

Ceci se traduit au quotidien par la présence de ghettos, par les problèmes environnementaux, par les difficultés rencontrées à accomoder décisions politiques et perception citoyenne.

A ces analyses, ajoutons un autre constat, qui est celui de la difficulté à organiser et financer des grands projets urbains, tant en tissu urbain existant - dans un processus de renouvellement et de revitalisation, qu'en espace non construit: c'est que de tels projets, dans leur conception et leur réalisation concrétisent de façon exemplaire les difficultés diffuses rencontrées dans le vécu et le gouvernement de la ville.

Le champ de la recherche

L'analyse des causes de ce malaise et de ces difficultés est concentrée sur trois sujets:

ad) ***'espace***: des solutions trouvées sur un périmètre géographique donné, ne sont pas acceptables si l'on considère un périmètre étendu. Ce qui peut être visé, c'est l'effet de ghetto, c'est aussi la concentration d'équipements dans l'hypercentre au détriment des banlieues, c'est encore la création d'espaces industriels et économiques à fort investissement, contribuant par ailleurs à accélérer des friches.Entre des solutions locales et un équilibre global, la ville idéale serait "glocale" (ce terme est discuté dans le premier chapitre).

ae) ***le temps***: les solutions à court terme obèrent la survie de la ville à long terme; ceci est vrai et perceptible en termes d'environnement et de pollution, de qualité d'investissement

(architecture, infrastructures), de structures d'accueil... Ceci est aussi vrai dans la logique même des développements urbains, davantage axés sur un contenant (formes, construction) que sur un contenu (activités économiques). Entre court et long terme, la ville idéale se qualifie de "***durable***". Ce concept de dévelpoppement durable est approché au chapitre concernant l'analyse des temporalités.

af) ***les acteurs***: ce concept est associé à la vision organisationnelle de l'espace urbain, social et économique. C'est à la fois un concept qui s'adresse à la sphère privée et à la sphère publique de "l'homo urbanus". La ville doit offrir et favoriser aussi bien un espace d'intimité acceptable, que des espaces de rencontre et d'échange à différents niveaux: famille, entreprise, corporation, entité locale, association, etc. Ceci se traduit par le terme de ville "***agora***".

L'incapacité de la cité à obtenir des optima à la fois locaux et globaux "glocaux" tant pour l'espace, que pour le temps, et les acteurs, est alors décrite (dans ce document déjà mentionné) comme un effet de la complexité.

La complexité

Cette complexité réside dans le nombre des acteurs ou entités susceptibles d'agir, dans l'écheveau institutionnel, dans l'étendue de l'espace urbain, dans la multiplicité deschamps qui interagissent avec le fait urbain:

- socio-économique,
- financier,
- culturel et historique,
- institutionnel,
- spatio-architectural,
- technique...

Il réside aussi dans la multitude des identités et situations des villes industrielles et postindustrielles, en situation de visibilité internationale, en expansion, en régression...

Il s'agit bien du terme de "complexe" et non de compliqué", terme proche et radicalement différent: le complexe nécessite intuition et intelligence, là ou le compliqué ne nécessitera que de la logique et de l'effort.

Pourtant, les termes de références ébauchent des pistes de solution: si les optima ne sont pas réalisés, c'est faute de concepts, et de moyens technologiques, et institutionnels: que signifie cette

approche, comment la développer, notamment sur le sujet du financement des grands projets urbains, quelles en sont les limites?

II. UNE ANALYSE THEORIQUE: LIBERALISME ET THEORIE DE L'INFORMATION

Poser le problème du "malaise" urbain en termes de compatibilité entre solutions locales et globales dans l'espace, entre l'individu et la société, est une façon de planter un décor, qui a son importance et qui mérite une "exlication de texte".

Le modèle libéral

Un présupposé majeur tient dans l'acceptation d'un modèle libéral de la société. Le modèle centralisé, ou encore celui du "despote éclairé" ne créé pas l'obligation d'agréger un niveau local et un niveau global, puisque la vision y est unique, centralisée, omnisciente par construction. L'espace peut y être organisé, avec sophistication, mais sans atteindre la complexité du modèle libéral qui résiste aux simplifications dans sa part d'imprévisibilité.

Ce qui caractérise le modèle libéral, et ce qui en est utile dans une approche de la compréhension de la complexité urbaine, c'est qu'il implique le jeu d'acteurs - dont les premiers modèles économiques simplifiant le rôle à celui de consommateurs et de producteurs - avec des règles qui reposent sur la notion de satisfaction (ou d'intérêt, ou de logique), et qu'il suppose enfin la

compréhension par ces mêmes acteurs de leur situation et de leurs enjeux mutuels:

- ***des acteurs ubains***: sans rentrer dans une définition et une catégorisation, ébauchée au chapitre suivant, nous pouvons souligner qu'une telle approche ne privilégie pas un acteur public, dans un rôle d'arbitre, de régulateur, et définisseur des règles et objectifs ("***la puissance publique éminente***"), par rapport à des acteurs privés assujettis, mais considère le, ou les acteurs publics (autorité gouvernementale, autorités locales) comme des acteurs au sens économique, avec leur propre logique (la "***puissance publique opératrice***"). Cette distinction entre "éminent" et "opérateur" est accompagnée de l'idée que le modèle libéral théorique ne prend pas en compte a priori le rôle éminent de l'un des acteurs, et se concentre sur l'intérêt économique des acteurs: les acteurs ne sont pas hiérarchisés
- ***des logiques de comportement des acteurs***: là encore, nous n'approcherons pas de façon détaillée cet aspect, particulièrement complexe. L'approche la plus courante consiste à se placer dans la sphère de l'économique, et à associer satisfaction des acteurs avec des critères quantitatifs et financiers. Des théories plus élaborées (théorie des groupes, néodarwinisme) existent naturellement. Nous avons tenté dans le chapitre suivant une approche qui n'est pas

explicative, main empirique: le constat des temporalités.

- ***la compréhension de la situation et des enjeux***: en effet, pour que des optima soient trouvés, il faut que les acteurs aient une relation spécifique à l'information: il faut en fait qu'ils y aient accès, qu'ils la comprennent et puissent la traiter, qu'ils puissent l'échanger, la communiquer, la transmettre.

Chacune des ces étapes a son importance:

- *Comprendre l'information,* c'est disposer d'un référentiel commun, d'un vocabulaire et d'une grammaire qui permettent d'organiser le sens. A l'état brut, l'information est incompréhensible, et requiert d'être triée, formatée, comparée à des éléments déjà connus, l'information requiert une "topologie": en fait cela implique la mise en place de "*concepts*". Cela suppose de définir un sens.
- *Disposer de l'information, y avoir accès,* et transmettre celle qui est produite implique à la fois un système institutionnel et politique, sinon philosophique, mais aussi des supports et moyens techniques appropriés. Cette dernière condition est potentiellement réalisée au travers des moyens actuels disponibles de communication, à un niveau et une échelle

précédemment inconnus: en cela, il peut y avoir les éléments d'une "nouvelle donne".

- *Traiter l'information*, la régionaliser, en tirer une utilité, est enfin un volet nécessaire. Comme pour les précédentes étapes, nous trouvons une dimension "sociétale" (la capacité culturelle des acteurs) et technique (la capacité des outils, leur disponibilité).

L'information

Concepts, environnement institutionnel et technologies, sont alors censés "fluidifier" l'information pour les acteurs urbains, et constituer, vis-à-vis de la complexité de l'espace urbain, les bases qui permettront de trouver "l'optimum" - démontré dans le modèle libéral économique.

L'"optimum" est en fait un équilibre entre un optimum de satisfaction "local" et un optimum "global", appliqué aux différents champs de l'urbain, dont:

- **l'espace**: cet optimum recherché peut s'appeler la ville "glocale",
- **le temps**: c'est la ville "durable" dans laquelle les solutions à court terme sont aussi correctes à long terme,
- **les acteurs**: c'est la ville "agora", respectant aussi bien l'individu que l'environnenement.

Le cadre de la réponse

Après avoir identifié les problèmes et enjeux liés aux contexte actuel de la ville, rechercher des solutions vers cette agrégation des optima locaux et globaux pour l'espace, le temps et les acteurs, est donc bien déjà un positionnement du cadre de la recherche:

- un système libéral,
- impliquant des acteurs-opérateurs (et non éminents),
- interrelationnés par l'information.

Agir sur la fluidification de l'information, tout en se concentrant sur le fait économique comme base de motivation des acteurs, est une approche qui s'inspire de l'optimum économique démontrable (*Voir Neumann - Morgenstern*), tout en se dispensant d'aborder frontalement le problème de la complexité.

Les chapitres suivants proposent une incursion dans cette voie, et en particulier dans l'idée qu'un gisement peut exister dans la cohérence entre acteurs, logiques, et information au plan financier.

III. LA DIMENSION TEMPORELLE DES GRANDS AMENAGEMENTS URBAINS

La perception d'un besoin d'optimum à long terme s'est dialectisée dans l'expression : "*le*

développement durable“.

Il s’agit bien d’éviter que des investissements lourds ne répondent qu’à un effet conjoncturel de mode, et ne se transforment au-delà d’un délai souvent court, y compris à l’échelle de l’habitant, en friche coûteuse à reconvertir.´

”*Le développement durable*“ induit une nature de réponse à un problème qui n’est qu’ébauché, et qui est celui des différentes échelles de temps de l’amenagement, et en particulier de l’aménagement urban.

Les différentes échelles

Si nous essayons de catégoriser ces échelles de temps dans un cas spécifique que nous qualifierons de ”Grand Aménagement urbain“, nous pouvons définir:

- l’échelle de temps du ***projet***
- l’échelle de temps des ***acteurs urbains***
- l’échelle de temps de la ***ville***
- l’échelle ***économique***

L’échelle du temps du projet se subdivise dans les périodes correspondant à ses différentes phases. Nous pouvons distinguer une approche physique et une approche économique.

- *Dans l’approche physique*, le projet comporte des éléments ”structurants“, en termes

d'infrastructures, de composition urbaine, de symboles, de constructions publiques et/ou privées, d'implantation économique, etc. Ces éléments jouent à la fois le rôle de guide, de lignes directrices et inamovibles pour le futur développement, le rôle d'anticipation de la complexité finale, le rôle de lien avec le reste du tissu urbain et de son histoire. Le projet comporte corollairement des éléments "*sectoriels*", modulaires, qui jouent d'avantage un rôle de "*remplissage*", qui sont en prise plus directe avec la conjoncture et le marché, et donnent un facteur de souplesse et d'adaptabilité tant physique que financière. Généralement, les éléments structurants sont à mettre en place au démarrage du projet, et à compléter dans des délais les plus courts possibles, de façon compatible avec la technique, entre 2 et 5 ans. Les éléments "sectoriels" se commencent et s'achèvent selon des opportunités et des cycles en temps réel, ou à peine anticipés. Si, à titre unitaire, leur durée de réalisation ne doit pas excéder 3 à t ans (délais maximum pour une maîtrise réelle), leur succession peut s'effectuer sur un laps de 10 à 20 ans, ou plus. De la part relative entre investissement lié au structurant et celui au sectoriel peut dépendre la nature du projet, sa réussite financière et ses modes de financement. Il est à noter qu'une certaine confusion peut exister entre les deux natures de

travaux ou d'éléments, lorsque l'environnement économique du projet permet sa réalisation complète dans des délais courts (3 à 5 ans).

- *Dans l'approche (méso) économique*, le projet s'inscrit dans un cycle à (au moins) deux phases: une première phase d'accumulation, de captation d'éléments attractifs -tant en termes de services, d'infrastructures, que de "locomotives" économiques- pour lesquels des actions volontaires, spécifiques, génératrices d'investissements parfois non immédiatement rentables sont nécessaires, et qui vise à créer une masse critique, et une deuxième phase où l'attractivité peut s'exercer de façon potentiellement autonome, suivant la taille et la nature programmatique du projet. La première phase est rarement en dehors de l'échelle de 3 à 5 ans. La ou les phases suivantes peuvent s'étaler, suivant l'activité économique exogène, jusqu'à la fin physique du projet et au delà. Toutefois, des facteurs accélérateurs peuvent modifier ces échelles; investissement public massif, événementiel fort, demande solvable forte, etc. .

Naturellement, le programme du projet et son environnement économique et démographique, peuvent contracter ces échelles, tant physiques que économiques; dans un tel cas, le projet semble

s’élaborer selon un processus continu, conforme à une programmation anticipable et descriptible dans un document.

L’échelle du temps des acteurs urbains: la notion ”d’acteur urbain“ est liée à l’acceptation des règles libérales, ce qui est un présupposé de cette discussion (cf. Préambule).
Par ”acteur urbain“, il faut certainement comprendre ceux qui ont un rôle opérationnel, comme ceux qui ont un rôle d’utilisateur:

- les ”*utilisateurs*“: habitants, entreprises
- les ”*constructeurs*“: aménagement, promoteurs, entreprises de construction, concepteurs, prestataires
- les ”*financiers*“
- *l’autorité publique*: les élus (monde politique), et les techniciens (technostructure)

Chacune de ces catégories pourrait être raffinée. A ce stade, nous pouvons déjà approcher l’analyse d’échelles suivantes:

- *les utilisateurs* - Pour un habitant, comme pour une entreprise, l’espace urbain doit être achevé le plus rapidement possible: au-delà de quelques mois, et en tout cas en moins de deux ans, l’impression de ”chantier“ devient inacceptable. Il faut que l’entité de proximité, que l’on pourrait appeler ”quartier“, soit achevé, que les services de base soient disponibles,

que l'image urbaine soit reconnue. Dans le même temps, la demande est forte pour que l'espace ainsi "bouclé" soit d'emblée parvenu à son niveau définitif de complexité. Des espaces trop simples, trop lisibles, sans "histoire" sont considérés rapidement comme inachevés, insatisfaisants: si on demande à un paysagiste de planter des arbres de 100 ans, on demande aux "acteurs de la production urbaine" une ville avec son histoire, et ses messages symboliques évidents ou subliminaux. Remarquons que l'utilisateur demande aussi une adaptabilité de son environnement urbain à son travail, à ses modes d'utilisation, à sa propre évolution. Quelle est la taille de l'entité de proximité? Les pratiques professionnelles et culturelles, la qualité de l'environnement déjà construit (hors projet), le niveau d'anticipation du résultat final sont autant de facteurs qui impactent sur cette notion de proximité, et aussi sur le caractère soutenable de provisoire; il est ainsi plus difficile d'accepter un chantier en ville nouvelle qu'en centre ville de Paris.

- *les constructeurs* - Les échelles de temps des "constructeurs" sont relativement connues, et appuyées sur des expériences vérifiables. Les "constructeurs" immobiliers, c'est-à-dire ceux qui sont associés à des opérations d'infrastructures simples, et de bâtiment, travaillent à

échelle de deux ou trois ans, entre la décision d'engagement et la livraison à un tiers. Les "constructeurs", au sens "aménageurs", travaillent sur des échelles en principe plus longues, entre 10 et 20 ans, voire plus (Villes Nouvelles). Par rapport à ces constructeurs physiques, nous trouvons des prestataires intellectuels: concepteurs, bureaux d'études, mais aussi philosophes, sociologues, historiens, dont les temporalités relèvent aussi bien de la contrainte matérielle et de l'environnement professionnel, que du projet personnel.

- *l'autorité publique* - Ce terme recouvre des situations complexes et différentes par pays, selon les degrés de décentralisation/déconcentration des pouvoirs, responsabilités et ressources, du poids relatifs de la décision politique par rapport à la continuité des technostructures de l'étendue des délégations et concessions vers le secteur privé. Le "temps" de l'élu est souvent celui de son mandant. La juxtaposition de strates électives de durées décalées complique le jeu, en créant de véritables "fenêtres" où l'action doit être engagée, et des périodes de quasi-blocage. Si l'on se réfère à la durée du mandat communal français, l'échelle est donc de 6 ans, rythmée par des périodes d'accélération et d'attentes... Les technostructures peuvent largement dépasser cette échelle: les Villes Nouvelles en

France sont sous l'autorité technique d'Etablissement Public depuis plus de trente ans (EPAD) pour certaines.

- *les financiers* - Toute catégorisation recèle une part d'arbitraire. En cela, peut-être y-a-t'il abus à identifier une catégorie d'acteurs supposée homogène et dotée d'un raisonnement particulier par rapport à l'aménagement urbain. En vérité, les financiers ne sont pas intéressés à l'aménagement en tant que tel, mais plutôt aux activités directes et indirectes qui en résultent, et qui permettent de générer un rendement de l'investissement. De fait, toute activité économique et humaine s'inscrit dans un cadre construit, qui est censé la servir. Cette relation matérielle permet d'associer le coût de l'investissement immobilier aux revenus réels ou supposés de cette activité. On peur alors trouver trois logiques, et leur temporalité associée: la *logique spéculative*, souvent associée à la spéculation foncière et immobilière, à court, voire très court terme: de un à trois ans; la *logique financiére*, qu va rarement au-delà de 10 à 15 ans, compte tenu des modes de calcul des taux internes de rentabilité; la *logique patrimoniale*, qui vise à constituer sur le long terme un patrimoine de rentabilité souvent faible, mais fiable, et qui utilise souvent des effets de leviers par l'emprunt (ou la délégation

à un tiers) excluant des rentabilités notables à court et moyen terme: on travaille ici au-delà des 15 ans, et il n'est pas rare de parler de trente ans, et même beaucoup plus (cf. institutionnels, assurances, services urbains, ...). Les logiques spéculatives et patrimoniales sont directement liées à l'immobilier et au foncier, et les logiques financières à l'activité économique.

De cette ébauche d'analyse, nous relevons l'extrême dversité et complexité de l'échelle de temps des acteurs, la relative prégnance des échelles courtes (2 ans), mais aussi la réelle présence d'échelle longue (15 ans) et très longue (30 ans et plus), ce qui indique bien une piste cohérente avec les exigences des "développements durables".

L'échelle du temps de la ville: si l'on considère la ville comme une entité analysable d'un point de vue formel, sans nécessairement s'impliquer dans les causes possibles de ces formes, on peut déceler des échelles de temps en liaison avec ses formes. Sans rentrer dans les différents mode de développement spatial et géographique des villes connues, on constate néanmoins des périodes de croissance, de réappropiation, de dégéneréscence, d'utilisation différente, conduisant à une véritable "*recyclabilité*" du tissu urbain. Cette recycalbilité conduit rarement à un phénomène de "*tabula rasa*" complet, mais plutôt à un phénomène de stratification. Ces strates urbains concrétisés par des monuments, des vestiges d'habitat ancien, des tracés de voieries, des ouvrages datés, et même des morceaux entiers de tissu urbain, écrivent une histoire et renseignent sur une durée. Cette durée, sans qu'on soupçonne toujours l'étendue, est instinctivement considérée comme longue, même si le

résultat fini n'en laisse pas paraître la dimension réelle.

A Paris, la rue de Rivoli entre la place de la Concorde et le Louvre, fut prolongée dès le début des années 1800. La puissance publique y construisit d'emblée les façades actuelles, sur un ordre monumental d'arcades: ces façades étaient étayées en attendant la construction des immeubles par les promoteurs privés. Cette situation perdura 40 ans! Ce n'est que vers 1840, en effet, que ce quartier prit son essor, et que de vrais immeubles en pierre vinrent remplir l'arrière des façades, remplaçant les échoppes et taudis en bois qui y avaient prospéré pendant deux générations.

La flèche de Notre-Dame de Paris fut construite au XIXè, soit 7 siècles après l'ouverture de son chantier. La "Sagrada Familia" de Barcelone mettra peut-être plus de 100 à s'achever: ces monuments inscrits dans l'échelle de la ville sont bien associés à une échelle de temps très longue qui lui est cohérente.

L'analyse de la trame à Paris fait apparaître, outre les alignements évidents ou secrets, des configurations redondantes, fruit de cette stratification et de temps, telles que la conjonction pont-place le long de la Seine.

En liaison avec l'espace urbain, apparaît donc une échelle très longue, supérieure à l'échelle humaine, et nécessaire. Apparaît aussi une échelle plus courte, qui pourrait être calée sur la durée d'une génération (20 à 30 ans) et qui correspond à l'échelle du changement, permettant la stratification. Ces deux échelles correspodent aussi à des territoires urbains symboliques différents: la ville "*pérenne*" est associée à un centre - dont d'ailleurs le statut peut évoluer - la ville "*recyclable*" est associée à un espace d'utilisation cohérent, quartier ou noyau de banlieue.

L'échelle économique: il faut entendre par ce terme les "cycles" économiques qui sont constatables à la fois sur le très long terme, et sur des périodes intermédiaires, allant de 20 à 30 ans, jusqu'à des cycles courts de 5-6 ans: ces cycles caractérisent notamment la croissance ou la récession, et ne sont que partiellement explicables, sinon même très partiellement prévisibles, même si des considérations démographiques, géopolitiques, technologiques, peuvent contribuer à en approcher la description. A l'évidence, ils créent une sorte de "toile de fond" par rapport aux comportement des acteurs. Ils ont une réalité temporelle historique (au moins constatable), et géographique: on peut dire que les économies comme les blocs continentaux, subissent des dérives relatives, avec des effets de rattrapage, et des effets de retard.

Il s'agit quand-même bien de processus cycliques, éventuellement adossés à des tendances lourdes, et relativement pas de processus continus: ceci est sans doute explicable dans une approche économétrique par les effets de décalage dans les comportement des acteurs économiques (décalage dû à l'obtention de l'information et de son traitement).

Les trois cycles

Cette approche, qui peut être détaillée, des temporalités en relation avec la ville, ses projets, les acteurs urbains et leur activité économique met en lumière différentes échelles et différents cycles, dont la combinaison paraît proche de la complexité de l'analyse atmosphérique.

- Il existe un certain regroupement autour de trois types de temporalité:
    - *temporalité courte*: de 2 à 4-5 ans. Elle est associée à des actions court terme, et à des

perceptions d'attente provisoire. Elle permet de mettre en place des jalons structurants, et permet à peine de créer des effets d'appel économique. Elle est à peu près cohérente avec les cycles électifs.

- *temporalité moyen terme*: de 15 à 25 ans. Il s'agit de cycles de générations, cohérents avec la recyclabilité, et géneralement nécessaires à l'accomplissement de grands projets urbains. Elle est cohérente avec la durée de vie de technostructures décentralisées.
- *temporalité long terme*: au-delà de 25 ans, ce sont des cycles ou temporalités associés à des acteurs pérennes (institution, service publique), et c'est aussi la temporalité associée à la perception de la ville comme objet stable et historique.

- Dans chaque "zone" de temporalité, on va trouver des exigences, des contraintes et des motivations différentes, et qui ne redeviennent compatibles qu'au delà des temporalités moyen terme. C'est notamment le cas de la vie du projet urbain, qui en temporalité courte nécessite des actions physiques et économiques dont le retour et la lisibilité ne s'effectuent qu'à moyen long terme. Le croisement entre "structurant" (obligation physique du projet), "réceptivité" (accueil de pôles économiques forts à court terme), "spéculation",

”aménagement“ et ”élus“ est à l’évidence contradictoire.

- Par contre, la compatibilité moyen terme pourrait se retrouver, en particulier dans les critères de recyclabilité, de rendement lié à l’attractivité et de rentabilité patrimoniale.

Au delà de ces quelques constats basés sur la confrontation des temporalités, il nous faut remarquer un certain particularisme des cycles financiers. En effet, ceux-ci ne sont pas strictement en phase avec les autres cycles, et en particulier, il faut noter le fait que la rentabilité financière s’appuie sur une temporalité de 10 à 15 ans (prenant en compte des taux d’actualisation de l’ordre de 8 à 10 %), qui est intermédiaire au cycle moyen.

Cette remarque a son importance, en ce que la rentabilité financière seule n’est généralement pas suffisante pour assurer le bouclage d’un grand projet urbain, à cycle plus long, surtout compte tenu d’un premier cycle ”court“ à fort investissement.

IV. APPROCHE PRAGMATIQUE DU FINANCEMENT

Le problème du financement urbain, notamment de la réalisation de grands projets urbains en tissu existant commence par le financement.

Equilibres financiers: une situation dégradée

En effet, le constat français actuel est que les coûts d'aménagement (acquisition du foncier, coût des infrastructures et équipements, coûts de gestion et frais de portage) ne sont pas équilibrés par les revenus d'aménagement, pris au sens traditionnel, c'est à dire la vente des droits à construire sur les terrains équipés.

Ce constat repose lui-même sur trois catégories de "faits":

- le marché de la demande est (conjoncturellement? Structurellement?) dépressif, surtout en ce qui concerne certains "produits" (bureaux). De ce fait, il n'y a pas de demande pour les prix d'équilibre (des grandes opérations urbaines);
- les frais de portage sont devenus significatifs, du fait de taux réels financiers positifs (taux de remboursement moins inflation), alors que ceux-ci pouvaient être fortement négatifs jusqu'à une période récente. Cette situation aboutissait antérieurement à amoindrir la charge des coûts fonciers et d'infrastructures, dans une forme de transfert macro-économique hors du périmètre de l'aménageur;
- un autre effet, renforçant les coûts de portage, est à trouver dans les coûts de foncier avant aménagement, souvent surévalués par anticipation des impacts positifs de cet aménagement.

Cette tendance de déséquilibre financier paraît aujourd'hui assez permanente par rapport à des projets en contexte urbain ou péri-urbain dense, d'une taille suffisante pour poser le problème du coût des infrastructures autrement que marginalement.

Par rapport aux bilans d'aménagement classiquement élaborés, elle pose le problème de l'engagement de ces opérations urbaines complexes, la décision politique devant être confortée de plus en plus par des projections bilantielles positives, justifiant l'intérêt sinon "collectif", du moins économique.

Dans le même temps, l'autorité publique - tant sous sa forme étatique que locale - prend conscience de la rareté des ressources et de leur coût. La tendance est alors de chercher un partenariat avec le secteur privé, qui résout ce problème de ressources à la fois financières et opérationnelles: des montages en concession sont donc recherchés.

Les Grands Projets: la tendance à la concession

Les grands projets d'aménagement urbain à ambition de revitalisations sociale et économique, les infrastructures de transport régionales ou métropolitaines, les grands réseaux d'équipements sont traditionellement à la prérogative de la puissance publique. La prise de conscience de la limitation des ressouces publiques, tant financières que techniques, et le retour à des conceptions de recours à l'entreprise privée dans une logique de marché, ont entraîné un mouvement vers la concession de cette prérogative au secteur privé. Cette tendance est perceptible non seulement en France, mais aussi et surtout dans les pays en transition, aux ressources fragiles.

Le ”financement de projet“

Sans s’étendre sur la catégorisation classique des concessions au sens large, celles-ci peuvent s’appliquer:

- au financement de l’objet à construire et exploiter;
- à la maîtrise de sa conception et / ou de sa construction,
- à la gestion du service associé ou à sa maintenance;
- au recouvrement des recettes liées au service, auprès de l’utilisateur.

Suivant la nature de la concession, les catégories concédées sont plus ou moins étendues: si les systèmes en METP[1]des lycées français ont recouvert financement, maîtrise de la construction et de la maintenance, d’autres concessions peuvent se limiter à la gestion du service et au recouvrement de recettes, notamment dans le domaine du transport.

Le système de financement de projet suppose que seuls les revenus du projet concédé couvrent son investissement selon un taux de rentabilité cohérent avec le montage financier, les risques associés au

1. METP: un marché d’entreprise de travaux publics consiste, pour une collectivité territoriale, à confier à une entreprise non seulement la réalisation de travaux, mais aussi l’exploitation du service public concerné, pendant une durée déterminée. L’entreprise reçoit directement de la collectivité une rémunération, contrairement au système de la concession qui implique de percevoir ses revenus de l’usager du service exploitè.

projet et á son environnement et le bénéfice escompté. Cette définition, en apparence simple, soulève d'emblée le problème d'une perception différente entre puissance publique et secteur privé, et la difficulté à mettre au point un outil de mesure commun économique et financier.

L'analyse de la situation, du point de vue de la puissance publique, peut suggérer un véritable gisement en ce qui concerne le calcul de la rentabilité d'un financement de projet.

La puissance publique et les externalités

L'état, l'administration ou une collectivité ne sont pas, habituellement, en situation d'effectuer un raisonnement du type "financement de projet", pour deux raisons.

- Il n'y a généralement pas de différenciation entre fonds propres et emprunt. La rentabilité est rapportée à l'investissement sans effet de levier par l'emprunt.
- Le périmètre exact lié aux bénéfices d'un grand projet n'est pas clairement défini. Par construction, la puissance publique est à même de capter, soit directement auprès de l'usager, soit indirectement auprès du contribuable, les revenus liés à un grand projet.

Ce dernier point pose la question des "externalités". En effet, dès lors qu'il y a mise en oeuvre d'un grand projet, on constate une modification de l'état économique d'un territoire qui va au-delà du périmètre de l'opération.

A priori, le terme d'externalité comporte deux acceptions:

1. prise en compte, valorisation dans le bilan, d'un projet et son analyse de rentabilité, de concepts, d'effets, de conséquences non chiffrés immédiatement: par exemple, les gains de temps de voyageurs, les gains d'infrastructures routières, d'énergie (au niveau national), les effets de pollution...
2. captation, dans le bilan du projet, de gains (ou de pertes) mesurables financièrement et associés à la réalisation de ce projet, comme les plus-values foncières de terrains à proximité d'un projet d'infrastructure.

Les deux définitions restent voisines, en ce qu'elles supposent une modification de la mesure du bilan et de la rentabilité du projet par apport de données externes valorisées. Toutefois, une différence importante sépare les deux approches:

- *L'externalité de type I* ne modifie pas le périmètre du projet, dans lequel le bilan serait différent. La valorisation des externalités prises en compte ne s'appuie pas sur un coût ou une valeur marchande, identifiable simplement et indiscutablement dans la comptabilité d'un acteur économique précis. De ce fait, la rentabilité modifiée par les apports de telles

externalités n'a pas une réalité financière à laquelle des acteurs économiques autres que le maître d'ouvrage initial du projet, pourraient souscrire. Dans cette optique, l'exercice d'incorporation a pratiquement et exclusivement un intérêt comparatif, entre plusieurs solutions de même nature ordonnancées par le même maître d'ouvrage. Nous qualifierons ce type d'externalité d'"*indirecte*".

- *L'externalité de type II* s'attache à associer un périmètre avec chaque externalité incorporée. Plusieurs natures d'évolution de périmètre sont envisageables:
  - géographique, en premier lieu, en comptabilitsant dépenses et recettes sur un territoire plus étendu. C'est le cas de la captation des plus-values foncières sur les territoires d'un secteur équipé en transports;
  - institutionnelle ensuite, en considérant non plus seulement le bilan du maître d'ouvrage, mais le bilan consolidé des acteurs intéressés à son action: collectivités, concessionnaires, utilisateurs finaux;
  - économique enfin, en s'intéressant non seulement aux dépenses et recettes d'investissement et d'exploitation, qui sont la nature majoritaire des flux financiers du maître

d'ouvrage, mais aussi les coûts et recettes liés aux services et aux taxes ce qui suppose aussi une évolution de périmètre de type "institutionnel", voire aux apports de nature macro-économique induits par des infrastructures (création d'emplois, alternative à l'investissement dans d'autres domaines en rapport avec la "politique de la ville").

Nous qualifierons ce type d'externalité de "directe".

- Ces différents natures de périmètres peuvent être, et sont de fait, combinées. La valorisation des externalités directes prises en compte s'appuie sur une valeur marchande, payable ou récupérable par un acteur économique identifié, dans une relation qui peut être contractualisée. Dans cette définition, la prise en compte des externalités, appuyée sur une réalité potentiellement opérationnelle, revêt un caractère intrinsèque vis-à-vis du projet et de sa décision de lancement.

Tout grand projet engendre des externalités: plus-values foncières, création d'emplois, amélioration du cadre de vie sur un territoire plus vaste que celui limité au domaine d'intervention.

La puissance publique, et au travers d'elle, ses opérateurs, cherchent à en quantifier l'impact, dans une logique qui est essentiellement comparative (choix d'alternatives socio-économiques) et assez

peu financière (recherche de fonds et contributions financières), sachant que la plupart des retombées seront captées dans le filet fiscal, ou retro-agiront sur de actions à impact budgétaire.

Dès lors que le grand projet est concédé sous forme de ”financement de projet“ au secteur privé, si pose la question du périmètre des revenus.

Quelques exemples

Les exemples suivants vont permettre de mieux cerner les externalités:

- Le premier concours du *Grand stade* (de la coupe du monde de football de 1998), alors situé à *Melun-Senart* (ville nouvelle au sud de Paris) associait deux éléments: la construction et l'exploitation du Grand stade proprement dit, et l'aménagement et la promotion de surfaces de bureaux voisines, le postulant concessionnaire calculant une subvention que la puissance publique lui remettrait pour équilibrer son bilan global (supposé négatif compte tenu des difficultés à exploiter un tel équipement). Ce montage, dans son principe, met en lumière l'apport d'externalités:
  - Une partie en était rétrocédée directement au concessionnaire sous forme de subvention: ce que la puissance publique était prête à payer, entre autres, pour accélérer le démarrage de

la ville nouvelle.

- Une partie était captable par le concessionnaire (dans l'hypothèse d'une conjoncture immobilière soutenue), qui récupérait la plus-value apportée par le grand projet sur des surfaces de bureaux voisines.

Ainsi, la puissance publique avait élargi de périmètre des revenus au-delà de l'exploitation de l'objet concédé. Ces revenus pouvaient résulter de la présence du projet et en constituaient une externalité devenue directe et récupérable par le concessionnaire (avec un certain nombre de risques, que le retournement de conjoncture a démontrés).

- la *réhabilitation du centre ville de Beyrouth*, l'état libanais a, en quelque sorte, "concédé" l'aménagement du centre[1] à une société de droit privé, Solidere (Société libanaise de développement et de reconstruction). Dans un schéma de type "français", Solidere se serait probablement contentée d'aménager les terrains (de financer leur achat et les infrastructures) et de les revendre à des promoteurs privés. A Beyrouth, l'aménageur est aussi le promoteur (pour le tiers des surfaces), porteur et gestionnaire de patrimoine et concessionnaire

1. 165 hectares de terrains - dont 45 hectares de remblai gagné sur la mer - et 4,7 Mm2 de constructions

(parkings, marinas, services urbains ...). Ce faisant, il peut capter à son profit une partie des plus-values qu'il a lui-même créées, en reconstituant un centre urbain viable. En l'occurence, ce schéma permet de rémunérer les actionnaires de Solidere, anciens propriétaires des parcelles récupérées par Solidere qui ont été rémunérées sous forme d'actions de la société, au plus près de la valeur future dans un projet achevé.

- Dans le projet *Eurodisneyland*, les organismes bailleurs de ce projet de loisirs et d'hôtels se sont garantis sur les revenus de ces ouvrages. Les hôtels constituent un premier niveau, évident, de récupération de plus-value apportée par le parc (ce qui n'avait pas été fait lors de la création du premier parc en Californie). En revanche, il existe un stock de droits à construire périphériques préemptables par Disney au prix de revient, susceptibles d'une appréciation du fait du projet (et surtout de ses infrastructures d'accompagnement), non associées au périmètre du projet financé.

Au travers de ces exemples, il apparaît que la puissance publique peut décider de déléguer la récupération de revenus qui ont un rapport plus ou moins direct avec le projet construit et exploité.

Il n'est pas indifférent de constater que cette récupération est souvent associée à une vision

patrimoniale, qui est naturellement mais non explicite pour la puissance publique, tandis que la logique purement financière, associée au périmètre exact de projet, s'adosse à une exploitation ou un usage.

La déstratification juridique et économique entre patrimoine et usage, classique dans la logique anglo-saxonne, s'avère ainsi un vecteur potentiel pour une incorporation des externalités dans le financement des grands projets urbains.

Intégration des logiques financières et temporelles

Nous avons vu au chapitre précédent qu'un grand projet urbain agrège différents cycles ou échelles de temps, et en pratique:

- un cycle à 3-5 ans, qui recouvre et aborde deux logiques financières: spéculative, et financière.
- un cycle à 10-20 ans, qui recouvre et aborde aussi deux logiques: financière et patrimoniale - et des logiques instantanées de type spéculatif.

Une possibilité existe de faire accéder les acteurs financiers à l'externalité des projets, via le recours à la logique patrimoniale, que la puissance publique utilise en fait par elle-même sans l'identifier comme telle.

La mise en perspective de gains, la possibilité juridique d'y accéder, et la possibilité technique de recourir à des modalités contractuelles communément admises et surtout comprises entre acteurs publics et acteurs privés doit alors permettre de trouver des modes de financement diversifiés jouant sur les différents temporalités.

Cette mise en cohérence passe toutefois par des processus qui ne sont pas aujourd'hui totalement évidents:

- la quantification financière des externalités socio-économiques
- "l'abandon" ou le transfert, même partiel, des acteurs publics, de la prérogative patrimoniale
- la mise en place d'outils techniques et financiers, ainsi que de processus permanents, d'évaluation et de contrôle, permettant la bonne réalisation des contrats.

V. CONCLUSIONS (PARTIELLES)

La ville glocale?

La première fois que j'ai lu le terme de ville "glocale", j'ai été un peu mal à l'aise. Ce syncrétisme revoie au mot français "glauque" (en anglais: glaucous, sea-green) qui n'évoque que trop l'aspect sordide que l'on cherche justement à minimiser. Ayant bien compris que cette contraction cherchait à faire rejoindre l'aspect universel, macrosystème, globalisant et l'aspect villageois, microsystème,

local dans un nouvel oecuménisme, je me suis attaché à trouver un néologisme synonyme, plus confortable à des oreilles francophones.

Après avoir écrit des listes entières de mots qui pouvaient être connectés à ces deux concepts et avoir essayé des alliances chimériques ou technocratiques, j'ai fini par me résoudre à exploiter le vocabulaire mathématique, qui, au fond, sous-tend les concepts d'optimum local et d'optimum global. Et j'ai pensé au mot "*fractal*", qui caractérise une courbe (un espace) dont les propriétés locales et les propriétés générales sont identiques - et par la-même qui réalise une symbiose parfaite entre local et global.

De plus, les espaces fractals renvoient à la complexité, ce qui me semble être un des points clés de la ville.

Fractal évoque aussi "fracture", comme on dit maintenant "fracture sociale", la vulnérabilité des tissus - sociaux comme urbains.

Mais surtout, ce mot comporte un gisement de similitude avec le fait urbain en système libéral dans ce qu'il a de théorique: dans un tel système, la production du tissu urbain n'est pas le résultat d'une forme imposée et mise en oeuvre par un maître d'ouvrage (un "prince"), mais le résultat du jeu entre acteurs, établi par des règles du jeu, qui sont les lois et règlements urbains et les lois économiques. Il n'y a pas de forme préétablie, pré-définie: c'est aussi, dans une certaine mesure, le cas de la courbe fractale dont on ne peut définir le tracé par une équation donnant la position de ses points (la forme), mais qui résulte d'une loi de composition (la règle du jeu).

La complexité

L’approche développée précédemment permet de jalonner une piste: dans ce qui est ”remplissage“, les acteurs urbains vont agir avec des règles du jeu qui peuvent aboutir à la possibilité d’un financement de la ville, grâce au recouvrement entre temporalités et logiques de financement.

Il est même possible que ces logiques de financement permettent de résoudre le financement du ”structurant“. Par contre, il n’est pas clair, dans le modèle qui a été pris pour cadre, de savoir qui est le moteur de la définition de ce ”structurant“, non plus que de savoir quelle est la frontière entre structurant et remplissage. Ceci constitue la limite de l’exercice, et au fond le rappel de ce qu’est la complexité.

NETWORKING THE CITY: THE NEW 'AGORA'

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The concept set out in this paper is for an urban framework which is based on an analysis of the most significant components of contemporary urban structure, movement and communication. The framework relates to different scales of development - metropolitan, district and neighbourhood and is defined through the public realm, urban infrastructure and communications systems. Three principal arguments are explored in order to develop the conceptual model, or framework. The first relates to the social, economic, technological and cultural forces which are propelling the

contemporary urban fabric towards two trends, that of suburbanisation and specialisation on the one hand and towards the revitalisation of urban cores on the other. The second argument relates to the importance of the transport system and the infrastructure of communication as an essential tool for understanding how cities develop and how contemporary 'agora' or meeting places might be perceived and strengthened. The third strand of the argument is concerned with current spatial perceptions in the post-modern city and suggests that experience of space is becoming mediated by mass means of communication, that is by TV, publications and other information sources. The framework proposed then draws on an observation of existing trends and suggests strengthening and managing them to propose a 'multi-centred compact city'.

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INTRODUCTION

This paper originates from the first of three specific objectives identified by the European Commission in their call for research proposals which sought to :-

- " Develop new holistic ' concepts for urban development aimed at the promotion of human centred (agora) city plans which, by applying technology options will enable social cohesion, co-operation for co-development of human beings, multicultural and multiracial coexistence.[1]"

The study's aim was to stimulate urban designers and researchers to develop an interpretation of a new human centred city through the use of new technologies. The global urban concepts developed by the study were also to be accompanied by ideas about possible innovations and changes to the city's systemics components and public meeting places, or "agora".

The concept set out in this paper is for an urban framework which is based on an analysis of the most significant components of contemporary urban structure, movement and communication. The framework relates to different scales of development - metropolitan, district and neighbourhood and is defined through the public realm, urban infrastructure and communications systems.

Three principal arguments are explored in order to develop the conceptual model, or framework.

The first relates to the social, economic, technological and cultural forces which are propelling the contemporary urban fabric towards two trends, that of suburbanisation and specialisation on the one hand and towards the revitalisation of urban cores on the other. The second argument relates to the importance of the transport system and the infrastructure of communication as an essential tool for understanding how cities develop and how contemporary 'agora' or meeting places might be perceived and strengthened. The third strand of the argument is concerned with current spatial perceptions in the post-modern city and suggests that experience of space is becoming mediated by mass means of communication, that is by TV, publications and other information sources.

The essential thrust of the overall discussion is that these interrelated trends have an internal logic and some valuable attributes. Even if it were desirable to return to the forms and practices of the pre-industrial city in some aspects of daily life, the scale and organisation of domestic life and the European economy would make this impracticable. The framework proposed then draws on an observation of existing trends and suggests strengthening and managing them to propose a 'multi-centred compact city or polypolis'.

The structure of metropolitan city regions resulting from these tendencies has grown more complex, with general urban functions decentralised to peripheral nodes and the main centres becoming more specialised. The need is to strengthen the 'hard' and 'soft' infrastructure that ties this loose network of centres together, making use of the new technology to give greater identity and coherence to the whole. The suburban centres can increase their sense of identity by specialisation and densification, allowing the emergence of local street-based agora. The realisation of such a concept of the city in a sustainable form will require an intensification of current trends towards a more

general reliance on public transport.

New forms and traditional 'agora' and meeting places would co-exist within the compact polypolis. The framework would not, however, suggest that the market should be left to itself. It is argued rather that it is the task of urban managers and designers to set up a system of urban governance and to intervene in the spatial framework in order to maximise accessibility and reduce social exclusion. Spatial interventions would include measures to enhance the legibility and identity of the urban fabric.

CURRENT TRENDS: SUBURBS AND SPECIALITY

Urbis vs. Suburbia

The history of the modern city can been described as a process of successive phases of centralisation and de-centralisation. In the early phases of urbanisation, the movement was from the countryside to dense and congested urban centres (Burnett 1980). The growth of huge slums often located close to polluting industrial sites prompted early reformist planning measures in the interests of public health (Gauldie 1974). In Britain, starting from the late eighteenth century, a new bourgeoisie fled the worsening conditions of the city centres to suburban villas close to the main routes out of the cities (Davidoff and Hall 1987).

As the road systems improved and road and rail-based public transport systems were developed, the opportunity to move to the suburbs was opened up to larger segments of the urban working

population (Bowley 1945). The ring of suburbs began to spread ever outwards, filling up the spaces around the railway stations or between the initial ”ribbon” development along the main arteries . Despite slum clearance, the scale of urban degradation compounded by real rises in incomes intensified the pressures for movement out of the inner cities (Jackson 1973).

British public policies encouraged a trend towards decentralisation which developed from the slum clearance and public health measures of the nineteenth century, which displaced indigenous populations in their thousands, (Stedman Jones 1971) to the public housing acts and home ownership policies of the interwar period(Swenarton 1981,Sims 1993). These measures were further compounded after the second world war, when a series of planning and economic measures dispersed industry, set up satellite estates and more famously, constructed a series of New Towns around London and other metropolitan centres (Barlow Report 1940, Abercrombie and Forshaw 1943, Cullingworth 1975).

In the cities of the developed industrial world, dispersal or ”counter-urbanisation” has continued throughout the twentieth century as a result of progressive infrastructure and transport improvements and growing private car ownership (Hall 1989). This outward movement can also be seen as a product of demographic and cultural changes.

Effects of the Transportation Revolution

Many factors contribute to suburbanisation but urban spatial dispersion is only made possible through developments in transport infrastructure. Malone and Rockart (1995) suggest that suburbs

represent a ”third order” response to such changes. First order effects are those of substitution, as when one type of transport technology replaced another, for example , the use of cars and trains instead or horse-drawn carriages. The second order effect is an increase in demand. People began to travel more and to commute further to work.

Studies have shown that the amount of time people allocate to travel to work each day has stayed fairly constant over a long period of time and generally averages between 30 and 45 minutes depending also on cost factors and on the particular geographical context (Zahavi 1981). Increased travel distance is a consequence of such constant ”time budgets” and more rapid transportation. As more people began to use the growing transportation networks, the third order effect occurred - the emergence of ”transport-intensive” urban structures, such as suburbs and out-of-town shopping centres. This was not simply the result of the development of new transport links, however. The development of telephone networks was also an essential factor since it gave people the necessary capacity to co-ordinate their activities at a distance.

The Suburban Cultural Imperative

Such changes are also dependent on underlying pre-existing cultural attitudes. In the United States, home ownership is highly valued and rural (or small town) life regarded as morally superior to the city. Daniel Solomon (1989) has linked suburban values in the United States to the myth of the ”lone rider of the prairie, to the culture of the frontier and ”vast distances....so infinitely seductive to the masses of the industrial cities of Europe, England and the East Coast of the United States”. This pervasive male dominated myth of the lone rider and the myth of glamorous suburban living that it

engendered, have in turn been perpetuated world-wide by American cinema, advertising and television (Solomon 1989).

The converse to the mythology of the lone male staking out his territory is that of the domestic idyll, where the home is a temple of the family, a moral and physical refuge from the pollution and dangers of the outside world (Hall, 1989). This idealisation of home life and its concomitant notions of subordination and domination between the sexes has had a profound influence on the development of the environment of contemporary British cities. From the middle of the nineteenth to the middle of the twentieth centuries, public policies towards wage controls, industrial location, housing and welfare provisions favoured an idealised nuclear family consisting of a male breadwinner and dependent wife and children (Roberts 1991, Land 1979, McDowell 1983)[2].

In Britain the idealisation of home life and a desire for a mythologised past has been associated with an anti-urbanism prevalent in British town planning and culture. The country has been seen, particularly in the nineteenth century, as a purified retreat, away from the city's physical degradation and by inference, moral pollution (Williams 1975). Taking this argument further, Davidoff, l'Esperance and Newby(1976) argued that such an association, well-documented in literary and popular culture had led to an "aesthetic blurring" and an affirmation of the idea that the natural place for the woman is in the home and that the ideal home should be located within the stable, hierarchical order of the rural village. This notion of 'organic community' has remained a persistent idea within British town planning practice (McDowell 1983)

The effects of such a pervasive ideology of gender difference were to exaggerate the division

between the public and private realms of the city and to encourage the construction of mono-functional areas of the urban fabric where housing was separated from workplaces (Pratt 1989). Furthermore public transport systems were geared towards the need of the male breadwinner operating at schedules and fares which met the requirements of morning and evening rush hours, thereby leaving pools of female labour prey to exploitation by nascent and footloose industry looking for cheap part-time workers.(Massey 1984).

As the twentieth century has progressed, such nineteenth century notions of order, division and difference have been progressively challenged by socio-economic, technological and demographic changes. These have also made their mark on the city fabric, tearing away former urban hierarchies and creating new networks.

Economic Re-Structuring

Whilst a complete analysis of the socio-economic trends influencing the future form of cities is beyond the scope of expertise of the authors of this paper, nevertheless some general observations can be made. It is apparent that the economies of the industrialised nations of Western Europe have been undergoing a process of re-structuring, with economic activity switching from declining industries such as ship-building, steel production and coal mining to the service and tertiary sectors (Massey 1984, URBED 1994).

This process of restructuring has been current in Britain since the late 1930's (Barlow Report 1940). Jobs have been lost steadily in the major manufacturing industries and employment has

switched remorselessly to service industries, the tertiary sector and 'high tech' manufacturing. These broad economic trends provide the context within which the major issues confronting contemporary urban planners and outlined in this proposal have been generated.

New technologies of production and information exchange have changed both the financing, operation and locational strategies of individual companies with a corresponding impact on the spatial form of cities. Whilst economists may differ in the explanations of the new industrial order, urban geographers such as David Harvey have argued that in our new post-Fordist economies, capital is foot-loose and flexible. Major transnational companies now operate in a global context, their investment decisions transcending national boundaries (Harvey 1989). Cities and regions are now in competition with each other, seeking to attract plant, offices and personnel.

Feminisation of the Workforce

A further important factor has been the 'feminisation' of the workforce occurring steadily throughout the century. This has recently accelerated with the increase in women in employment exceeding the fall in numbers of men in employment between 1971 and 1988. This is not to say that women as a whole have increased their economic independence. The majority of the jobs which women have gained have been in the part-time service sector. Rather , at the lower end of the income scale, women's wages are essential to keep families above the poverty line. The dual income household, with both partners in employment, is nowadays becoming more of a necessity in contemporary urban Britain (McDowell 1991).

The feminisation of the workforce, the increasing mobility of companies and retail outlets combined with a wider availability of car ownership are currently leading towards a further change in the composition of cities. One significant development in which the United States is a forerunner, is the appearance of 'Edge Cities'. It has been argued that these out of town developments are reliant on a predominantly female workforce (Garreau 1991).

The Emergence of 'Out of Town' Development

The early outward movement to the suburbs was later reinforced by the shift of manufacturing industry away from the centre towards less congested peripheral locations, followed by major retail and commercial functions, such as out-of-town shopping centres, retail, office and technology parks. This movement is dependent on the availability of competitive telecommunication services to local firms in order to co-ordinate activities and to maintain economic competitiveness.

In the United States, the concentration of commercial development outside downtown areas has given rise to the phenomenon described by Joel Garreau(1991) as ”Edge City”. Edge cities are workplaces rather than residential suburbs and are characterised by large-scale concentrations of office, retail and entertainment functions.

Suburban commercial and industrial development began as small-scale ribbon development along the main routes out of the cities. Issues of accessibility prompted the suburban location or relocation of the industrial estates, university and hospital campuses, shopping centres, retail, science and office parks that followed. These types of large single-use complexes tend to be strung out along the main

suburban arterials and orbital roads like beads on a necklace. Retail and leisure centres, in particular, rely on being of sufficient size to provide in one site, at one point in time, the kind of diversity of choice and critical mass of activities that evolves over a long period in the city centres. The latest example of this is the *multiplex cinema* which offers in one building the full range of popular films on release at any time.

This process has certainly gone much further in the United States, where land value on the periphery has increased sufficiently for quite dense developments to arise. These take the linear form of the ”strip’’ already described, but may also form nodes around intersections in the road network (typically where major orbital routes cross major radials), or at points along the strip. In mature edge cities, it is cost effective to build multi-storey car parks which allows tall office blocks to be built more closely to one other. Where such concentrations of activity result in office blocks less than the critical 200m distance apart (”the 600 feet law”) pedestrian-based functions (local services, cafes) can begin to develop (Garreau 1991: 464).

In Europe such concentrations of commercial activity outside central business districts are rare. By Garreau’s definition, urban sub-centres such as London’s Canary Wharf or La Défense in Paris fit into the special category of ”uptown” edge cities. Such developments are clearly determined by proximity to the central business districts and made possible by historic industrial decline in inner city areas.

However, a huge amount of commercial development has also occurred away from the urban centres, around and in corridors leading to airports (Heathrow in London, Schipol in Amsterdam) or on orbital highways such as London’s North Circular or M25 and the Péripherique in Paris. Where

the limits of the old model of the urban metropolis, with its single central business district, were largely determined by the half hour or 45 minute commuter ride from the centre, peripheral developments have doubled the effective commuter radius of the city and we have seen the emergence of the ”100 mile city” (Sudjic 1993).

CURRENT TRENDS: METROPOLITAN RENAISSANCE

Impact on the City Centre

The impact of suburbanisation on the central area of cities is the subject of some debate. The conventional view is that the vitality of the city centres is threatened by self-reinforcing ”cycles of decline” (URBED 1994). At first, the reduction in population densities and cleaning up of congested and polluted industrial cities was seen as a benefit and reinforced by public policy. With the trend towards jobs, shops and places of entertainment following the suburban exodus in the last twenty years, planning policy in the UK has been moving quickly in the opposite direction, towards revitalising and repopulating the city centres.

In contrast to the conventional view, a number of commentators suggest that the scale of downtown decline has been exaggerated.[3] Whilst it might be the case that there are concentrations of poverty and deprivation in inner city areas (Gordon and Boddy 1994), from this alternative perspective, in only a relatively small number of primarily single industry-based cities in Europe and

America have the central areas been denuded of sustaining functions, while most city centres have undergone an economic and cultural ”renaissance”. The relative success or otherwise of city authorities in competing in the market for global capital may also be seen as having a significant role, and the ”bullish” view of cities tends to focus more on the successes, in particular the successful *world cities* (Sudjic, D 1995).

The Information Economy

Economic growth during the last three decades has focused on *producer services* such as finance, property and law and on *social services* (education, health, etc.).[4] This has provided a backdrop to the more recent changes in commerce and production which have been brought about by the 'revolution' in information and other technologies. One of the most spectacular aspects of this change has occurred in London, where the effects of the 'Big Bang' or deregulation of the financial markets is still making itself felt (Budd and Whimster 1992, Hutton 1995). The physical impact of London's effort to retain a global position in the financial world took concrete form in the construction of a new urban landscape in London's Docklands (Brownhill 1990) and a massive rebuilding of some 50% of the office space in the City of London's square mile (Burdett 1992).

Whilst the explosion of financial services was strongest in particular world cities such as New York, London and Tokyo, the effect has also been felt in many smaller urban centres. This city centre revival has been associated with the emergence of an *information economy* . World-wide telecommunications links and computerisation were an important factor in the boom in financial services with the ”citadels of finance” portrayed as the ”command-and-control centres of the world

economy" (The Economist 1995) .

Successful metropolitan centres have come to rely not only on specialised financial functions within an increasingly global economic system, but also on political or culture-based industries such as administration, the law, specialised and higher education, electronic media, publishing, entertainment and tourism. The historic shift in employment from industry to services is partly a reflection of the shift in value-added to products by research, design, marketing and advertising, which in turn help to support growing broadcasting and publishing activities.[5]

Demographic Change

A consequence of the centre-led economic growth of the eighties, and perhaps the most remarkable urban trend, was the halt to and, in many case, reversal of the historic decline in the population of central cities in all developed industrial countries.[6] In the United States, the share of the total population living in centre cities increased during the eighties at about the same rate as the outer city suburbs .

The larger metropolitan centres which had experienced decades of declining population saw the biggest revival. After losing nearly two million people since its peak, for example, London has recently experienced a slow but steady increase in its population. In the UK during the eighties, central populations grew in metropolitan and industrial cities, market towns and historical resorts alike, although at different rates (The Economist 1995).

One major demographic change which has occurred in Britain since the 1920's has been the

growth of small households (Gittins 1985). More recently, the traditional consumer of suburban housing, the single family household of four or five members has declined from 27% in 1961 to 20% in 1993. Meanwhile the number of smaller households has increased and in particular, the number of single person households has increased from 14% in 1961 to 27% in 1993. Although it might be presumed that this increase is directly related to the higher proportion of the population which is living beyond the age of 60, it would appear that paradoxically, this increase in number is accounted for largely by the numbers of men under pensionable age living alone. Government projections suggest that by 2001 nearly one in ten households in Britain will consist of a single man under pensionable age compared with one in thirty in 1971 (Central Statistical Office 1995).

A factor which may be related to this trend towards smaller households may be the high rate of divorce and remarriage in Britain, with approximately one third of marriages ending in divorce. One further demographic factor which also supports the projected increase in numbers of small households is that the number of childless women is also rising. As a result of the high divorce and remarriage rate, the rate of household formation and dissolution is also increasing. This picture of discontinuity and change may be offset by noting that the proportion of elderly households is also increasing.

It seems likely that this demographic change is helping to sustain the re-establishment of population in city cities. Certainly in Paris 60% of households within the inner core bounded by the périphérique consist of one or two person households, who are either young people or of pensionable age. Indeed, in that city redundant offices are being re-converted to houses (Newman and Salter 1995)

Gentrification

Small households with higher than average disposable incomes, such as young and middle aged couples and single professionals have provided a strong part of the market for gentrified properties in the inner city. A movement by the professional and middle classes into low-income areas in the inner city was satirically observed by Jonathan Raban as long ago as the late 1960's (Raban 1974) and has since formed both a strong motor for regeneration and a keen area of academic debate (Redfern 1994). Whatever the analysis of gentrification in class and status terms, its outcome has resulted in the upgrading of the physical fabric of many parts of British inner cities with a concomitant rise in property prices and displacement of the indigenous population.

The differences of view about the relative well-being of city centres depend on both functional and spatial definitions. It is fair to say that the greatest decline has been experienced in low income urban areas, whether focused in the inner city, as in many American cities, or in the inner ring of industrial nineteenth century suburbs around the centre of many European cities (The Economist 1995). It is here that the loss of industrial employment and the growth of large scale unemployment or employment in low wage service or ”sweat-shop” type activities have had the greatest impact. Within such areas, the loss of retail investment and other urban services is predictable.

The argument that the centres of cities are reviving does not only flow from a growth in the rise of financial services and the locational preferences of the upwardly mobile small household. It also derives from an extension of the tradition role of city centres, as places for meeting and transaction.

The Role of Informal Contacts

Activities, such as financial services, rely as much on informal networks as on formal communication. In business, face-to-face contact is essential for promoting trust, as well as for the unpredictable effects of the exchange of ideas in chance conversation. In design and advertising, as in the media and entertainment, it is essential to operate in a physical milieu in which the latest ideas and shifts in fashion can be shared in an informal way (Bianchini and Landry 1995).

Cities have always been centres of knowledge generation and information exchange, as well as sites of administration and control. The explosion of communications networks and knowledge bases appears likely to enhance the position of metropolitan centres as the nodal points of the networks and centres of creativity, for both historical and economic reasons (Commission of the European Communities 1990) . The information economy is dominated by large metropolitan cities and urban centres. Local urban authorities are pursuing ICT based initiatives to provide information services to businesses and other sectors in order to maintain local competitiveness. In the United States, many current initiatives are directed towards accommodating the growth of knowledge-based activity and the related need for informal contact in the city centres (URBED 1994).

Economic Factors Favouring Cities

Apart from the continuing need for face-to-face contact and to benefit from technological spillovers, there are other good practical reasons for being in the city. Most important of these are the pools of multi-skilled labour that the city offers, the more so when the requirement for different types

of skill is in a state of flux. For this reason, and because of the local inter-dependencies, knowledge bases and organisational culture, particular industries have tended to cluster in specific urban locations. Other factors include improvements in management and communication which have led to the introduction of ”just-in-time” techniques in manufacture. This favours suppliers being close to their market, whether these are other companies or concentrations of consumers. As part of this trend, and with the introduction transport telematics, edge-of-town warehouse are likely to become largely thing of the past (The Economist 1995).

Some of these factors favour peripheral as well as central locations. California’s Silicon Valley is only the most famous of many examples. However, central cities look set to continue to benefit as well with the continued growth of the nexus of culture and knowledge-based industries. In parallel with, or perhaps because of this new-found significance, the cultural image of the metropolis has taken on a new lease-of-life. Even if the ”big bang” of eighties finance capital has passed its peak, city-directed tourism and leisure continues to boom.

TRANSPORTATION AND COMMUNICATIONS NETWORKS

This consideration of the factors which have favoured and structured our cities leads on to a the second major strand in the argument of this paper. This is that it is the communications networks which form the essential building block for a model of the city's structure, rather than the neighbourhood. The argument behind this assertion lies in the notion of *transaction*, which, itself provided the origins for the *agora*, or market-place.

It is useful to consider the individual's experience of the complex city and to adopt an human-centred approach. This approach provides a contrast to an attempt to compress the complexity of the city into a simplified description or a spatially limited model such as the village. The notion that a district can be understood as a cultural entity is misplaced and geographers have long rejected the notion that places have singular and fixed identities with clear boundaries(Massey 1992).

In any one district there is likely to be a number of resident as well as non-resident social groupings with a range of associations with, expectations of, and commitments to that place in particular and the city as a whole. While local transactions and the diversity are important to vitality it should not be assumed that the relevant population will be resident locally. Districts may acquire a particular character by their origins and use as much as by their resident populations. For example, 'Little Tokyo' in central Los Angeles acquired its character from the Japanese flower sellers who congregated there at the beginning of this century. The majority of these families have long since moved out to the suburbs (Hayden 1995).

The urban system, as Christopher Alexander so aptly described it, is organised as a *semi lattice*, with activities serving a variety of different sized and overlapping catchment areas (Alexander 1965). Hillier has described the system as operating on the basis of origins and destinations everywhere (Hillier & Penn 1993). This loosely structured but overlapping functional specialisation of cities is what gives them their resilience and adaptability to long term economic change. It gives rise to a type of mixed use that is based not on local autonomy but, as Jane Jacobs described it, on ”organised

complexity" (Jacobs 1965). Unless people are physically restrained from travelling or transporting goods, the notion of a discrete self sufficient urban neighbourhood is unworkable. Furthermore, the substance of the city, its persistences and latest developments are underpinned by its movement systems. As Rossi (1982) says it is often the street system which is the most enduring part of the city.

The Street Network

This leads to the argument that the fundamental component of the city is not the urban block but the street. The street has two fundamental qualities: the first is as a route of communication and the second is as a place of transaction. The locus or positioning of these functions varies at different scales and in different technical forms, depending upon whether, for example, the street is a back street, a main thoroughfare or an urban motorway .

The street forms the primary structural network of the city. This public structure supports and enables the multitude of private communicative and cognitive networks of the citizens. Lynch(1960), for example, noted that the path was the most important organising principle of most individuals' mental maps. The street network is an obvious essential for the free movement of people and goods which is perhaps the most basic prerequisite of urban life.

In the traditional city the street was the only form of movement as experienced by the pedestrian (or equestrian) and this remains the case at the local scale. In the modern city the street network is augmented by new mechanised forms of transport (including the car) which allow the compression of space and time required by the functional metropolis. These new forms of transportation can be

thought of as forming hybrids of the street network. The points at which these various systems interact articulates the system locally and creates points of intensity in the city. Transport can be seen in this way as a primary element in the structure of the 'agora' city rather than a specialised sub-system.

An obvious extension to the definition of the street is that of the square or piazza; the place of assembly, the original agora, and by extension the market; the place of transaction. The street and the square form the locus of interaction and spaces of transaction which are often described as the pubic realm. Here distinctions of public and private can be awkward, but it is feasible to associate private spaces open to the public and of public interest, such as public buildings, shops and malls with the concept of the street network. Similarly historic places of assembly have their modern counterpart: the stadium, theatre, and the leisure centre.

The increasing traffic movements and associated large scale road infrastructure today means that the major inter- and intra-urban roads are now becoming just as dislocated from the city's public life as rail or air transport corridors. Interaction with the public realm is increasingly being concentrated at junctions or nodes in these systems where changes occur between scales or mode of transport.

This network of the city, the public network or public structure, will have at its core the street network and its mechanised hybrid of the transport system. To this can be added the networks of exchange and assembly and other service infrastructures which sustain urban life; the distribution of energy, water and electronic services conform too to a network based originally on the street pattern.

Information Technology Networks

A new type of urban system is being formed around the new communication technologies and their applications. The "Information City" (Hepworth 1987) is based on an emerging infrastructure of intelligent buildings, teleports, fibre optic networks and other leading edge technologies. This high tech infrastructure is a complex grid of computer networks implemented as wide area (intra city) and local area (site specific) systems producing, processing and distributing information within and between urban areas. It effectively forms a virtual street network passing information and undertaking transactions within and between cities.

This new infrastructure of computer-based communication networks supplements the existing system of broadcast and networked telecommunications which have allowed the modern city to remain functionally organised and comprehensible to its inhabitants in its spatially dipersed form. Current developments are leading to the convergence of personal computers and the telecommunications network bringing telephone like capabilities to the computer industry[7] . this in turn is leading to the integration of communications, computing and content such that the newest technologies include video-on-demand and digital television (Cane 1995). Urban areas have the potential to move closer to Martin's (1978) concept of the "Wired City".

The dominant users of this advanced telecommunications infrastructure have to date been the large multi-locational corporations and government agencies. They operate private computer networks which reach the public through nodes or terminal points such as the automatic teller machines in branch banks or point-of-sale retail systems. Greater public access is now becoming possible with the

emergence of intelligent networks capable of transmitting large quantities of information at high speed to individual personal computers via a telephone link. Today, for example, 50 million people across the world have access to the Internet[8].

Access to these networks is bringing increased knowledge about and intervention in the urban systems which operate in our cities and could, ultimately, provide greater choice and efficiency in their use. Advanced control systems and techniques could improve the experiential quality of both personal and public transport (Sparmann 1992), while sophisticated monitoring and control techniques provide the opportunity to increase the efficiency of other environmental systems such as water supply and energy provision (Dupuy 1992). Increased network access could also result in many of the past functions of the "agora" as a place of assembly and transaction shortly being carried out in competition with its virtual reincarnation in the form of public information systems such as the French Minitel or teleshopping systems, one of which is currently being developed by the major retailer, Sainsbury plc in the United Kingdom.

Communication and information technologies are providing greater information about city events, activities and facilities, their locations, timing and means of access. In the provision of such increased choice and knowledge it seems probable that the number of journeys will increase, thereby extending and increasing the use of the present day 'agora'[9]. This is likely to more than compensate for the loss of those functions that are being or might be overtaken by developments in new information technologies.

The public realm within cities is becoming increasingly managed and mediated with the aid of new

technologies. The difficulty with predicting the effects of computer networks and other communications innovations on the physical form of the city is in distinguishing between the relative importance of first, second and third order effects. At face value, it would seem that current spatial trends will be intensified. Of critical importance, however, is the interaction between telematic and transport infrastructure systems.

It might be expected that improved tele-communication and knowledge bases will provide consumers with a better understanding of urban supply systems, allowing greater efficiency in the use of existing transport systems to reach more specialized functional centres. At the present time, however, the telematics revolution is very much technology and supply-driven and consumers are presented with an ever increasing diversity of choice that is related neither to needs or constraints.

Whilst most attention has focused on the potential of replacing physical movements with *virtual* interactions, the increasing growth and efficiency of urban markets could lead to an *increase* in movement-based transactions, with increased stress on already over-congested transportation systems, and transport becoming the limiting factor.

A New Definition of the Local

New technologies of movement have led to a compression of both time and space (Harvey 1989). Such apparent reductions and paradoxical relations of distances and travel times suggest that the previous hierarchies of neighbourhood, district and metropolitan scales need some reinterpretation. The challenge for the human centred 'agora' city is to reconcile the personal and the local with the

metropolitan. To this end, it is useful to trace the convergences of the the networks of the city. One can envisage a description of the city where the particular elements are distilled from the general mass of the urban form. These will be the principal features of the superimposed networks; the most memorable and used streets, the axis of communication, the places of exchange and assembly and components of the service and social infrastructures.

It will be similar to the 'nodal structure' posited by Gosling and Maitland (1984) who suggest that such a model can act as a scaling device in the city, persist through changes in the built fabric and reconcile differences between the specialised functions and the collective use of the city. Others refer to this structure as an 'armature' (Calthorpe 1993, MacDonald 1986, Buchanan 1988). It consists of those components which are of general public utility and amenity. The armature is not the network as a whole ; rather it comprises the key features of the various urban networks which combine to form a core of movement, activity and meaning. Around this core is the mass of urban form, the 'tissue'.

Many urban forms have been shown to have fractal properties (Batty & Longley 1994), and the armature can be thought of in this manner. The level of detail will depend on the scale of study, for example, a district at one scale may become a node at another. What is of public interest at a local level may not be at a larger scale and form part of the tissue. Regardless of the scale under study the armature carries with it the implication and connections to its own mapping at other scales.

To support the human centred agora scenario it is not the block that needs to be multi-functional but the street (here used in its broadest sense as 'armature') as the site of exchange. In order to expand the range of the poly-centric local the armature needs to be made more vivid ; the convergences of

urban networks should be focused so as to reinforce and support one another. Many studies on the cognitive images people form of cites emphasise the importance of movement (Walmsley1988, Lynch 1960). It follows that to be memorable features of identity should also relate to patterns of movement and activity. This requires not only a holistic approach to the various urban systems but also one which can operate at a range of scales.

PLACE AND IDENTITY

If one effect of technology is to increase the connections between places and the ability to make those connections, another effect is to mediate the way in which the concept of place itself is understood. The information revolution, the cheapening of the print media, the growth of TV, cinema and computer networks, combined with an increasing mobility amongst populations have led to greater ambiguities and uncertainties about the definitions and identities of place.

The built environment is both a concrete reality and a social construction (Lefebvre 1991). Attachment to place, the ability to understand and participate in the production of place is a basic part of individual and group identities. Individuals invest and extract meaning from the built environment which helps them locate within space and social groupings. These identities are not fixed, however and just as the city acquires plural identities so too do the individuals with in it.

Increasingly daily experience is shared between several districts. Each district may well have facilities for dwelling, work, shopping and recreation but, of necessity for each individual's time budget, these activities are carried out in differing parts of the city. Each of these becomes part of an

individual's 'home range' , although knowledge and sense of attachment may differ for the locus of different activities. An individual's understanding of the metropolis is expanded through direct as well as mediated experience. The notion that each of us carries a personal 'schema' or mental map of urban knowledge has been widely accepted (Appleyard 1981).For each person, the city becomes a mosaic of places, some of which are well known, others partly, by repute or not at all together with a socio-spatial schema which links and relates them (Walmsley 1988).

The manner in which people build up their own mental maps has been less well-documented and we would suggest that information technology could play an increasingly important role in disseminating knowledge about the socio-spatial aspects of the city. It is also likely that in a situation of greater complexity, people will be making more decisions based on mediated knowledge rather than on direct experience.

This consideration of the social construction of the spaces of the city suggests an overlaying of a complementary description of the city as a network. The mechanical construct of the movement system needs to be overlaid by the collective overlapping of each individual's own cognitive schema or 'mental map'.

While this description of the individual's place in the city might suggest a model of a flat network of places and cognitive images, it is set in the context of the socio-economic realities of urban life. In the past decade this reality has become more divisive in the advanced industrialised nations such as Britain.

Post-Modern Experience of the City

The effects of the opening up of markets and competition and the impacts of new technologies on the labour force have not been entirely positive. Whilst the impacts of change have been mediated by different national governments, in Britain where the political project of Thatcherism was both to release the enterprise culture and to restrict the control of the state, there has been an increased polarisation of income and wealth. Incomes at the lower levels have declined, with the bottom decile of earnings falling from 66% of median earnings in 1979 to 59% by 1989 (Northcott 1991). By contrast, at the upper level of the scale, the transfer of income and wealth to the very rich is illustrated by noting that dividends paid out to shareholders increased from 1% to 5% of GDP in the same period[10] .

Furthermore female households of lone parents and single people are over-represented amongst the poorest households. McDowell (1991) concludes that the disparities between women who are partners in professional middle class households and their low-paid, unskilled counterparts has increased in the 1980's.

The effects of such polarisation have made a physical impact upon British towns and cities. Beggars and homeless people are a relatively common sight on British streets and have even, in some instances, established their own territory, as with the 'Cardboard City' adjacent to London's prestigious South Bank cultural centre. By contrast, the growth of major retailing chains, increases in the scale of development and the expansion of office and commercial space has coincided with an increasing privatisation of the public realm. Shopping malls, office atria and closely surveilled

pedestrianised streets have become an integral part of everyday life (Punter 1990). This increase in the management and control of the public realm has been formulated, on the one hand with the beneficial intent of providing a humane, user-friendly environment (URBED 1994) which more questionably encourages consumption, but has also included the less attractive motive of excluding and outlawing the most deprived members of society.

The juxtaposition of relative affluence with absolute poverty, much of it experienced by immigrant or indigenous ethnic minority groups, has led many writers to comment on the fragmented nature of the post-modern city. Such fragmentation they argue, leads to a rich experience of diversity and difference.

For example, whereas urban design approaches to the city in the 1960's emphasised the alienation which a contemporary city inhabitant may have felt from the modernist city (Jacobs 1966, Lynch 1985), post-modern writers have instead celebrated the fragmentation and diversity of city culture and life (Wilson 1991, Wright 1985, Sennet 1991). Such writers enjoy the richness of diverse ethnic cultures and the co-existence of classes which characterise contemporary urban life.

Mapping the city has proved to be more of a problem. The literary critic Frederick Jameson(1991) noted the dislocation between the exits of the atrium in the Bonaventura Hotel and the streets outside. Such dislocations between levels or scales of the city are integral to its multi-layered nature : however they may also reinforce the exclusion and disempowerment of deprived social groups within the city. The literary example in Tom Wolfe's (1988) fictional narrative *The Bonfire of the Vanities* of the hero's panic on missing a freeway exit and finding himself in a black ghetto illustrates the extreme

consequences of such lacerations and dislocations between urban neighbourhoods, social groupings and communications networks.

Influence of the Media

The inter-relation between places and their media image has been mapped by Zukin (1991) in her studies of gentrification in New York. She relates how gentrifiers, the new urban pioneers, bought up disused warehouse spaces and turned them into artists studios and lofts. Aided by urban public policy programmes, their efforts led to a sharp rise in property prices, the development of a new urban *chic* and culture based on loft living, which eventually led to their economic exclusion from the area gentrified.

Urban space is becoming increasingly commodified, in the mall, the historic tour, the tourist destination. One of the dangers of this commodification is that, with the influence of the mass media, places can become a series of stereotypes and everywhere can become like everywhere else. In this context, the influence of local spontaneous action in creating new uses and activities and in disseminating information, is vital.

THE NEW METROPOLITAN STRUCTURE

Flattened Hierarchies

The spatial dispersal of some of the urban functions traditionally associated with the city centres,

with growth of those that remain, has resulted in a more spatially-specialised metropolitan structure. Peripheral concentrations and city centres assume complementary roles. Less specialised retail and commercial functions have moved out, not only to suburban locations, but to non-metropolitan city and town centres within the commuter belts of the major cities. The prior existence of a network of closely-spaced smaller historic towns in the densely populated regions of Europe has probably helped to retard the emergence of fully-fledged edge cities. The new urban structure then is complex and polycentric, a ”polypolis” encompassing revitalised metropolitan centres, nascent edge cities', and an increasingly integrated hierarchy of established town and suburuban centres.

Improved transport and telecommunications networks in suburban areas have provided low density catchment areas for some of the retail and leisure functions traditionally associated with the centres. The same networks provide pools of labour for industry and commerce of a size to match those of the inner city areas. The population is more spread out, but people can travel more quickly to the new strategically-located workplace and service functions.[11]

The urban pattern which combines increasing decentralisation with increasing centralisation seems to tie in with a more general trend in social organization towards *flattened hierarchies*. Vertically organized, bureaucratic structures in both public and private sectors are being broken up and ”down-sized” in order to adapt to market forces. At the same time, the controlling interest is being concentrated in global corporations, quasi-government and supra-national regional bodies.

New Metropolitan Structure - Diagnosis

The new metropolitan structure presents urban planners with a number of issues:

- **Urban Design Implications** - The urban grain of a concentrated peripheral development is determined primarily by the needs of the car and in reality, there is almost no pedestrian-orientated public space at all in such developments. The centre of public activity, the peripheral *proto-agora*, is to be found in places such as the shopping mall, which are entirely privately owned and managed.
- **Social Implications** - While the city centres and better off suburban areas continue to flourish, there is increasing polarisation within city centres and inner urban areas. The city centres attract poor immigrants with the possibility of finding work in service industries and the juxtaposition of immigrant communities with local communities with major social problems of their own can lead to ethnic conflict. At the same time, the increasing cultural diversity of many European cities is self-reinforcing, with different ethnic groups establishing their own social infrastructures and many people, particularly the young and the well-off being attracted by the cosmopolitanism of the major city centres. Social exchange in

the city centres, then, can be very different in character to that in the suburbs. Cultural and social diversity has very strong positive aspects despite the potential dangers of conflict and provides a framework, albeit a ”messy” and often unmanageable one, for the creative social interaction in our cities which we see as key to the concept of the agora.

- **Political Implications** - The relative privatisation of the public realm has already been noted. In Britain, political boundaries have not kept pace with changes in the socio-economic reality. In more general terms, of course, both national and local governments have lost influence over urban affairs to global corporate interests (Parkinson 1990). At present there seems to be little alternative to cities competing with one another for investment and jobs but this brings with it problems of reducing a city’s identity to its marketing image. This makes it all the more important that planners and urban designers seek to reinforce the more authentic local basis of city identity. In terms of the physical or ”hard” infrastructure , this involves emphasising the key perceptual elements of urban structure, as described by Kevin Lynch.[12] Equally important, however, is the ”soft” infrastructure - the systems of municipal government, local social, cultural and community organisations and the local media. In all

these areas, particularly the last, where there is a constant threat from global media interests, the new technology has a direct role to play in reinforcing the local infrastructure and identity.

- **Environmental Implications** - The view that a high energy, high pollution economy is not sustainable in the long term is now very widely accepted. The modern metropolitan structure is clearly neither energy nor pollution efficient. Public transport systems designed to meet extreme peak one-way flows of commuters at two points in the day are not efficient. Car-based transport-intensive structures like suburbs in general, and peripheral sub-centres in particular, compound and magnify the problem many times over. Apart from the appeal of cheaper living space and, increasingly, access to well-paid jobs in commerce and industry, the suburbs offer a refuge from the messiness of the city centres but with absence of the 'agora' that the centres offer. As an exclusively car-based existence is unlikely to be sustainable in the long term, planners must address the issue of how a more urban, public-transport based lifestyle can compete with the attractiveness of suburbia. Giving a tangible character to the concept of agora will play a vital role in this process.

A number of contrasting urban planning responses to these issues and visions of the future have recently emerged. In simplified terms, two of these include:

- **Maximum Dispersal - The Telecommuter Model**

  In the extreme version of this model, the *first order* effects of the telematics revolution, the synthesis of telecommunications and computer networks, are set to transform the way we now live. Movement in "cyberspace" will largely replace movement in physical space. Most people will work from a computer terminal at home, do their social interacting in "virtual communities", take part in interactive computer-based home shopping and have an unlimited choice in home-based entertainment. The "global village" (McLuhan 1994),will allow people to live almost anywhere they choose and most people will choose to live a rural or semi-rural existence, working from their "electronic cottage" (Toffler 1970). The urban population will be dispersed across the landscape in a latter-day electronic networked version of Frank Lloyd-Wright's Broadacre City.

  This vision of the world is blind to the limits of technology and the way that it relates to human needs and patterns of behaviour. Interacting with a VDU is only one of an ever increasing number of ways in which people experience the world, each with its own benefits and limitations. The result of the explosion in different forms of media is the differentiation of markets into ever finer niches. Second order and third order technology effects are often more frequent than first order substitution effects. TV did not replace cinema, nor cinema replace theatre,

although each profoundly affected the way the other was used. The telephone had the effect of expanding people's potential for physical interaction in the city. It allowed them to live further apart and travel more rather than less, as might be expected if telephone conversations had replaced face-to-face discussions. The effects of computer-networked communication may be of a similar kind.

The telecommuter model assumes most people, actually or potentially, work in offices with computers. It assumes most people have a middle class life style and can afford a computer where currently, in the UK, an estimated 60% of the population cannot.[13] It assumes most people will want to work at home rather than in collective workplaces, though telecommuting has been slower to catch on than experts are predicting (Beekman 1994). Telecommuting seems to make sense in terms of sustainability, as the environmental impact of moving information is far less than that of moving people. However, even if people have less need to travel, if a more dispersed population is a result, this would inevitably involve a greater impact on the environment in terms of the physical movement of goods and utilities.

- **Local Autonomy - The Urban Village Model**

The radical environmentalist approach incorporates a version of the anti-urban sentiment that has been a feature of western culture since Rousseau. The green urban ideal is a ”human-sized” community with a fairly large degree of economic autonomy. The EC have adopted policies that promote more dense, mixed use development in urban areas which are ”more likely to result in people living close to work places and the services they require for everyday life”. While the term *urban villages*, has a variety of interpretations, in Europe the idea of medium density, mixed-use communities is consistently linked to a notion of urban sustainability based on people living within walking distance of their jobs and local services (Aldous 1992). Our previous discussion of the nature of contemporary European cities suggests that without authoritarian powers to limit choice of workplaces and housing, such a return to pre-industrial patterns of urban development are impractical.

The Networked City: the Compact Polypolis

Urban Concepts

Our concept of a *compact polypolis* is based on combining an integrated approach to transport and land use planning with the idea that the new urban sub centres should be able to develop their own identity through a degree of specialisation within the urban region, dependent on parallel improvement in public transport and communications networks. Certain points within these networks, particularly the interchanges between one form or level of transport and another, form natural nodes for the development of agora-type urban sub centres.

Increased density and the greater use of public transport are interdependent. With the continuing growth in car ownership and use, growing congestion and pollution in inner cities will sooner or later force the introduction of policies to control private car use, if this has not already happened. At the same time car-dependency is likely to persist for the foreseeable future in lower density residential areas and some form of gradualist approach is inevitable in these areas.

Rather than expect autonomous urban villages to develop, the immediate aim should be to encourage the most efficient use of transport systems to distribute existing inefficient commuter flows among a number of centres. The new technology can be expected to play a central role, both directly in the use of advance transport telematics (ATT), and indirectly through the effect of partial home working to stagger working hours. The public transport application of passenger information and operational control systems linked to traffic control and driver information systems could increase flexibility of use and the ability to switch between transport modes based on up-to-the-minute information. In this scenario, the short term aim is local densification of suburban development, overcoming the historic dislocation of transport network from urban structure in these areas, whilst maintaining the dynamism of the city centre by strengthening its connections with the periphery. The bias would be towards densifying the more central suburban centres, with the long-term aim of achieving a more compact overall metropolitan structure.

New 'Agora'

While certain public events (processions, demonstrations, concerts, sports events) require large scale public spaces and arenas, however, most social interaction in the physical public realm today is

small scale and informal in character. Thus the concept of agora that we are most at home with is the street-based café or bar, park or promenade - near to the places where we work, the shops, places of entertainment or cultural facilities that we use. The agora today is likely to be associated with the traditional town or city centre, with its concentrated mix of business, retail, leisure and social facilities, and with the specialist leisure zone of the tourist resort or district, though there is a further realm of smaller local meeting places wherever the intensity of associated activity - residential, leisure or employment-based, can support them.

We have seen the development of more specialised *agora*, associated with the enhanced business and leisure and tourism functions (e.g. Covent Garden in London) on which the recent growth of the metropolitan centres is largely based. The counter-arguments for maintaining a balanced mix of uses to promote vitality in city centres at all times of the day were put most cogently by Jane Jacobs some thirty years ago (Jacobs 1965). This is first and foremost a matter of having a *significant number of people living in an area*. The continental European model of densely-populated downtown areas demonstrates how this type of approach can be used to support vibrant, if "up-market" shopping areas, accessed largely by foot and public transport with a manageable if reduced level of local parking.

Traditional agora combined all the functions involving social interaction - economic, religious, political and personal. Our political life is no longer conducted through public debate in the market square and most of our experience of it is through the non-physical public realm of the mass media. New technology might be harnessed to make politics conducted through the electronic media more interactive and make the virtual agora more of a reality, although active democracy may continue to be best conducted on a face-to-face basis in public meeting places.

Another key question that has arisen relates to the influence of market demands as opposed to social cultural needs on the framework. How strong is the structure in resisting those market demands that may not comply with the human centred agora, and how flexible is it in responding to changing economic circumstances? The answers to the above will determine whether or not the framework can meet the needs of the human centred city and lead to a new form of "agora" as related to current and future transactions.

Given the changing boundaries of our proposed urban structure and the increasing role of the commercial sector in providing information, access and facilities consideration of the means of political control in defining and managing the public realm is critical. Issues of equity, ownership and partnership must be incorporated in the socio/economic structure of the city.

The relationship between public intervention and direction and the influence of potentially unregulated markets needs to be resolved. Attention should be focused on the areas of the communication networks and the public realm within the city rather than on single landmark buildings or developments.

To summarise, our concept for the multi-centred compact polypolis, is neither a reversion to pre-industrial forms, nor a futuristic dream. Rather we would seek to recognise the structures that exist, in particular those that determine the city's form such as its networks of movement and communication and those that exist as social constructions in the minds of its citizens. We would propose that technology is used to strengthen new types of emergent 'agora' in the emergent structure of the city, to intervene and to humanise them. In this way the life of the existing historic centres

within the city can be conserved as part of its living fabric.

Whilst we would support the insertion of mixed development areas throughout the structure of the city, we would argue that specialisations within areas should be allowed to develop. The production of social knowledge about space should be monitored and local intitiatives encouraged. Finally powers of central and local intervention should be garnered to manage, humanise and to make public, the emergent 'armature' of the city.

According to Spiro Kostof "Cities are never still; they resist efforts to make neat sense of them. We need to respect their rhythms and to recognize that the life of the city form must lie loosely somewhere between total control and total freedom of action "(Kostof 1991). Change is the only thing that is certain and history has shown that a natural quality of cities, and one that should not be constrained, is adaptability. The networked city is an approach to reinforcing its natural *self-organizing* tendencies.[14]

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NETWORKING THE CITY : THE NEW 'AGORA'

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Introduction

Team constitution - Symonds Travers Morgan and the Urban Design Unit, University of Westminster.

Stated objectives

Objectives taken from City Studies City Action RDT Programme

- Develop new 'holistic' concepts for new 'agora' city; urban components; city plan
- Technical solutions to enable social cohesion and co-existence

Observation of current trends

Context assumes acceptance of non-physical modes of communication

- Impacts of technology:suburbanisation, dispersal of core functions to fringe, increased movement, increases in scale, fragmentation, dislocation, specialisation, accelerating rate of change
- Cultural/demographic:ageing of population, growth of small households, gentrification

and revitalisation of city centres, heritage

- Socio-economic: power of multi-nationals, privatisation of public realm, social polarisation, alienation

Mode of analysis

Concepts of 'organic planning' and 'urban villages' assumes that natural community is limited to geographical locality. We argue instead that:

- impact of technology now means that relevant community no longer confined to locality, now encompasses several different districts for each individual
- key urban component is not block, but street. Street has two essential qualities - communication route and place of transaction. Different forms of contemporary streets, from pedestrian place to urban framework.

Performance criteria for new 'agora' city

The city should satisfy the following human-centred needs:

- need for legibility and identity
- sustainability - reduction of energy consumption, waste and pollution
- environmental/human quality - support of human interaction
- support of accessibility, choice and equity

Determinants of new 'agora' city, physical and virtual

- integrated transport network: recognition of transport as key component of urban form (support of accessibility and choice)
- recognition of different scales within city; importance of glocal connections; importance

of interchanges between different levels of scale and activity
- understanding human impacts of new technology (support of equity)
- integration between perceptual and physical scales using new technology (support of legibility/identity/choice)
- recognition of specialisation within districts (necessity of critical mass/equity)
- need for fine-grain, mixed development at local scale (support human quality)
- need to densify at local scale (support public transport/increase sustainability)
- new forms of physical meeting place: transport interchanges, leisure/retail centres, historic centres, speciality districts, business centres

Policies for new 'agora' city

There is a need to change the structures of local and regional government:
- to provide management and control of the new 'agora'/communication networks
- to support local involvement in political life

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UNIVERSITY OF WESTMINSTER

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- The mixed use development of City Centres (for which a book is currently in preparation)
- Public Art and Private Developments: The Design and Financial Impacts.
- Development Partnership: alternative vehicles for partnership in development
- The Changing Management and Organisation of Local Authority Planning Departments
- Tourism and Urban Regeneration
- The Scope of Planning Gain
- Partnership Agencies in British Urban Policy
- Urban Development Agencies in France
- Comparative Landlord and Tenant Law
- Comparative Practice in Private Sector Contributions to Urban Infrastructure
- Green Policies in European Local Government
- City Identity

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The Transport Studies Group

The Transport Studies Group (TSG) was established in 1970 and has broadened its interests from an early involvement with traffic and engineering and works closely with the Planning Group. Work is now mainly focused on the operation, economics and management of transport activities. Postgraduate teaching and research is carried out by a core team of lecturing and research staff from a wide range of disciplines, making it one of the largest academic centres for transport studies in the UK.

How to increase "spatial propinquity" in the city

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Introduction

The city is under attack. Traffic and transport problems which manifest themselves as poor air quality, poor noise quality, unfavourable economic climate and congestion are the consequences of life style changes and mobility aspirations which are not compatible with the heritage and built form of cities. There is a central paradox in these life style changes. On the one hand we search for the freedoms and convenience of the car which can take us to large numbers of destinations separated by long distances and accomplish this in relatively small amounts of time. On the other hand we complain about traffic danger, dirt, smells, asthma and the loss of fine buildings, trees and green space

which are being replaced by car parks, car-centred developments and new roads throughout Europe. We identify cities such as Heidelberg and Lubeck as very attractive and we complain that car access to London or Berlin is so poor that traffic speeds are now as low as they were in 1910. The city suffers from this paradox. London is the subject of new road proposals, e.g. the M11, and the London docklands and those cities regarded as attractive are the objects of tourist interest, usually by car.

We know that in many cities of Europe the quality of life from a psychological and emotional point of view is very poor indeed. We restrict the movements of our children because the external world is so unfriendly. Children in the UK are now more likely to be driven to school than to walk or cycle and the vast majority of parents regard the act of playing outside as unsafe. Journeys on public transport can be threatening and dangerous because of attack in lonely situations and because of the lack of people. When cars take over the public domain then people must go into retreat and under those circumstances the city takes on a radically different meaning for those who live there, work there and visit.

Cities have adjusted themselves to the car at the expense of people. Cities are increasingly shaped around the needs of cars in ways that block and disrupt the needs of people. This is even more apparent when specific groups of people are considered, especially children, the elderly and parents with young children. The people-unfriendliness of cities can be seen in the decline of walking and cycling and in the relatively deserted streets of many cities outside of working hours. This is also associated with the decline of diversity and interdependence in the provision of small scale shopping facilities, school, community activities and the social interaction that goes with small scale business and entrepreneurial activities. The decline of shopping opportunities in Britain paralleling the rise of larger units at edge

of town and out of town locations has a large impact on traffic growth but has an even larger impact on killing small shops, neighbourhood shopping facilities and the social interaction and cohesion that accompanies a dense patterning of destinations within small urban areas.

Jane Jacobs brought these matters to our attention in 1961 in her "Death and Life of Great American Cities". She showed the extent to which high quality, vibrant and socially satisfying urban life was dependent on a varied social mix, large numbers of community and local facilities and a strong sense of mutually supportive informal surveillance. All of these qualities derive from some very basic principles. These include an organic development process where activities in the urban environment synergistically reinforce each other having had the opportunity to grow and decline over a large number of cycles. The result of this organic model can look somewhat chaotic but it provides a strong sense of community and a strong sense of attachment to place. The other basic principle is related to the interplay between space and time. Strong communities and a strong sense of place do not evolve in circumstances where individuals roam over vast distances in a frantic search for the right shops, the right schools and the right social facilities. Short distances and the maximisation of social interaction in small amounts of time are the key to the quality of the urban experience and the future of urban civilisation. The car conquers time and as part of the same deal destroys place. It rearranges our psychology as successfully as it rearranges our cities and this fundamental process of unravelling the organic model of urban life is the central focus of this contribution to this conference.

In this paper I shall review the role of space, time and consumption in the processes that influence the development of cities. These key determinants of the way cities evolve and meet the needs of their residents (or not) will also determine the extent to which sustainability objectives can be met at the

urban scale. I shall then use the insights gained in this review process to chart a course for the full application of sustainability objectives at the urban level.

The objective of the paper is to demonstrate the significance of space-time relationships in achieving high quality urban environments.

Space, Time and Consumption: a review

The experience of travel and transport has shifted over the last hundred years or so from one involving large expenditures of time for relatively short distances to the reverse relationship between time and distance. The friction of distance much loved by geographers and spatial modellers has been lubricated to such a degree that long distance travel to exotic destinations for holiday purposes is the norm and most goods and services consumed by households are sourced at some distance from the local region. Marks and Spencer, in their heavily packaged offerings of fresh vegetables, proudly declare that runner beans and mange tout have been specially flown in from Kenya or Nicaragua.

This transport and erosion of the friction of distance is expensive and it changes perceptions and psychology. It is very energy intensive and produces large amounts of greenhouse gas emissions and a number of health damaging pollutants. Faster and faster travel opportunities effectively destroy the friction of time. The destruction of time alters the nature of place. If we live a spatially dispersed life style then our home base or place consciousness is likely to become very diluted. Daily activity patterns are more likely to be snatched glimpses of a large number of places shared feelingly with

other transients. Whilst temporarily immobile (in a space-time co-ordinate sense) we can of course consume large amounts of energy, food, entertainment or sex (or just go shopping) before embarking on another bout of air, car or high speed train travel to the next point of consumption and the next bout of frantic time filling at some distant location.

The friction of distance generates and sustains place distinctiveness. High speed travel, exotic tourism and the reduction in the amount of time available to "spend" in a home locality effectively convert places into various shades of a general place identity. The shops, restaurants, goods available, food crops, culture and artistic life will resemble that of all other areas. Time penalties, traditionally seen as a problem or as something to be destroyed can also be seen as conferring a protection on distinctiveness.

A lifestyle defined in terms of hyper mobility and high levels of consumption exchanges time formerly spent in neighbourhood and household activities (ie local) for activities spent at a large number of widely dispersed locations. This shift from low distance intensity to high distance intensity is one of the roots of contemporary environmental problems and non-sustainablility. It carries a double penalty. There s no time available for local activities that take up time, eg community involvement, discussions and actions with neighbours about traffic, local schooling, health care, prioirities of local politicians. This community deficit contributes to run down of public services, public spaces and environmental degradation. There is no-one looking after the store. The other penalty is the energy and raw material penalty. It takes a lot of energy and creates a lot of pollution to support the frantic bouts of dispersed activity.

The intensified consumption of distance that is made possible by the destruction of time is fundamentally non-sustainable. If it were adopted on a global scale it would wipe out a large proportion of raw materials and energy sources and lead to pollution levels that would make many world cities uninhabitable. If it can only be accessed by one quarter or less of the world's population it fails the equity test of sustainability and if it leads to depleted resources or heavily polluted cities it fails the inter-generational test of sustainability. John Gummer, the UK Secretary of State for the Environment put the inter-generational test very succinctly when he declared that "we must not cheat on our children".

On a more practical level, time (or a radical distortion of time) is implicated in environmental destruction. Road construction in the UK is justified on grounds of saving time. Very destructive projects like the M3 motorway near Winchester (Twyford Down) have been constructed to save a few minutes on the journey to Southampton. Similar projects are in the pipeline for the A34 (Bristol to Southampton) and for a south coast motorway to link Brighton with Portsmouth. Time savings are formally incorporated into the cost benefit analysis which is used to justify the roads and these time savings are likely to be higher if the existing road system is congested. This is the case around Birmingham where a Birmingham Northern Relief Road is proposed for the Eastern side of the conurbation and a Western Orbital Road is proposed for the west. The arguments for both roads are couched in terms of time savings on the existing crowded motorway system. The time savings themselves are individually too small to amount to much in the way of usefully reallocated time. The additional road space continually added to an overcrowded system will ensure that more car trips and more lorry trips are added and so perpetuate the congestion by eliminating time savings. More

importantly the land use system is pushed further in the direction of dispersal, loss of local facilities, development of edge of town and out of town shopping facilities and business parks and hence higher still levels of acre use. The non-sustainable trajectory is given a strong boost by the urge to save time and all the time we spend more time reaching those destinations that once upon time were available over shorter distances.

This paper will attempt to shed some light onto these questions by exploring the historical and contemporary changes in transport to show how at all scales the advantages of faster and more frequent travel has not been equitable. It will begin by "flagging" key areas in which transport has affected the way we perceive, and use, our global environment. It will then consider temporal changes in transportation technology at the local scale, and show, using intra-urban journeys as examples, how the nature and size of our urban areas have changed as a direct result of the friction of distance being reduced leading to progressively longer journeys being taken on a day to day basis. Transportation changes between cities are then considered at both the national and international scale. In both cases the concept of time-space convergence (a shrinking world) and cumulative linkage advantage (better accessibility) are introduced to illustrate how greater demand for interaction between places leads to the development of high priority transport corridors that can exclude other places along a route. A direct result of this being that these places may be more disadvantaged than places connected by the high priority corridor.

The nature of transportation change

Human civilisations have constantly struggled to overcome the limitations enforced on their economic and cultural development by the need to move goods and people from place to place. In many ways this is the lifeblood of an economic system. Accordingly, this need has resulted in innovations in transport technologies in an effort to move both goods and people more quickly and as cheaply as possible. The net result of these changes has been a progressive reduction in the time/space dimensions of our global environment. Put another way, we all live in a world that in terms of these two variables is shrinking.

Throughout history civilisations have been able to establish massive trading areas over much of the known world. Yet the speed of communication or the quantity of goods traded was limited by the transport technology of the day. Thus, innovations which improved either (or both) of these variables spread rapidly. The invention of wheeled vehicle technology was so important that its utilisation by other cultures was very rapid; within approximately two millenia its use had spread from what is now Iran and Iraq to virtually all of Europe, India and China. The introduction of wagons to carry goods and people as opposed to animals did not necessarily increase the speed at which these commodities travelled, but it nevertheless increased the amount that could be carried. Thus, the draught-drawn wagon effected a significant reduction in the cost of transportation.

Although innovations in transport media have occurred at all stages of history, it is in the industrial age that these advances have brought about the biggest changes to our global society. As well as increasing both the volume and the speed at which goods and people could be carried, early

innovations such as steam power, iron boats and railways also dramatically increased the range over which commodities could be moved in a given unit of time and at a given cost. For example, in the 1831-35 period no significant amounts of fruit and vegetables were imported into Britain. By 1909-13 however the average distance these commodities were imported from was 3,200 miles. Similarly for butter, cheese and eggs over the period there was an order of magnitude (x10) increase in the distance travelled by these goods. This increase in the physical range of products in the nineteenth and early twentieth centuries was accomplished through technolgoical and efficiency development in rail and ship transport. In more comtemporary times the transport revolution has been centred on greater use of road vehicles, aircraft and pipelines. In Western Europe for example, over the period 1970-90 inland freight carried (measured in thousand million tonne-kilometres) by these modes increased by annual rates of 4.04%, 9.31% and 3.06% respectively, whereas freight carried by rail decreased at an annual rate of 0.38%. In terms of percentage modal share of inland freight, in 1990, road carried two thirds (66%), whereas rail's share dropped from nearly 30% in 1970 to just over 16% in 1990. If we look at these changes over a longer time scale we see an even greater shift to road transport. In Great Britain over the forty years between 1952 and 1992 road transport has increased its share of freight moved from 35.2% to 61% whereas rail has seen a decrease from 42% to just over 7%.

These changes in the structure of the movement for freight transport have been driven by a dramatic increase in the movement of food, drink and tobacco by road (up 51% in the period 1979 - 1994) and by the increase in the length of the average road freight journey. This was 54 miles (86km) in 1994 compared with 52 miles (84km) in 1993 and 43 miles (70km) in 1979.

Road freight trends represent fundamental changes in the location and organisation of industry and

all economic activities. Local production and local employment are eroded by the concentration of economic activity at fewer points and the increasing distance intensity of production. These supply side changes are in turn mirrored by changes in lifestyle on the part of households and individuals who spend more time travelling over longer distances to more destinations than they would if local facilities were available.

What factors have contributed to this dramatic change in the nature of freight transportation and associated lifestyle characteristics? Whilst it is tempting to answer this question by continuing on the technological change theme, this clearly misses a number of other important factors. Transport innovations such as greater fuel efficiency, better roads, faster speed, and larger payloads have played a central role in enabling change to occur. Innovation and technical change provide the right conditions for social and organisational change but cannot bring about that change in the absence of other factors.

High land values and rents at traditional manufacturing sites have contributed to the dispersal of this sector to green field sites away from urban areas, or at infill sites at the urban periphery. Typically, these new areas of economic activity are not served by fixed route transport corridors such as railways, or waterways. These forms of transport cannot therefore provide industry with the flexible, low-cost and controlled transport services that they require.

In the case of freight transport there has been a pronounced trend towards greater levels of manufacturing processing involving large investments in new plant and equipment, concentration at fewer sites to reap economies of scale, higher levels of energy consumption, greater transport intensity

and higher consumption of materials in packaging. This process has been made possible by improved transport technology but larger scale social and economic processes have played a major part. These include changes in lifestyle of individual households in the direction of more convenience food, larger disposable incomes and the development of a corporate culture heavily influenced by the desire to create new tastes and completely new items of consumption through heavy advertising and large marketing budgets.

Just-in-Time delivery based on splitting loads into smaller batches can (in theory) reduce inventory levels to zero. McDonnell Douglas (UK) switched from a conventional manufacturing system to JIT in the mid 1980's and were able to relieve one third of shop floor work space that had been used for "kitting" in the traditional system. They were also able to reduce the value of work-in-progress down from £2.2 million to just £0.8 million. Clearly, JIT can bring significant cost saving to companies. Accordingly, it is seen by many as one of the most important and successful innovations in logistics in recent times. However, the environmental costs are equally significant. For example, instead of one large vehicle delivering goods once a week JIT means that smaller vehicles will deliver daily or in some cases several times a day. A result of this will be an increase in fuel consumption for a similar amount of goods moved. For example, if one vehicle carries 25 tonnes 100km this will use approximately 49 litres of fuel whereas five smaller vehicle carrying 5 tonnes each will consume over three times this at 165 litres. In addition to being less energy efficient the use of more vehicles will also increase noise disturbance and visual intrusion and increase the demand for more road space. Since rail is ill-equipped to match the performance of JIT (at present) an industry-wide dependence on JIT severely changes the prospects for rail transport.

In terms of personal travel over the same period private modes of transport have burgeoned at the expense of less polluting modes such as buses, rail, and pedal cycles.

In 1952 the percentage modal split of passenger kilometres travelled was: 42% bus, 27% car, 18% rail, and 11% pedal cycle.

In 1992 this had changed to: 4.3% bus, 86% car, 6% rail, and less than 1% pedal cycle.

Furthermore, this change does not represent an increase in the number of journeys. Rather, it indicates that we are all travelling greater distances. Shorter trips to local facilities have been replaced by longer trips to more distant facilities. The exchange of 'near' for 'far' as an organising principle of transport and land use policy is the root cause of many environmental and social problems. It discriminates against nature, against urban life and against the poor.

Transport intensity defined as the physical amount of transport used in the production of a given unit of a given product is increasing. Part of the explanation for this increase is the very low cost of transport as a proportion of total costs and the very large savings that can be made to a maufacturer through long distance sourcing and inter-plant transfers to take account of wage rate differentials, economies of scale and variations in grants and subsidies to manufacturers who claim to be creating jobs or appear to be moving them around.

The erosion of space-time constraints has a dramatic effect on the way in which we use our urban and rural environment. Advances in transport technology means that businesses now attach little value to the advantages of clustering economic activity, or "agglomerating" in a single area. Also,

modern transport technology has lifted the constraint on many firms to locate close to a source of raw material or the market place. Rather, in a shrinking world where transportation costs are relatively low and travel time short, the market place or the source of materials can be as far away as the opposite side of the world. Due to the removal of these constraints other factors such as cheap labour, cheaper land costs, and the availability of economic incentives such as grant aid are now seen as being more important locational considerations.

These benefits to firms in the form of greater profitability have been bought at the expense of greater damage to people and the environment because of the need to transport raw materials and finished goods greater distances. Similarly, the need for employees to live close to a source of employment is also no longer necessary. Cheaper and faster forms of transportation have given workers and shoppers greater levels of mobility enabling people to increase the distances that separate work, home, shops, schools and leisure facilities.

Increases in speed and new opportunities provided by technology for both freight and passenger movement have permitted and encouraged longer distance journeys. The benefits of time savings brought about by technology have been consumed by greater levels of physical separation. This consumption is maintained at a high cost in terms of energy use, carbon dioxide emissions and health damaging exhaust emissions. It alters the physical structure of cities and regions so that higher levels of dependence on cars and lorries are necessary and it destroys its attractiveness.

Transportation changes in the city

Generally speaking the major growth phases of individual cities have been governed by the movement of labour and capital into these areas as a response to the cycle of national and international prosperity. This has stimulated the necessity to build more housing to accommodate additional workers needed by the growing industries. The result of this being the zonal and sectoral patterns of cities that have developed over a long period of time. However, the single most important determinant of urban morphology and residential differentiation has been changes to systems of transportation. This process has a cultural dimension so that suburbs in Los Angeles, Sydney and Melbourne are more extensive and auto-dependent than in European cities. Urban transport systems have also been influential in the development of the distinctive sectoral and radial patterns of many cities, in that it has been the succession of different transport systems that have created corridors of commercial and industrial areas between which residential areas have been built.

The development of different urban transport systems and the resultant phases in city growth can conveniently be divided into three distinct periods. These are:

- the walking city; pre mid 19th century;
- the public transport city; mid 19th century to mid 20th century;
- the car city; post World War Two.

Typically walking cities were characterised by their compactness. London in the early part of the

19th century housed approximately 2 million people yet extended not much further than what is now the City and West End. Though horse-drawn carts brought goods into and out of these city areas, the principal mode of transport was by foot which limited the functional size of the city to a radius of approximately 5km from the centre (the distance a person could walk in 1 hour). A direct result of this constraint was that the city exhibited an urban population density gradient which declined sharply with increasing distance from the centre and then abruptly stopped at the edge of the city.

The public transport city phase can be further divided into "early" and "late" periods that correspond to the development of horse-drawn systems and then the emergence of steam and electrically powered trains.

The shift away from walking as the principal mode of transport was essentially a response to the development of railway technology, in particular the manufacturing of steel wheels and rails. Although the Skockton to Darlington railway had been in operation since 1826 the use of railways was not initially seen as being applicable to the mass movement of people over relatively short distances due to the slow acceleration and deceleration rates of these early steam engines. Rather, this technology was seen as a method of transporting goods and people on inter-urban journeys. In the mid 19th century the first horse-drawn tramcars (a passenger wagon on steel rails) and the omnibus (a simple passenger wagon drawn by a horse) appeared. These early examples of mass transport systems, together with steam powered versions developed later, enabled the already strained cities to expand further into the surrounding open country by reducing the friction of distance; in that, though still slow by modern standards, they nevertheless enabled the daily travel range of workers to be extended by up to a factor of two (5km to 10km).

The "late" public transport phase began with the application of electricity to the tramcar networks and commuter railways. This further revolutionised the mass transportation of people because of two fundamental differences that this technology brought with it. These were:

- Electric trams were more efficient than horse drawn systems (they could carry more people) because of an increased power to weight ratio and could travel twice as fast.
- Due to their increased efficiency the electric tram effectively made the cost per passenger kilometre much cheaper therefore allowing a policy of low fares to attract a high volume of passengers.

It has been estimated that the move to electrically operated systems reduced the real costs to passengers by as much as 50 per cent in the UK. More importantly, the increased speed of the trams effectively increased the range of commuters 4 fold.

The development of electric trams dramatically changed the urban form of many cities. For example, much of the early housing developments took the form of discontinuous ribbons along major routes. As commuter distance increased these ribbon developments were also extended, in some cases speculative developers working in conjunction with tram companies to promote suburban developments.

Transport has had a well documented effect on the social geography of British cities making its

contribution to urban and social segregation on income, class and ethnic dimensions. In practice reality is more complex than explanations based on land values, transport costs or transport technology. Many European cities have wealthy individuals living in high density city centre areas not far from ethnic enclaves (e.g. Wedding and Kreuzberg in Berlin). British cities are frequently characterised by concentrations of poor quality housing in peripheral greenfield sites built up by public bodies without adequate attention to social infrastructure and basic facilities. The explanation for these failures of both market forces and the planning system goes much deeper than a mechanistic model of transport choice and housing price or supply.

Increasing levels of car ownership and car use have added a very distinctive and qualitatively very different experience to urban form, mobility and life style. Car use is very demanding of urban form and land use allocations. It requires large quantities of land for roads and car parking, it stimulates car-rich developments (e.g. hypermarkets, out-of-town shopping centres) and it actively extinguishes alternatives. Walking and cycling are very difficult in heavy traffic and in fact congested traffic and cars lead to expensive delays for buses. Cars also stimulate dispersal rather than concentration.

Thus, a dominant feature of the motor era has been the dispersal of jobs away from central areas caused by the greater flexibility that private motoring has brought to urban areas. No longer are people restricted to modes of transport dedicated to moving people from the suburbs into a central business district. Rather, they can, and have, formed alternative corridors across or around the city from suburbs to secondary business districts or industrial estates as and when opportunities have arisen. As a result of this, there has been a significant increase in journey distance length, yet at the same time public transport passenger-kilometres have declined indicating that we are all using private modes of

transport more that public modes for urban travel. Data from the most recent National Travel Survey conducted by the UK Department of Transport indicate that in terms of average distance travelled by mode of travel between 1975/76 to 89/91 car passengers and drivers increased by 42 and 57 per cent respectively, whereas distance travelled by London Bus and the category "other local bus" decreased by 41 and 35 percent respectively. Clearly, this illustrates the extent to which there has been an increase in the use of private modes of transport.

Has this modal shift and subsequent move to a more polycentric urban morphology been beneficial to a city or its inhabitants? Cities such as London, New York, Paris and Tokyo have retained the importance of their central areas in terms of employment, which has enforced a form of rail dependency on these cities due to the fact that it is only rail systems that can handle the peak rush hour flows of up to 40,000 per hour on a single corridor or track. The more peripheral areas of these cities are increasingly becoming more car dependent. Furthermore, other smaller urban areas such as Manchester, Brussels or Frankfurt have lost some of this centrality and have taken on a much more multi-centred morphology.

In theory the development of many different and competing centres for shipping, employment and recreation should increase choice and reduce distances travelled. In practice the urban system as a whole is exploited for what it has to offer and the range of facilities exploited by intensive use of cars. Thus distances travelled go up. Changes in job, the requirements of two career families and lifestyle changes (e.g. from living alone to sharing with a partner, to having young children and children finally leaving home) all work to reduce the probability of short distance links between residential location and other activities.

These social factors and lifestyle factors combine with higher incomes to increase car dependency and miles travelled. As this dependency rises so the conditions for those without cars deteriorate especially in terms of noise, air quality and susceptibility to road traffic accidents.

The effects of car dependency on urban form are dramatic. The car is a proliferate user of space. Estimates of the number of cars parked for periods of up to eight hours on working days in the central areas of Paris or London are uncertain, but are higher than one million. Whether this is on or off street, legal or not, the result is an enormous consumption of the scarcest of urban resources - space. Most European cities devote between 10 and 20 per cent of their total land area to accommodating cars. In Cologne, for example, road and parking space takes up twice as much as the area of the city's parks and almost half as much land as was devoted to buildings of all types. In Germany as a whole, cars (roads and car parking) occupy 60% more space than the total for housing. In Britain roads and car parking occupy approximately 600 sq kms, a portion of land twice the size of Birmingham. Taking the total area dedicated to roads and parking each car and lorry in the UK is responsible for over 160 m2 of concrete and tarmac.

The consequence for European countries of maintaining a constant allocation of tarmac and concrete for cars and lorries as the vehicle fleet grows in size is a significant loss of urban and rural land and a major qualitative change in the character of what is left. The consequences for China and India are even more dramatic and would require the complete re-modelling of their urban areas.

Spatial Propinquity: a way forward

If we want to regenerate urban areas, achieve sustainability and satisfy deep psychological and social needs as well as economic and environmental needs we will need to approach the problems from as many angles as possible in a unified and coherent fashion. Space-time restructuring offers one framework for managing such an ambitious programme of social, spatial and economic change in our cities. To bring about change we should carefully consider the usefulness of the organic model of change. This advises caution in the rate of change and the scale of disruption that can be tolerated. We have to initiate change but in the words of Vaclav Havel we have to nurture those changes so that they can grow and bear fruit and be part of the community and the economic life of the city. "I believe we must learn to wait as we learn to create. We have to patiently sow the seeds, assiduously water the earth and give the plants the time which is their own. One cannot fool a plant any more than one can fool history. But one can water it. Patiently, every day" Transplants, grafts and major surgery sometimes look as though they are the only course of action but can very easily lead to rejection and a deterioration in the condition of the patient. Smaller changes, carefully designed, carefully monitored and cheaper to implement will produce less dramatic but longer lasting, holistic and thoroughly integrated transformations of urban space and urban culture.

The central theme in this suggested programme of change is the restoration of spatial propinquity as a basis for emphasising the potential for local (and indeed micro) interaction and as a basis for new communities, a regenerated economy and a good environment. Spatial propinquity means emphasising local links so that urban citizens can discover their own cities, work in their own

communities, walk and cycle in the course of their daily business, occupy the streets, live in city centres and get to know their neighbours whilst rediscovering civic pride and informally supervising street activities, children, the elderly and deterring crime.

Spatial propinquity implies a number of clear policy experiments:

1. Reducing the amount of traffic in all areas heavily used by people to encouragewalking and cycling, "lingering", social and recreational use of urban space and more people using the street as a social and civic space
2. Improving via IT and telecommunications, the availability of information to all urban residents about all the opportunities for benefiting from living in that urban space. This implies a significant technological investment to bring information about jobs, services, goods, leisure and recreational opportunities to every home. It also means the creation of an information rich urban society where public transport data is widely available and all goods, services and transport can be purchased by electronic means reducing transaction times and improving the performance of the urban economy and its transport systems
3. Improvements in physical stock of public space, public transport, education and training,

computer literacy and housing. Specifically for housing there should be maximum take up of city centre space (eg above shops, banks etc) and of city centre land parcels for high density development. New housing should be of the highest quality possible designed to satisfy the most rigorous environmental standards.

4. Intelligent land use planning is an important component in this package. Whilst market forces may well move retailing and other activities in the direction of out of town car dependency (and longer distances for the journey to shop) land use planning can still encourage small shops, services and enterprises in mixed assemblages, near housing which are very attractive because of the short distances and rich availability of opportunities for a full life in a reinvigorated urban system. Novel forms of public/private partnership in stimulating economic development in the small firm service sector can be targeted on enriching local services and facilities to feed the growth of strong communities, employment and environmental quality. Examples of such partnerships already exist in Europe (eg Lancashire Enterprises Limited, in the north of England).
5. Specific attention is needed for the small and medium enterprise (SME) sector. Local firms

can do far more to enhance their competitive situation if they share expertise, information, maximise the supply of goods and services locally and create a critical mass of innovation and entrepreneurship that can easily out-compete the very large firms in the multi-national corporation (MNC) sector. The results of such a local sourcing strategy (local production/ consumption relationships) will be economic success and an improved environment with less dependence on long distance road transport. Long distance road transport generates large amounts of CO2 and contributes to the rampant unsustainability of current urban life (as manifested for example in per capita CO2 production). Local firms can benefit from global links via Internet/Compuserve etc and benefit from local links in terms of commuting and the supply of goods and services.

A metric

The current global pattern of economic organisation is determined by space time relationships, transport technology (including flows of goods, services, people, information and money) and transport costs. These factors have developed to such an extent that they have removed the basic advantages of cities and of systems of cities. We have now entered a phase of development associated

with "edge cities", suburban office complexes, out of town shopping centres and global linkages. It is not possible to design a new spatial, social and economic order to reverse these trends and it would be counterproductive to do so. It is not possible to restore the importance and advantages of cities but it is possible to experiment and to adopt actions that have the objective of allowing us to learn about how we might move in a different direction.

Time is a fundamental metric and can be used to design measures that could be used to sustain healthy and successful cities. Action at the level of individual cities and at the level of systems of cities can be influenced by the need to:

1. Minimise travel times within urban areas by public transport, walk and cycle to maximise interaction possibilities over short distances
2. Minimise travel times by rail and its associated local public transport between cities that actually or potentially form systems of cities.
3. Maximise the availability of information within the city of relevance to the SME sector and maximise the use of local goods and services as long as these are competitive on price and quality. Firms in the SME sector do not have the time for executing sophisticated search routines to identify partners and joint marketing initiatives. Rapid access to high quality information would have a catalytic effect on local economic performance, job creation and

reduction of pollution resulting from transport.

4. Maximise the flow of information and exchange opportunities between cities in regional systems of cities. The potential for new economic growth based on innovation and entrepreneurship will be greater if systems of cities reach a critical mass defined in terms of the number of goods and services that can be accessed within one hour's rail travel time and the number of people with specialist skills who can be visited within the same time budget.

Conclusion

Cities are worth a substantial investment of time, effort and creativity. In many substantial ways currently they are not working very well. If we are prepared to focus more energetically on the importance of small scale everyday activities and interaction and to redirect resources to the local and the neighbourhood level then we can recapture the psychological, social and aesthetic values of cities. This will imply a major commitment to local values and local community aspirations which is entirely consistent with Agenda 21 agreed at the UNCED at Rio. It will imply a major rethink of traditional and not very successful policies in the area of economic development and planning and it will mean a commitment to policies that facilitate and encourage rather than policies that destroy and rebuild. The organic model of a large number of small scale changes trading on the synergistic advantages of one another is more likely to produce a sustainable urban lifestyle than a policy based on high speed

transport systems, global sourcing of products, employment depending on inward investment and hyper mobility as a way of life.

The current patterning of human activities and the current interrelationships of space and time are a function of fossil fuel use, prices that do not reflect the environmental or whole life cycle costs of the activity and public expenditures that conflict with sustainability objectives. All of these issues have been identified in the EU's 5th Environmental Action Programme as target areas for policy change and this will help. Sadly there is not a clear political commitment to these changes either in Brussels or in national capitals. Social change of any significance does not come about from the analyses of scientists or from logical debate. It comes about from the insights that are to be found in human value systems and in the ability to visualise alternative futures. The abolition of slavery in the 18th century, the arrival of large scale engineering works in cities in the 19th century to provide universal fresh water and sewage and the trend to shorter working weeks and strong health and safety rules in the workplace were all the result of various combinations of social protest, political vision and political will. These factors are likely to be the source of a new utopia for European urban civilisation. What they need more than anything else is experimentation and creativity to reveal what can be achieved by large numbers of small changes in a number of different cities. Is this kind of experimentation really a problem when we have spent the last 70 years experimenting with fossil fuel hyper mobility, psychological disorientation and loss of sense of place to the point where cities are once gain regarded as dirty, dangerous and sterile places to be avoided?

John Whitelegg

September 1995

ART074 - Berlin

ECO-LOGICA LIMITED

COMPANY PROFILE

Eco-Logica is a new and innovative transport and environment consultancy, formed in August 1993 by Dr John Whitelegg (former head of geography at Lancaster University).

Eco-Logica specialises in transport and the environment, sustainability, life cycle analysis, sustainability and car free city concepts and provides specialist advice across all modes of transport, both passenger and freight.

Examples of the services Eco-Logica provides are represented by recent commissions which have included:

- Transport training course for The British Council
- Environmental Awareness courses for British Airways managers

- Environmental impact study for British Telecommunications
- Sustainable freight transport report for WWF
- Roads, Jobs and the Economy report for Greenpeace
- Providing evidence and appearing at public inquiries on behalf of independent campaign groups
- Life Cycle Analysis of Housing for Scottish Homes

JOHN WHITELEGG, MANAGING DIRECTOR, ECO-LOGICA LTD

Date of Birth:20 May 1949
Nationality:British

Professional Qualifications

1970 B.A. (Hons) Geography, UCW Aberystwyth
1974 PhD in Industrial location and change over time in economic activity, UCW Aberystwyth.
1975-77Economic Development Officer, Outer Hebrides.
1977 - 1990Lecturer and then Senior Lecturer, Department of Geography, University of Lancaster.

1984 Visiting Researcher (6 months) Sagar, Allahabad and Gorakhpur (India)
1986 Visiting Researcher, University of Darmstadt, Germany
Jan. 88 - July 90Researcher, Ministry of Transport, State of North Rhine Westphalia, Dusseldorf, Germany.
Visiting Professor, University of Essen, Germany
1.7.90 - 31.7.93Head of Department of Geography and Director of Lancaster University's Environmental Epidemiology Research Unit.
1.8.93 -Managing Director, Eco-Logica Ltd

Previous Experience

- Consultant to the Australian Government on its "Building Better Cities" project.
- Consultant to British Airways on the environmental impact of air transport.
- Member of the review group on the urban environment of the European Environmental Protection Agency Task Force.
- Consultant to European Parliament on economic and fiscal incentives for a cleaner environment.
- Consultant to BICCon Environmental issues
- Consultant to British Airways on environmental issues

- Currently teaches environmental auditing and environmental policy on Lancaster University's

MSc in European Environmental Policy and Regulation degree course

Author of seven books

* Urban Transport. MacMillan Education, 1985

* Transport Policy in the EEC, Routledge, 1988

* One False Move: a study of children's independent mobility, 1991, Policy Studies Institute, London (with Mayer Hillman and John Adams)

* Traffic Congestion: Is there a way out? Leading Edge Press, 1992

* High Speed Trains: fast tracks to the future. Leading Edge Press, 1993

* Transport for a Sustainable Future: the case for Europe, Belhaven, 1993

* Critical Mass: Transport, environment and Society in the 21st Century, forthcoming

Author of over 50 papers in academic journals

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* Member of Chartered Institute of Transport
* Member of Environmental Auditors Registration Association

A model for local integration of different scale and nature networks : application to urban transport interchanges

A common project of
Centre National de Recherche Scientifique - Paris, France
RÈgie Autonome des Transports Parisiens - Paris, France

Dr. Nikolas Stathopoulos (CNRS)

In considering a network it is useful to view it in territorial terms. This helps in developingthe network and in improving links with theterritory served.There are broadly two types of instruments for territorial structuring:Static instruments delimit territories through various forms of political action: frontiers betweencountries, between areas within the same country, between the public and private sectors in the economy of a country, etc. They generally take the form of bans or regulations which restrict the various types of movement, of persons, goods or capital. Networks, however, are dynamic instruments for building territories: they are not designed to limit movement but rather to make it easier. They influence territorial development channelling movement in certain directions,

thus excluding others.This can be understood from the example of the new TGV Nord line. The fact that it does not finallyserve Amiens will not stop anyone from travelling from Paris to Lille via Amiens. However, the existence of a TGV connection between Paris and Lille can make other connections passing throughAmiens less popular and seriously affect the status of this town in the French urban system. By favouring one direction of movement within a territory, the network can either confirm an existing territorial structure, or induce changes in it.

1 TRANSPORT NODES AND URBAN POLARISATION

The primary factor determining the most favouredaxis of movement in a territory is the transport capacity provided on this axis. Given that access can only be gained to the network at individual discrete points, the distribution of journeys isdetermined by the facilities the network providesfor travelling from a particular place. In the case of the saturated RER Line A, forexample, the choice between the various possiblepaths to reach Etoile is made at a given point suchas Nation, from which the capacity provided in thedirection of Etoile is much greater than in otherdirections. The resulting weighting of directionsfrom RER stations in Paris increases the status ofthese locations in the urban territory. For users,these network nodes become mental landmarks,which shape their travel strategies. From mere network nodes, these points thus form urban focal points, often referred to as "poles". For the networkoperator, the question is how "network points" can become urban focal points. The transformation willarise if the following conditions are met:

- the network point is perceived as intimately linked with the network;
- the weighting of the various directions of movement (capacity) outward from the network point is significant with regard to the destinations of passengers entering these points;
- the layout of the facility is compatible with its intended function.

2 A MODEL FOR NETWOK POINTS : BASIC CONCEPTS

The concept of a network point is important because it expresses a fundamental fact: transport is discontinuous. One cannot jump on to a passing bus or train, nor from one vehicle to another. Thus, we need to arrange dead points to enable changes in because it speed between the territory (pedestrian speed) and .expresses a the transport system or between two transport systems (or subsystems). This "movement initiator" approach determines the nature of points, network-points and at the same time, territorial points, and their functions.

2.1 THE ROLE OF NETWORK POINTS

In terms of function there are two types of points:

- simple "entrance/exits" to the network, providing only the basic "access" function;

- points which, in addition to access, provide a "connection" function within the network(s), between several lines, several modes or even several systems. .

Tabelle 2:

figure 1: Local and translocal Roles		
	Territorial aspect	Functional aspect
ROLE	**Local**	**Acces**
	Trans-local	**Acces+Connection**
Note : exceptionally there may be some network connection points which provide only interchange without acces (e.g. hi-way road nodes)		

The access function (entrance/exit) of the point interests only local users involved with the "district". Thus, a point providing only access will be referred to as a point of local interest. The connection function gives the network point a translocal role with respect to its territory with connecting passenger and other transiting through it. This analysis uses the concepts of local and translocal roles but at the same time transcends them because they have territorial implications as

well.

2.2 AREAS : INTERNAL AND EXTERNAL

The "network point" is all the more important as it is essential that good access quality is provided (comfort while waiting, escalators etc.), good internal connections between two or more lines, or modes as well as certain services (ticket sale points, information, etc.). Network points tend to create specific areas, as well as providing transport for an area. In many cases the connection function may be provided outside the network point, e.g. via theneighbouring streets to bus services. As space in the cities is limited these aspectsmay conflict. The metro resolves this conflict in its own way by creating additional space underground. The management of this space presents certain opportunities (related services, advertisements, etc.)as well as problems (cleanliness, safety).

The Internal area: is specific to the point and is roughly the area where the network operator (owner or concessionaire) operates;

The External area: is the area in which the network point's "immaterial" connections (sign-posting) operate. Given the access function, it also includes the approach to the point. It should not be confused with the zone over which land use effects are felt or with its area of influence, which can extend much further, depending on whether it serves a local, regional or national function.

2.3 HOW NETWORK POINTS FUNCTION

The functioning of network points can be considered from three aspects:

- The network point's basic functions which are directly derived from its nature and its role, Iocal or translocal;
- The services offered at the network point, internal and external areas;
- The behaviour of users of the network point, "attracted" by the influence of the network point and conditioned by its structure and the services offered within it.

Behaviour and activities within the network point are primarily linked to the internal circulation of passengers within relatively easily accessible areas which may be more or less labyrinthine. This requires orientation and signposting. There is also waiting time, which can be made more or less comfortable. The wish to add value to transportation or waiting time must be considered either in terms of entertainment or of exploiting available area-time. Behaviour in the network must also be regulated, or even controlled : problems relating to fraud, safety, cleanliness, etc.

The individual services offered by the operator(s) within the network point fall into one or more of three categories:

- Direct services, linked to basic functions, facilitating the use of the network point.(e.g.

selling travel tickets). This also includes signposting and information about the trip while waiting. Maintenance services, e.g. for escalators, also form part of these direct services.

- Related services, whose link with the transport function may be close or remote, diversifying the character of the point. This includes information, on other networks, on the district around the network point, on points of tourist, etc. There may also be "proximity services" (such as newsagents, florists, bakers), or links to other types of network (such as the telephone).
- Transverse or regulating services. These are services which affect network point areas, as a whole as, "public areas". These services might be defined as all services (such as cleaning and lighting) which contribute to the material and psychological quality of the network.

Policing and information both qualify under either definition. The network police play an essential role in ensuring security and acceptable behaviour in these areas. The three goals - facilitating, diversifying, regulating - may be in conflict at times. The efficiency of these services depends on the their organisation in relation to the nature and structure of the network point, as illustrated in Figure 2.

Figure 2 : how network points function		
SERVICES		
Direct *Facilitate*	**Related** *Diversify*	**Transerse/regulating** *Regulate*
Ticket sales Signing Transport Information Equipment Maintenance	Entertainment Reatailing Publicity General Information Telephones etc.	Security Passenger assistance Social and Urban Information

2.4 THE INFLUENCE OF NETWORK POINTS

The sphere of influence of a network point is not confined to its internal and external areas. Several aspects of its influence must be taken into consideration. These include:

- Social/town planning effects: The price of floor space, the location of employment and/or housing, the development of retailing and the mobility of populations.

- Field effects: Caused by interaction between the point and other points in the territory. These effects are traditionally described as the network point's zones of attraction.

Figure 3 : *Network points influence*

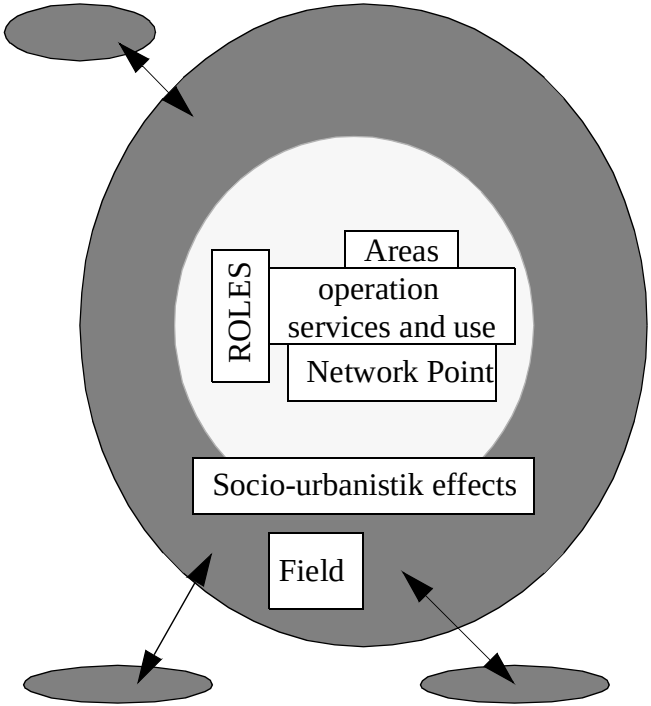
Scale/type	**Social town planning effects**	**Field effects**
Local	Real estate Retailing Housing Employment	Local service Local attraction
Translocal	Mobility and intremodal connection effects	Fragmented field of translocal attraction

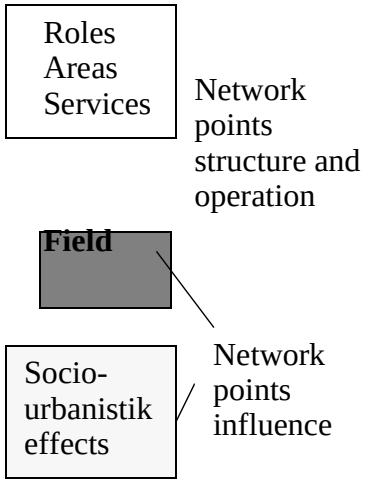
3 A MODEL FOR NETWORK POINTS ANALYSIS

The following diagram groups the concepts which make up the framework for designing or analysinga network point. The "questions to be asked" about a network point (existing or future) can be grouped in three categories, as shown in Figure 4.

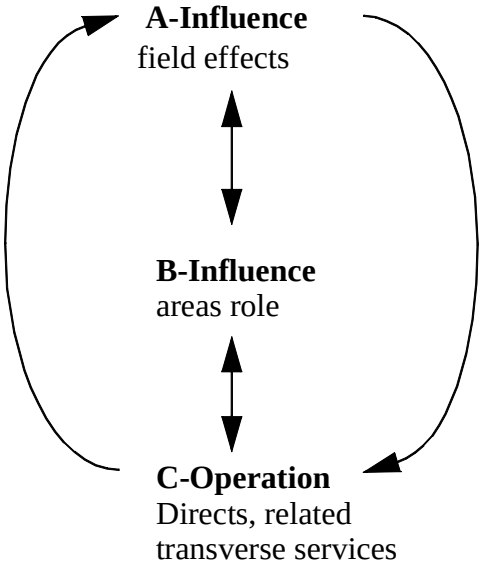
- What is the network point's influence? (i.e. the range or shape of its field of attraction and theboundary and nature of its urban effects?)
- What is the network point's role ? Is it only external space, on the public road, or does it also have internal space whose primary purpose is transportation in the network?
- What are the services - direct, related and transverse - offered to users within the internal or external areas of the network point?

The answers to these questions allow the type of point to be specified and will provoke new questions.





The types of questions to be asked when designing or analysing a network point can be summarised as shown in Figure 5



3.1 REAL NETWORK POINTS

The two basic functions (access and connection) must be provided within the internal or external area of any network point. Figure 6 is a matrix to distinguish the four combinations of basic functional roles and areas.

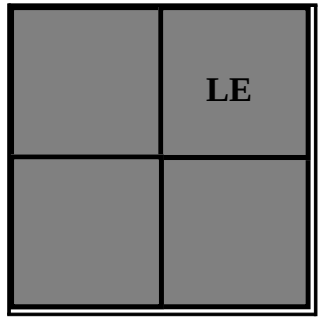
Figure 6 : combinations of basic functional roles and areas

Tabelle 3:

ROLES	**internal**	**external**
Local	LI	LE
Translocal	TI	TE

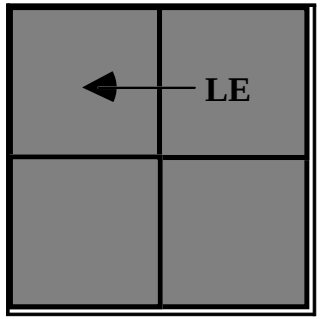
The first requirement when determining services in network points is to analyse the relationships between services and area roles for each type of point. Points of the same category and type of structure may differ in the scale of their urban effects and fields of attraction. This is illustrated by considering the typical network points in order of increasing complexity:

Simple bus stop



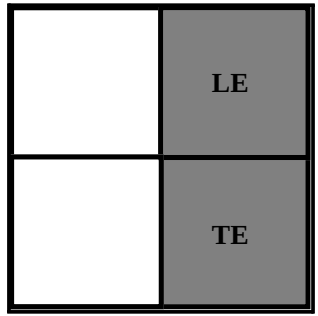
The almost exclusively local role of this point means that the access function prevails, although the connection function still exists (e.g. for people who are dropped off by car at the stop). The external area role however is generally designed for the access function only.

The bus shelter



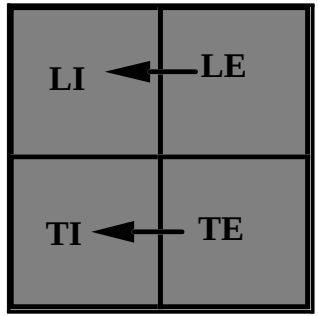
In this case part of the external area is internalised (covered shelter, lighting etc.) : The informative and attractive aspects of the networkpoint are improved and new direct or indirect services may appear, e.g. ticket sales, advertisements.

Bus-bus connections



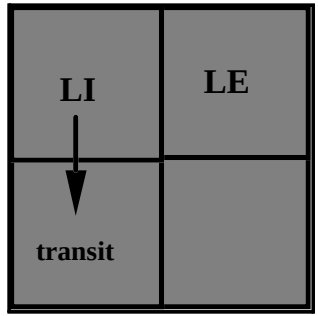
Both access and connection are provided in external local and translocal area roles. This depends on either (a) two or more routes serving the same bus stop, requiring spatial grouping of the direct or indirect services by which connection and access are provided, and (b) walking along the road and possibly crossing the street. In this case, the lack of "legibility" of routes and directions, combined with exposure to the elements and the risks of missing connections, may offset the advantages of same level interchange

Key points: a mixed configuration



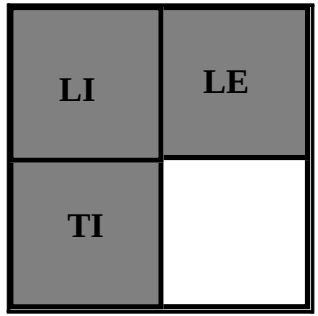
The internalisation begun with the bus shelter tends to be more advanced for buses at key points - e.g. in the Paris suburbs. Here, using the metro station as a model, a partly covered and closed area may be provided, with marked paths for connections, shops and information services. While in the case of the metro additional space is created underground, extension of the key point on the surface is at the expense of other road uses, and may prove difficult in urban centres. Unlike the metro station, internal or semi-internal areas of the key point tend to be closely linked to its surroundings. Thus, the use of signs, services and facilities (which serve to create internal space for the network point on the basis of external local area roles and external translocal area roles) becomes problematic. This approach can, however, be represented by the preceding diagram which shows that the chal-lenge of key points (modelled on metro stations) is to internalise existing area roles by transforming urban furniture at the network point from a simple sign to an architectural envelope, allowing the range of services to be extended without having to increase the number of area roles.

The simple metro station



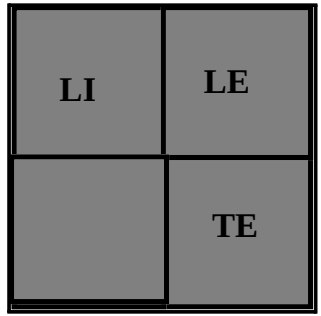
In the most basic point with its own internal space, some of the area roles will be fulfilled in an area controlled by the operator. Beyond the area roles LI and LE, there is a translocal role in regard to passengers on trains travelling through the stations who may notice station advertising and renovation as much as those entering the station.

The metro-metro connention



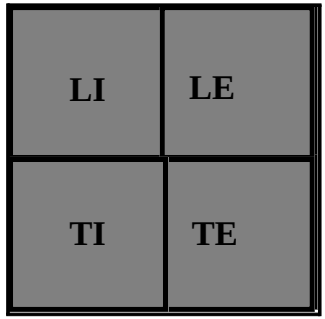
Studying this connection confirms the internal translocal area role of the simple metro station. Through signing, the Tl-area role is effected in the halls and passageways beyond the turnstiles whichallow passengers to find their bearings.

The metro-bus connection



By contrast, at the metro-bus connection, the connection is made via the external space. The external translocal area role has to be organised by signs to the bus stop by the station exit. Certain services relating to the external translocal role have to be provided within the station's internal space (e.g. map of the district). This combination of roles within an area can sometimes hinder legibility, with passengers tending to lose their usual points of reference.

The interchange complex



In the large interchange complexes, the internalisation of area roles is more pronounced: the local internal area role is visible as a set of intermediate areas between the city and transport services (entrance, ticket halls), providing network access Various services are added to it: reception, sales, turnstiles, information, internal signing, possibly entertainment and advertising, while transverse services (information, security) are provided on a bigger scale and are more visible.

The interweaving of area roles and the diversity of possible services means that even in the specific local internal area of the network, any intervention (architectural, functional) by the network operator must take into account potentially conflicting uses. Rather than expecting the local or translocal uses that meet in this area to change in order to obey signs and a predefined architectural and functional logic, it is preferable to review the logistics, allowing for the complex interweaving of roles within the physical area concerned.

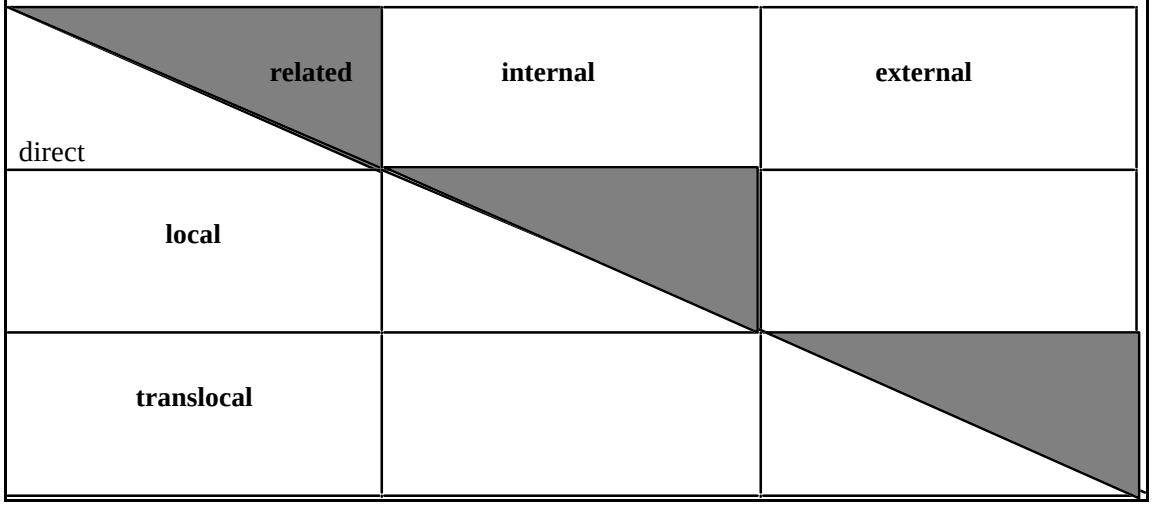
4 COMBINING ROLES AND FUNCTIONS

This brief analysis of how network points function was specifically limited to simple and identifiable points as shown above. In practice designs can depart from these simple types by combining the area roles of several typical network points. Thus, taking a bus station as an example, there are two options:

- Surface bus station in an unprotected external local area. In this situation the LE, TE configuration is dominant and area roles Ll and TI are dispersed into the surrounding urban environment.
- Surface bus station in a protected internal external area. The densest configuration is the "four area roles" type, although the sheltered bus roads may be immediately adjacent to the external highway at the station.

The distribution and the layout of the direct andrelated aspects of a service within the internal orexternal areas of a point must be planned according to its structure and its influence. The matrix below provides an overview for an interchange complex where all area roles are present. The area roles largely determine the requirement for services, as well as the service organisation while the range and frequency of the services will depend on the influence of the point.

Figure 7 : Service/structure matrix



Network point area roles and physical roles should not, however, be confused. Area roles can coexist (sometimes in a conflicting manner) within the actual physical space, particulary as not all area roles necessarilyexist at all network points.The sometimes necessary presence of translocal type services within network points whose translocal role has not been sufficiently defined can conflict with the nature of the point and with the activities within them: this reduces the legibility ofboth the

area roles and the physical areas. Theabove matrix can help us to address these potential incompatibilities.

CONCLUSIONS : URBAN POLARISATION RELATIONSHIPS

The way in which network points function is also closely linked with urban polarisation: where thereare internal areas, or when the external area of the point clearly belongs to the network. Area roles tend to be expressed through the architecture (corridor - interchange concourse - platform) as well as encouraging certain types of behaviour (moving - choosing - waiting) within the internal space. The associated development of direct or related services will in turn strengthen the network point in the territory. The extent of the resulting polarisation will depend on the urban context:

- In an area of dense and homogeneous development, well covered by the network (as in Paris) the effects may be limited to the development of a small district centre around the network point;
- In a town centre, a network centre will strengthen the polarisation effect (density, real estate, shops) of the centre compared with its less dense periphery.
- In a low density area a network centre will tend to create polarisation. This will however be

slow and may not overcome the natural resistance of the urban environment without concertation with the local authorities. Moreover, if there is no urban centre nearby there will be no nucleus from which a new urban centre may grow.

To conclude, the combined use of structure (arearoles) and service/structure matrices for each type of network point enables us:

- To determine the area roles which must coexist within the physical space and define itsbasic structure.
- To acknowledge the relationships which exist between the various aspects of a service and the point's area roles: relationships which define its organisation.

Those who manage transport areas could find this approach helpful when considering the design and arrangement of services in interchange complexes. This article offers a range of concepts (roles, areas, functions, field and services) upon which to base asystematic analysis of network points, but otherapplications are possible and will ultimately deter- mine the usefulness of this method.

Practical application will be presented in Berlin conference on method's use for describing structure and functionning of Paris metropolitain traders

NAPLES AS A GLOCAL CITY. LOOKING FOR STRATEGIESFOR A SUCCESSFUL EXPLOITATION OF LOCAL DIFFERENCES

Dr. Mario de Sena

1 -Project objectives and features

1.1 The challenge of globalization

With the globalization of the economy and the appearance of large, integrated free-trade areas, European cities and metropolitan regions are facing more direct competition, now that the conditions of relative stability and safety ensured by customs barriers and protectionist policies no longer exist.

This new situation places the weak areas of the EU, and in particular southern Italy and its cities,

in a difficult position. This has been demonstrated during the present economic crisis by the different response capacity of northern Italy: more integrated with Europe, more competitive from an industrial angle and with more and better infrastructures than the Mezzogiorno.

If Naples and Campania are to meet the challenge of globalization, civic and regional institutions must actuate a policy capable of releasing the great potential represented by territorial resources, culture and business initiative, organizing them around a *development project* for regenerating the economy and employment and guaranteeing services to citizens.

1.2 The project objective

The objective of the project we are proposing is to work out a development model for the restructuring of the great metropolitan areas, based on a successful exploitation of the diversity between their parts and, at the same time, on their reciprocal functional integration, to give an optimum response to the challenge of globalization.

The model will be based on a paradigmatic case, Naples and its regional basin, seeing how practicable the aforesaid strategy is for it and assessing how it responds to the challenge of globalization.

The possibility of disseminating the model of the "glocal city" in the European regions suggests developing an intervention strategy also proposable in other cities with a similar territorial structure and socio-economic dynamics, with particular regard to Mediterranean cities, such as Athens, Barcelona, Marseilles, Genoa, etc., comparable in many ways to the "Naples case" we are proposing.

1.3 The terms of the challenge

The group studying this project started from the consideration that, in the last decade, social sciences have rediscovered the city as a focus for the organization of society ("city of services") for two fundamental reasons. First of all, despite the persistence of some crisis factors, such as the lowering of the quality of life, the marginalisation of some social groups and the frequent inadequacy of infrastructures and services, the city still demonstrates the maximum innovatory potential, not only in technological terms but also in a political, social, organizational and business sense. Secondly, the cities play a role of interface between the local systems (regional and national) and the global systems ("product city") in the globalization of the economy.

This twofold role is obviously played out on two different hierarchical levels. What we want to emphasize is that the hierarchies among cities in Europe and worldwide are undergoing profound changes precisely on the basis of their ability to perform these roles. Once flourishing cities are tending to decline (for example the British inner cities), whereas others are assuming emerging roles (for example the French and German medium cities).

The challenge therefore lies in the capacity of a city or a "network of cities" to perform this role of "interface" with the global system. This will certainly depend on the existence of an efficient system of transport and telecommunications with the "rest of the world" but, basically, it will depend on the quality of the "supply", in terms of goods and services, which the city and its regional system are able to offer.

This supply depends, on one side, on the successful exploitation of the specificity and quality of

the local resources, understood as the object of the exchange with the external systems and, on the other, on the efficiency and functionality of the city and regional hinterland connected to it and, in the end, on its overall capacity to respond to the challenge of globalization.

It is on this terrain that the project proposes to intervene; that is, on the urban and regional transport and telecommunications networks, to improve their efficiency and at the same time to achieve a balanced model of intra-city and inter-city relations capable of maximising the potentialities of local resources.

The construction of such a territorial model and the possibility of verifying its effects in reality must take into account the challenges and critical situations imposed by the city and the regional hinterland which have been chosen as a study case. The characteristics of this study case are illustrated below.

1.4 The territorial reference scenario

A scenario open to the solution of territorial re-balance, certainly of great breadth, is that of reorganizing the Campania Metropolitan System within the multipolar territorial structure resting on the urban pivots of Naples, Salerno, Avellino, Benevento and Caserta. This area contains numerous medium cities with populations of between 50,000 and 111,000 inhabitants, as well as a groups of conurbations with the weight of a medium city.

The regional urban structure is all enclosed within a radius of around 30 kilometres, with its centre in Nola and including all the provincial capitals. Thus the entire urban area is concentrated in one third

of the regional territory.

In this framework, the five provincial capitals and the medium cities of Campania are a reality to be tapped to the full, and it is to the advantage of all parties to develop the theme of an "extended" metropolitan system. Two functional levels would have to be established:

- the first is the CAMPANIA METROPOLITAN SYSTEM, exchanging "energy" with the outside - with other metropolitan systems - and in which the five pivots, independently of their size, would become mouthpieces for mutual interests, and therefore with qualitatively equal functions;
- the second is that of the metropolitan system as such, that is an organism which has to work out its own internal organization and in which, therefore, those same pivots could and must promote all their *individuality and specificity*.

This solution would create both a single great metropolitan voice (decidedly stronger and with more depth than the present one), and would also safeguard the peculiarity of its components. This means that the discourse of the autonomies would cease to be confused with competition to the bitter end and become a discourse of constructive emulation in the interests of the whole. In other words, *cooperation among cities*.

A similar cooperation model is the Dutch so-called "blue banana", consisting of a group of cities with differentiated and complementary roles.

Two urban subsystems can be identified within the Campania metropolitan system, with distinctly different features:

- the metropolitan area of Naples, consisting of the Naples-Caserta "urban system", characterized by a multipolar urban structure on the plains of the Volturno and Sarno rivers;
- the Salerno-Avellino-Benevento territorial system, linear and spread out along the first strip of the Apennine ridge.

The project we are proposing will specifically study in depth the metropolitan area of Naples, which presents both the maximum regional potential and the highest critical levels and, at the same time, a multipolar structure well suited for experimenting in terms of a glocal city, the objective of the project.

1.5 Challenges and critical state of the Neapolitan area

Naples and its regional hinterland form an area in which the centre-periphery polarization is present both within the capital (Naples) and between the capital and the rest of the area; moreover, both the capital city and the rest of the area are characterized by socio-economic and territorial differences, based on highly qualified areas existing alongside areas of great economic and social

marginalization.

This double polarization of the territory (intra- and inter-city centre/periphery and intra- and inter-city qualification/marginalization) suggests intervening to obtain a functional rebalance of the entire area and raising the quality of life overall. The current imbalance and malfunctioning, if not promptly corrected, risk compromising the total development of the area, nullifying that development potential which does exist and which, if successfully exploited, could constitute the specificity of the area's "supply" with respect to the external context.

This is the stand taken by the *Giunta* (executive) of the city of Naples which, in its urban planning guidelines, has set the supra-municipal dimension as a territorial scale for resolving some critical aspects of the capital, and the regeneration and rebalancing of the metropolitan territory as the main targets of the new territorial policy. Over the last 40 years, the metropolitan outskirts (that is the territory indicated here as the area gravitating on the capital municipality) and the urban outskirts of the city of Naples have experienced a "unregulated growth causing a condition of infinite disorder"[1].

The area under examination consists of 2,040 square kilometres, equal to 15 percent of the regional area, and is administratively divided into 150 municipalities. The average population density at the 1991 census was 1,835 inhabitants/km2 against the 411 of the entire region and the 187 of the national average, with extreme points of 15,000 inhabitants/km2 in the municipalities immediately contiguous with the city of Naples. Just consider that, in the sole provincial territory of Naples, the urbanized

1. From the report of Architect V. De Lucia, Councillor for Urbanism of the Municipality of Naples.

areas covered only 700 hectares up to 1961; from 1961 to 1991 they rose to over 22,000 hectares with a mainly residential use, lacking infrastructures and services.

Campania is a region still recording a population growth of 2.3 percent over the last decade, unlike what is happening in the country as a whole.

In the regional sphere, over 67 percent of the population is concentrated in the regional basin of Naples and the regional demographic increase, calculated at over 430,000 units on the horizon of 2005, will be concentrated (390,000 units, 91 percent) in the metropolitan area of Naples.

Most of the regional administrative and business functions are concentrated in the city of Naples, as well as services to firms and families; Naples even satisfies service levels of a lower ranking, inappropriate to is role as primate city, because of the functional inadequacies of the municipalities in the Neapolitan hinterland. In 1989, the Neapolitan area ranked 84th in a classification of Italian provinces based on their social infrastructures, with an index of 1.6 m2/inhabitant (against the 18 m2/inhabitant minimum laid down by law). Just consider that the supply of health services (in public and private hospitals) is estimated at five beds/1000 residents; public commercial concerns are estimated at 5.9/km2; cinemas, theatres and other entertainment places as 0.5/10,000 residents; the supply of higher secondary education is calculated at 2 classrooms/1000 residents; that of sports facilities is 1 every 10,788 residents; finally, the supply of cultural amenities (libraries, museums, art galleries) is 1 every 6,614 residents.

These figures have prompted the new Municipal *Giunta* to state that: "If the rebalancing strategy is to be consistent, we think that firstly the most important functions must be rapidly moved from the

centre of Naples to the hinterland, starting with the seats themselves of political and administrative power: the region, metropolitan city, but also universities, hospitals, etc. But we think that we must also capitalise on the presence of numerous historic centres of considerable substance and tradition in the metropolitan territory, conserving and promoting the role of the historic centre of Naples as a place for cultural activities"[1].

The lack of social infrastructures and services in the regional hinterland places this area and its residents in a state of direct functional dependence on the capital city, generating two negative effects: the first is the saturation of the supply of services and functions which, albeit located in the capital, is mainly tailored for local users and certainly not metropolitan ones; this saturation obviously reflects on the quality of the supply which, even when it manages to satisfy the demand, or part of it, does not manage to satisfy those quality standards to which the user of the service is entitled; the second negative effect is the increase in flows moving towards the capital, entering and crossing the city, mainly in private vehicles, contributing to a constant lowering of the quality of life, both of the residents and the same people in movement; consequently, the saturation of the network forces an "unpredictable" portion of daily time to be assigned to unsystematic movements.

This has created a centripetal and unbalanced territorial model, the consequence of which can be measured by an exchange, in the morning rush hour alone, between hinterland and regional capital of about 65,000 incoming units and 33,000 outgoing units.

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1. From the report of Architect V. De Lucia, Councillor for Urbanism of the Municipality of Naples, "Guidelines for Urban Planning", Naples, June 1994.

The infrastructure index of 189.5 km/km2 calculated over the territorial area puts the regional area gravitating around Naples at the head of the national table. However, when one looks at the population, it occupies the lowest places in the table, precisely because of the high residential density. Moreover, the transport networks do not have effective intersection nodes, so that the routes often have frequent points of interruption, increasing both intra-city and inter-city travel times.

The consequence of the situation described above is a profound and generalized environmental degradation, in which air, noise and water pollution have gone well beyond the danger thresholds, and have contributed, with the pollution produced by industry, to have the Province of Naples declared an "environmental risk area".

Finally, in the marginal areas of Naples and its hinterland, the absence of manufacturing activities on a local level, managed and owned by the residents, has caused a constant impoverishment of local communities: the basic problem of these areas is that they are poor not only because little money enters, but also and above all because the flow of money which does enter goes out rapidly, leaving the community without resources.

On the other hand the urban area of Naples is among the best supplied for telecommunications infrastructures, since it has a telephone network based on digital methods connected by lines using fibre optics. Telecom Italia has also started to replace lines in the area with glass fibre cables, offering subscribers access to innovative services of a multimedia nature. Again in the Neapolitan area there is an experimental network based on the ATM system with leading-edge technology (implemented by the Centro Nazionale delle Ricerche) connecting the main university research centres of the area. The

quality of telecommunications infrastructures in the outlying areas is lower than those of the centre, where the majority of the administrative, business and educational functions are concentrated.

Compared with this innovative infrastructure, the situation of the services delivered in network is particularly deficient, creating a gap between the transport capacity of the telecommunications network and its utilization for providing telematic services. The start up of innovative services would not only enable functions to be decentralized to the main city-nodes, but would also strengthen the competitiveness of the local manufacturing system.

The critical situations illustrated thus require a global approach, aimed at an environmental regeneration of the territory. All the different crisis factors must be considered and a new balance sought between the needs of development and production and those of the quality of life, in a framework of the "sustainable development" of the urban sphere.

1.6 Current guidelines in regional policies for the restructuring of the area

Since drafting our initial work document, there has been the recent election of the Regional Council of Campania and the new Regional *Giunta*, which have given priority to drafting a *"Programme of regional development"* and a corresponding *"Territorial restructuring plan"*, still lacking 25 years after the establishment of the regional body.

The previous regional government's lack of "planning ability" was the main reason for its incapacity to use the available resources as well as for the lack of a solid framework for private investment and the random, indiscriminate nature of public investment which should have been aimed

at meeting the Region's "structural" needs.

The development and restructuring of the territory which the new *Giunta* intends to plan will be of a "strategic" nature, that is constructed "by objectives" and by priority "projects" centred on the "infrastructure networks" and "city networks"[1].

This perspective basically coincides with the "glocal city" approach defined by our working group in the competitive document presented to D.G. XII and which will be explained here below.

1.7 Formulation of the issue within the perspective of the "glocal city"

In approaching the issue, the working group aimed at solving three main problems:

- connecting the city and its regional hinterland with the outside world;
- the "permeability" of the infrastructures inside the regional system, to guarantee equal access for the territorial nodes;
- the qualification of "city-nodes", starting from local specificity, to be implemented by allocating specific functions and services to rebalance the overall structure of a hegemonic city.

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1. See planning report of the President of the Regional Giunta, Hon. Rastrelli (July 1995).

This type of approach can be repeated in all territorial situations characterized by a plurality of cities in which one dominates the others.

The general project is split up into two big priority and strategic sub-projects:

A. Enhancing the infrastructure networks and nodes to be carried out on two different levels of interventions, and in particular:

1. *The implementation of a big infrastructure node in the Tyrrhenian plurimodal system to guarantee national and international connections for the transport of goods, people and information.* The international airport, the implementation of the high-speed railway track to Naples, the line upstream of Vesuvius to Salerno, the entrepôt of Nola-Marcianise, the expansion of the port system of the Bay of Naples and Salerno and the implementation of a telematic network on a regional scale, are the big infrastructures needed to overcome the constraints imposed by Naples and Campania's position on the periphery of the international development lines.
   - The completion of this infrastructure system would give the Campania Region and its city a role of "hinge area" between Europe and the Mediterranean countries in view of the

European Union's announced "Mediterranean" policy.

- The Corfu Conference of the Heads of State of the European Communities has emphasized that the UE's policy, currently concentrated on consolidating relations with the former Communist countries of eastern Europe and developed in a middle-European key, should be realigned in the Mediterranean direction.

After this conference, the Commission of European Communities presented a request for ECU 5.5 billion to lay the foundations for a Euro-Mediterranean free-trade economic area project, in which the partners would be the EU on one side and the north African and Middle East countries and Israel on the other. This free-trade area would involve 49 countries and 800 million inhabitants.

The importance of this prospective for Italy, the Mezzogiorno and Naples is evident, and it can be supported both by the Italian government and through the UE presidencies which will be wholly Mediterranean for the next turns (Italy and Spain).

2. *The completion of the regional and metropolitan infrastructural network*

The Tyrrhenian plurimodal system on a national and international level should be connected up to the regional infrastructural networks which must be restructured to guarantee *the efficiency of exchanges within the region.*

The main interventions for this end will consist of:

- *onverting the State railway network into a regional metropolitan network*, on the model of the German S-bahn
- The implementation of the high-speed line and the upstream of Vesuvius, on which the national traffic will be concentrated, offer high transport potentialities on former State railway lines. This will enable them to be reutilized to upgrade the regional services. In the Naples-Caserta-Salerno urban system alone, 250 kilometres of network with 45 stations and 11 stops can be converted.
- This project can be combined with a plan for converting old railway areas and rehabilitating areas around stations for locating equipment and services; this would fill the structural lack of services in the cities in the metropolitan hinterland, indicated as the prime cause of congestion in the provincial capitals, and especially Naples;
- * *completion of the infrastructure network of the Naples-Caserta urban system*, already almost entirely executed with the intervention ex law 219/81;
- * *integration and expansion of the present telecommunications system and the*

implementation of a "virtual teleport" connecting the main nodes of the territory (port, airport, entrepôt, railway station, university, industrial areas, public services, etc.) and these with the capillary network of users inside these infrastructures and services. With the progressive implementation of EU directives regarding telecommunications, a large space is being opened for private initiative for realizing and managing dedicated telecommunications systems. The creation of a *teleport* would enable a greater exploitation of the telecommunication infrastructures present in the urban area of Naples. It involves implementing a system of networked services and strengthening the telecommunications infrastructure in the outlying areas to raise the standard of the network to that of the centre, guaranteeing equal access conditions to all users in the metropolitan area. The applications deliverable through the Naples *teleport's network* could help to relieve congestion in the centre of Naples, where the main administrative, educational and service functions are concentrated, as well as promote the development of the characteristic manufacturing activities of the area. Teleworking, teletraining, and access to administrative archives would enable important functions to be decentralized in the main city-nodes of the area.

"Cooperative working" initiatives could sharpen the competitive edge of the Neapolitan manufacturing industry, fostering interaction between firms and between these and the world of research, as well as developing a production model based on creativity, cultural values and tourism resources;

- *improvement of water supplies*, especially in the provinces of Naples and Caserta which are the most affected;
- *enhancement of the energy sources and networks*, mainly aiming at alternative power sources.

B. *The "medium cities" project*

The infrastructures described above are already partly completed and the project will intervene by implementing the territorial rebalancing strategy, concentrating on enhancing the infrastructural networks for the transport of goods, people and information and *on the definition and features of city-nodes, understood not only as intersection points, but also as places for the polarization of functions.*

To this end, the project will act simultaneously on the service networks, the different hierarchical levels, the distribution of functions and activities and the consequent rebalancing of housing, bearing in mind the new housing demand, amounting to 390,000 units.

In this framework, *the strengthening of international-class metropolitan functions* such as finance, business initiative, training, research and communications, take on a new importance, with the parallel exploitation of the existing potentialities of culture, university, tourism, accommodation facilities and recovery of the urban image. The new functions must be located in the medium cities and in the new nodes of the urban system, relieving the congestion in the central city.

The aim of the project is to define the role of the medium cities in the regional area with relation to their vocations, and to pinpoint groups of minor cities for the infrastructural nodes which have achieved a sufficient demographic threshold to enable the management of the common services (education, health, ecological, etc.) currently lacking. An inverse procedure will be applied to the city of Naples, that is pinpointing in the administrative districts the places to decentralize the functions currently concentrated in a few urban central areas.

When constructing the new "glocal city" scenario for Naples and its metropolitan region, the working group intends to concentrate on environmental regeneration. Starting up processes for rebalancing the environment in urban areas is one of the priorities of territorial planning. The territory must be regenerated on the basis of an ecosystem concept, constantly seeking compatibility between peoples' needs and environmental features. It is on the basis of this compatibility that territorial policies must be defined, divided into the sectors of *change*, *conservation* and *recovery*.

these sectors, that of recovery has a particular significance in the metropolitan region of Naples, especially for its reinsertion in the vital circuits of the community, for its numerous historic centres.

The Neapolitan area is full of small municipalities with unexploited historic and architectural

assets, if not actually buried by the "modern" and trivialized by the general marginalization of the places. These are the poles linked up by the march of history through the Campania region and which can therefore "tell a story" through the new interactions they will establish.

2 Conclusions

The critical situations and challenges illustrated here confirm the need to create conditions in the regional area of Naples (and in some quarters of the city) which encourage, through the "exploitation" of local potentialities, the birth and development of environments able to support themselves and to integrate with each other as regards both functions and benefits. It is important to think of a development model which does not tend only to "individualize" the marginal areas through providing social service infrastructures, because this would lead to a fragmentation of these places and of the entire territory; vice versa, one must think of a model which, albeit aiming at the internal qualification of the areas, places them in conditions of reciprocity with regards to some functions and services, optimizing the efficiency of the transport and communications systems.

To this end, if the area of study is imagined as a network of functional relations, the nodes in the network play the role of poles of functional interaction or interchange. To prevent the poles becoming hierarchical, they have to enjoy equal accessibility (in qualitative and quantitative terms) and thus be equidistant in spatial or temporal terms.

In particular, the project will verify the benefits of a model of intervention aiming at:

- rebalancing the territory by successful exploitation of the medium cities and minor centres so as to constitute "loci" encouraging accessibility to the various branches of the social and production networks;
- connecting the various nodes of the networks according to a non-hierarchical order which, albeit guaranteeing equal opportunities of access and use by applying leading-edge technologies available in the communications and transport sector, tends to exalt local specificity and the relative "vocations", attributing a particular role to each "loco" in the *glocalization* process;
- seeing how a balanced local organization combined with the successful exploitation of local resources can encourage *inbound* and *outbound* relations, without them being necessarily mediated by the central city.

TELEPORTI ITALIA S.p.A.

TELEPORTI ITALIA S.p.A. was founded, by the I.R.I. Group, thanks to the will of two different traditions: one in charge of the building and management of great real estate projects, and one that realizes and manages telecommunication services and systems. Its goal is to realize the highest level of synergies in the design, realization and management of technological infrastructures, plants and ad-

vanced services.

Teleporti Italia is a company of "Engineering Services" - whose larger shareholder is the TELECOM ITALIA; it fosters, studies, projects and coordinates the development and management of Teleports, taking part in the complex organization of network services for industries as well as for residents and coordinating the Group Companies to develop advanced projects.

It draws up preliminary and/or feasibility studies and projects of integrated view-data systems on a urban scale and infrastructural interventions to develop advanced telecommunications areas-systems (Teleports).

It projects integrated view-data systems and area services for great multi user companies, business centers, technological parks, equipped areas, transport infrastructures, etc.

It realizes telecommunications, view-data systems and automation systems and services as well as their equipment, shouldering the responsibility of "general contractor".

It organizes and manages high-tech telecommunication systems and services in Teleports, business centers and scientific and technological parks, with proper facilities called "telecenters"; it even offers to residents complementary services related to view-data systems and specialized equipment (security, intelligent building, cabling systems, training, etc.).

Teleporti Italia has grown up a significant experience in the promotion, realization and management of network systems and centers for services accomplishment, especially for multiuser applications, as

videoconference, Message Handling, electronic mail with store and forward facilities, videoinformation, date-bases access, office automation, multimedial systems, cable and satellite TV distribution.
TELEPORTI ITALIA operates in the organization and promotion of information and training structures necessary to promote services and to make users able to know and use systems in the best way.

LA PRESENTAZIONE DELLA SOCIETA'

TELEPORTI ITALIA nasce in ambito IRI, dall'incontro di due vocazioni: quella impegnata nella realizzazione e gestione di progetti urbanistici-infrastrutturali, e quella operante nella realizzazione e gestione di sistemi e servizi di telecomunicazione ed ha l'obiettivo di sviluppare il massimo livello di sinergie nella progettazione, realizzazione e gestione di infrastrutture tecnologiche, impianti e servizi avanzati. E' una Società di "Ingegneria dei Servizi" - controllata dal Gruppo STET - che cura la promozione, studio, progettazione e coordinamento delle realizzazioni e della gestione dei Teleporti, intervenendo nella complessa organizzazione dei servizi a rete per le imprese e per il cittadino e coordinando le azioni delle società del Gruppo per lo sviluppo di progetti complessi.
Elabora studi preliminari e/o di fattibilità e piani programmatici di telematizzazione integrata su scala urbana e di interventi infrastrutturali atti allo sviluppo di aree-sistemi a telecomunicazione avanzata, ovvero Teleporti.
Progetta sistemi telematici integrati e servizi di area per grandi imprese multi utente, centri di affari, parchi tecnologici, aree attrezzate, infrastrutture per il trasporto, ecc..
Realizza sistemi e servizi di telecomunicazione, di telematica e di automazione intervenendo nell'esecuzione dei relativi impianti anche con assunzione di responsabilità di "general contractor".
Organizza e gestisce sistemi e servizi di telecomunicazione ad alto valore tecnologico presso Teleporti ovvero centri affari ed i parchi scientifici e tecnologici attraverso apposite strutture denominate

"telecenter", offrendo all'utenza anche servizi complementari nei settori legati alla telematica e all'impiantistica specializzata (sicurezza, intelligent building, cabling systems, formazione, ecc.).
TELEPORTI ITALIA ha maturato una significativa esperienza nella promozione, realizzazione e gestione di: sistemi di rete e centri per l'espletamento di servizi, prevalentemente multiutente, quali videoconferenza, Message Handling, store and forward, videoinformazione, accesso a banche dati, automazione di ufficio, sistemi multimediali, distribuzione TV via cavo e via satellite e nell'organizzazione e promozione di strutture di informazione ed addestramento necessarie per promuovere i servizi e mettere in grado l'utenza di conoscere ed utilizzare in maniera ottimale tutte le potenzialità dei sistemi realizzati.

Mario DE SENA

Born in 1947, married with two children, he graduated in Jurisprudence at the University of Naples in 1969 and gained a Master in Civil and Commercial Law in 1972. He is entered in the Register of Statutory Auditors.
He was assistant lecturer in Finance from 1970 to 1972 and from 1992 he has held a post-graduate university course on "Business Management" in the School of Specialization in Business Administration and Management of Naples.
He began working in the corporate sphere at the end of 1972 with a data-processing company belonging to the Banco di Napoli Group.
Appointed manager in 1974, for the years he held various managerial positions (sales manager, administrative manager and finance manager) in companies of the Banco di Napoli Group, FI.ME, Finanziaria Meridionale and Banca Nazionale del Lavoro Holding in Bari, Rome ad Milan.
In 1984 he joined Finanziaria Italstat (now Iritecna) - I.R.I. Group - where in 1986 he became head of

the Organization and Information System Central Management until 1991.
In the last twelve years he has also sat on the Board of Directors and Board of Auditors of Italian and foreign companies of the groups for which he has worked.
In December 1990 he was appointed Managing Director of Teleporti Italia S.p.A., a company of which the I.R.I. Group has a 100 percent shareholding through the STET and IRITECNA holdings and controlled by TELECOM ITALIA, operating in the major areas, implementing and managing integrated systems of communications networks and non- regulated telematic and telecommunications services.

CITIES AND TOWNS ON THE EU BORDER: IDENTIFICATION OF THE INSTRUMENTS NECESSARY FOR THEIR INTEGRATION INTO THEIR REGIONAL DEVELOPMENT

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The paper summarizes a proposal submitted to DG XII (FAST), code ACT-VILL/15.6.94, in 19 September 1994. Another proposal for social exclusion on the European borders from the same coordinator but a different research network (including Altlantic Arc, Spanish and Italian participants and excluding Stockholm and Vienna) was later submitted to the Framework 4 TSER programme.

There are therefore several sections in common in the two proposals.

INTRODUCTION

> „A boundary is not that at which something stops but, as the Greeks recognized, the boundary is that, from which something begins its presencing“
>
> Heidegger, 1954/71:154

This is not so for urban Europe. Western and Southern borders, of course, open to the Atlantic Ocean and the Mediterranean Sea, mark the beginnings of Europe in a self-evident way. But the Northern and Eastern borders are places where urban Europe stops. Shifting boundaries gradually incorporate new regions, which are peripheral to the EU core, and there are only few large cities on those borders which can be considered as the „beginning“ of the EU: Vienna and Stockholm since 1995; Berlin with a border within it until 1989; and a constellation of small towns in peripheral regions of Greece and less peripheral ones of Italy, many in islands as gateways to Asia and Africa. The purpose of our ACT-VILL proposal was to identify the instruments necessary for the integration of these towns and cities into their regional environment, and to seek ways of enhancing their cooperation.

The core of Europe has been adequetely studied form this angle. „Urban futures“ belong to the core

and are denied to the fragmented periphery of the EU, especially border cities. From approaches to urban boosterism and identities to the sustainable city debate, multi-cultural marginal regions are excluded. They are left to struggle alone with their restless regional environments.

Regional questions have become quite complicated and pressing in Europe since the fall of the Berlin wall in November 1989 and the emergence of certain destabilised enclaves of conflict, war and civil strife very close to the EU border, which is constantly redefined and diversified. It is easy to see in existing literature a lopsided treatment, where certain localities and topics are extensively covered whilst others have been rather neglected. Cities in the core of Europe belong to the former category. This research proposal considers the latter type of localities, but targets another side of the story: the border regions, which increasingly threaten to destabilise EU futures. The cities selected, and whose Universities form the present research network, are outside the „blue banana“ or any of its versions, and can not possibly develop any ambitions to belong in it.

This „blue banana“ is even lucky to have a lot of border areas supported by the INTERREG Community Initiative. Many dissimilar places on internal EU borders (e. G. Dutch-Belgian, Belgian-French), including the additional type of internal borders recently created by the Schengen agreement, have seen considerable development. Their multi-cultural regions are peaceful, prospering, and already cooperating, as evidenced on the aggregate level by positive population and employment change (CEC 1995). Having benefitted from European integration, high-speed transport and policy including INTERREG I, they already experience commuter flows or flows or migrants and consumers, as well as economic transactions and networks. These are growing to be the new dynamic regions of the EU.

By contrast, multi-cultural regions along the external borders of the EU face increasing problems and the whole debate on „Fortress Europe“: socio-spatial exclusion, hostilities, escalation of security problems repelling enterprises, depopulation and occasionally a brain drain, economic decline and marginality, illegal migration and refugees. External borders are bound to attract increased concern during the 1990s, not the least because of developments in Eastern Europe. Cities chosen in the proposal all belong to the EU, and are located near the border between the EU and former socialist Europe and Asia. Cities on the west, along the Atlantic Arc, were not considered, because their common problems with respect to urban-regional intergration, isolation in particular, are different form those of Eastern border cities.

1. RESEARCH OBJECTIVES AND SPATIAL EMPHASIS

The present proposal has as a key objective to challenge prevalent models built upon experiences of „glocalisation“ in the core of Europe, and introduce new concepts and models concerning peripheral regions. It will be investigated, how the actual process of European intergration, gradually including new nations and reshuffling external borders, reshuffles regional basins and affects different cities on both sides of the border. More specific objectives of the project are, first, to unravel the processes whereby bottlenecks of communication occur between border cities and their regions and within cities themselves; and, second, to explore how these bottlenecks can be tackled by modifying their regional basins of attraction, where necessary, and by encouraging synergy, interaction and

networking between cities on the border. This involves two basic choices in forming the sample of cities: one, that they are on the border of the E.U. with other European countries; and secondly, that they have established Universities as an integral part of their economy and society.

New technology enhancing human and institutional communications, as well as traditional transport technology, will be evaluated and restructuring will be investigated, in order to unblock urban-regional integration around cities affected by their location on the E.U. border (outbound approach). On the intra-urban front (in-bound approach), one of the main barriers to communication is social ethnic or racial segregation, which receives increased intensity on the border. In fact, some cities are paralysed by hostilities, illegal migrants, terrorism. There are different migration experiences and contrasts between successful cases of multi-cultural societies with unsuccessful ones, involving socio-economic disintegration, negative attitudes towards immigrants, discrimination against them, and residential segregation. Recent studies of issues relating with wars around Europe, focus on the waves of refugees and migrants passing through the borders, often illegally, from Eastern Europe, near and middle East and the Third World (King ed. 1993). However, the very localities where these migrants first arrive have not received much attention in the relevant literature. Policies and instruments for integration within border cities are crucial, also where there are barriers such as land use allocated to military installations, confidentiality of information which can be hardly overcome, and secluded cultures often resisting integration, as in border cities.

It is proposed to achieve thes objectives by relying on existing knowledge centres, or ones under formation, as well as on cooperation within a network of cities. Universities and research institutions in each country are seen as catalysts for the interaction with local agents, private firms and a variety

of other actors. It has been extensively argued that in new Europe, the network logic emerges in place of earlier centre-periphery hierarchies, on every level, including the urban and regional one. Concepts of the regional basin have also shifted in the last 50 or even 20 years. The regional environment around and beyond cities on the border can be re-defined in a two-fold manner:

Traditionally conceived regions surrounding cities across borders; definition of the boundaries of regions can be based on flows - migration, economic activity (exchange, consumption, production), sometimes commuting or consumption visits; in this definition of regions, cities belong in settlement hierarchies, as well as settlement networks which often extend across borders, into multi-national regions, not by the choice effected by networking, but by the geographical necessity imposed by location. Hierarchies are also formed between urban quarters. Border cities present characteristic articulations and face the globalisations challenge in a way completely different form other European cities.

The external regional web: multi-national flows, interactions of influence and exchange, often do not physically surround cities: increasingly in Europe toward the 21st century, we pass from a world of hierarchies to one of networks, form a world of tribes to one of flows. On the regional level, this means that the milieu of a city is not constrained by its surroundings on the map, but consists of a web of flows, a network of interdependencies among settlements all over Europe or the world, selectively interconnected and not necessarily in close proximity, but accessible by different networks.

The cities selected belong to multi-national regions of both types, or have belonged in the past (Berlin). They are now facing bottlenecks which may be lifted by shifting their relationship to another

regional basin, or by strengthening certain flows in the same regional basin. Diverse options should be explored, because of differences in size, function, and role of the city chosen their regions of influence and exchange.

London, on the border of the European core, on the edge of the proverbial „blue banana“, is the global city which functions as a catalyst for our networking endeavour rather than a case study. Berlin, our other E. U. core city, contained a border within its centre until recently, which has not necessarily vanished, even after the demolition of the wall on 9 November 1989. In any case, the celebrated de-militarisation in Germany comes to stark contrast with the re-militarisation of the Greek borders with the Balkans and Asia, which affects the future of the island towns of Lesvos, Crete and Corfu, as well as those of mainland Northern Greece. The Greek paradigmatic case studies are several medium-sized towns rather than a large city: Mytilene and Heracleio on two large islands; Xanthi and Ioannina on the mainland, also with Universities; Kastoria without one but advanced in flexible production systems; and in the Ionian sea, the island and its town, Corfu, is affected by Balkan unrest via Albanian illegal migrants. Further northwest, the Italian cities of Trieste and Gorizia face their problems on the border with ex-Yugoslav republics. Though close to the celebrated developing Third Italy (Mingione 1991), the region is not economically rigorous and faces illegal migration from neighbouring societies at war.

Restlessness in this area comes to stark contrast with serenity on the Austro-Swiss border and the city of Innsbruck, comfortably developing in a regional milieu between three nations. Exchanges on the eastern side of Austria, between Vienna and Budapest, on the border hand, have a remarkable historical depth. Now it is Vienna rather than German cities, which has emerged as a dominant

metropolis on the East of the EU (Cattan et al. 1995). Finally , the archipelago dividing Stockholm from Estonia is much quieter than the Greek Aegean, and Stockholm opens up to regions beyond it. These are the cities to be compared, contrasted and explored in this study: dissimilar places, which are brought together by their location on the border, but also torn apart by different size, complexity, language, culture and institutions.

2. HYPOTHESIS AND METHOD

Existing studies of uneven regional and urban development will be the background against which our proposed project will commence. Further, we will develop new theory in the context of current epistemologies (critical realism, postmodernism), and innovate by introducing new methodological approaches for comparative international research and analysis of dissimilar regions sharing a common axis of problems; create key concepts, variables and indicators shifting and enriching the meaning of „uneven regional development“, by introducing a strong geopolitical component in the investigation of its forms, processes and causes.

2.1 Research Hypotheses

Border cities are multi-cultural societies with a high population turnover, created by migration and militarisation, often abandoned by residents and entrepreneurs but flooded by migrants, to different degrees. Their regional basins are in flux, sometimes divided between two nations. Our general research hypothesis is that urban-regional integration processes vary according to the variety of local

histories of productive restructuring , of national histories of border delimitation and policy on fortification and minorities, and of the nature of neighbours, ranging from the restless Balkans to the quiet Swiss border. Of particular interest are also levels of perceived security and border „identity“ in international relations and national cultures, affecting emigration, the brain drain, and the lack of entrepreneurial interest; immigration and tolerance of multi-cultural societies; illegal activities; and attention or neglect by EU policy.

A more specific set of hypotheses about uneven development and regional integration, follows: Neighbours at war disrupt communication with the rest of Europe, causing isolation. Even under peaceful conditions, however, the conception of the border as a barrier means that infrastructure and communications are interrupted or, at least, concentrate in some specific spots which are very well controlled. Human relationships, commercial interchange and investment therefore find literal „walls“ blocking regional-urban integration.

Borders near nations at war face problems of safety and therefore increased militarisation, which interferes with regional basins, distorts the employment structure, creates high labour turnover, and threatens social cohesion. Security in the localities is linked with levels of social cohesion and identity building (Gow 1992, Donnan &Wilson eds 1994). An interaction between social and spatial dynamics on both sides of the border has to be therefore investigated.

Border cities and towns are usually at a disadvantage in urban competition, excluded from the major European development corridors and the various versions of the „blue banana“ (Leontidou

1995, Yiannakou 1995).

Border cities and towns are also behind in productive restructuring in Europe: problems of safety may discourage productive investment and undermine embeddedness, causing development lock-ins (Grabher 1993). Safety conditions repel firms and entrepreneurs, and create market bottlenecks. Policy to attract them has not always succeeded, and setting up cultural, educational or other public institutions has been considered as an alternative to actual industrial investment.

Emigration caused by shrinking employment opportunities brings about an ageing population structure and a brain drain (King ed. 1993). Many cities under investigation have hoped in new initiatives to counter this, evidenced by the establishment of the very Universities forming the nodes of our network, with considerable difficulties in their development. Efforts at regional integration also involve infrastructural and tourist-oriented investment, with varying degrees of success.

Immigration, often illegal, facing various degrees of nationalist and regionalist sentiment, can create ethnic tension or racial segregation, which can receive increased intensity on the border (Lafazanzi 1993). Marginality and the informal economy (Mingione 1991, Leontidou 1993b) are expected to be found at a higher proportion here than elsewhere: illegal activities, and even drug traffiking across some borders, disturb regional integration.

The hyopthesis that inadequate EU policy intensifies regional-urban dissociation on the border is also to be addressed. The most relevant initiative is INTERREG. Otherwise, the reform of Structural Funds has hardly touched upon special problems encountered in the numerous localities on the restless European border.

2.2 Theoretical and methodological innovations

Geo-political dynamics of regional-urban integration and disintegration in different borders are affected by urban diversity (size, function and structure), degree of spatial exclusion (from the European core to the islands), socio-economic dynamics (economic restructuring or stagnation, types of urban deprivation and social exclusion) and modes of interaction between cities and regions and their neighbours. Hostilities on the Balkan border of our study area, contradictory forces of investment flows and embargos, migrations and their control, are ample evidence of influence through negativities, which can easily block integration. On the other extreme, there is serenity on the Swiss border. In-between we find a multitude of case studies, including the polarisation experiences of cities divided by a border until recently, like Berlin. The diversity of experiences requires certain methodological innovations.

Our inter-disciplinary, international network of scholars will bring together several research traditions, methods and techniques. Not only are academics from different disciplines coming together, but also intellectuals who combine and cross-fertilise different disciplines within their own work - e. g. economics and social anthropology; geography and sociology; geopolitics and anthroplogy. The interaction between them is hoped to set in motion a learning process and lead to theoretical and methodological innovation in understanding aspects of regional-urban integration which have been hitherto neglected in mainstream research.

In earlier local development projects we have already criticized neoclassical and instutional economics and introduced regulation theory as an alternative (Moulaert, Delladetsima & Leontidou

eds 1994). However, this is inadequate to highlight the social and cultural aspects of restructuring, global and local (Amin & Thrift eds 1995). It underplays the social in the economics of inter-firm relationships and the role of spatial dynamics. It is proposed to opt for the alternative offered by embeddedness theory to inform the historical comparative case studies (Grabher ed. 1993). Its further development in this research project relates with its use for the study of institutions other than firms alone, in an approach also informed by the cultural/ institutional triplet of market / association / reciprocity (Mingione 1991; Leontidou 1995), the latter intercepting the familiar couplet between private and public. These two advances on the theoretical level will form the conceptual apparatus to put economic restructuring of regions in perspective, without the pitfalls of productivism, which is particularly inappropriate for border regions.

Within the critical realist epistomology (Sayer 1992) adopted, the question asked is not only „how often", but especially „how" events occur. Intensive and extensive research will alternate in the research procedure. Value-laden binary distinctions (like integration / disintegration, development / underdevelopment, etc) will also have to be deconstructed in the diverse environments under investigation, as in postmodernism (Doel 1992; Leontidou 1993a; Papadakis et al. 1989; Moulaert & Leontidou 1995). The deconstruction/ „unpacking" process will be used for a critical exploration of existing concepts, but also understanding of social histories, diversity and dynamics; and then the reconstruction process will be used for a systematic comparison, understanding, explanation, and ultimately, solutions. The relationships between postmodernism and critical realism have never been explored in the past, let alone used in research procedures; only their contrasts have (Pratt 1995). Postmodernism is especially useful in the study of places on the margin (Shields 1991; Leontidou

1993a). Theoretical and methodological innovation in this project rests, not only in exploring the fruitfulness of the combination of critical realism and postmodernism, but also in putting deconstruction to work, which has yet to be done, despite the considerable bibliography on postmodernism (summarised in Cook 1990; Leontidou 1993).

3. SOCIO-POLITICAL DIMENSIONS AND IMPLICATIONS

The broader social, political, economic and cultural significance of the study proposed can not be overemphasized. Overwhelming focus on the core of Europe in the study of regional restructuring has created a policy environment which prioritizes economic restructuring. Despite all turmoil in Europe of the 1990s, it is still not realised that uneven development is not only the outcome of strategies of firms and the relevant „glocalisation" processes (Amin & Thrift eds 1995). This was so in the 1980s, before the Berlin wall was demolished, and then again not always; but it is not so any more. External borders are bound to attract increased attention, not only because of wars, but also because of European integration dynamics which constantly change them.

Networks between „our" cities, between these and neighbours, as well as with the European core are only part of the solution for intra-urban and regional-urban integration, defined narrowly or broadly. Other instruments include equal-opportunity spatial networks in place of segregation, improvement of traditional transport and communication channels, exchange of databases and

strategic plans, bilateral and multi-lateral partnerships, twin towns across borders, trans-frontier cooperation, strenghthening existing or creating new networks and encouraging synergy across the European border. The exploratory study will involve knowledge centres and institutions, but also enterprises of various types, hard and soft investment to networking, in order to facilitate economic and population flows, or information flows with an Observatory and permanent research networks as possible goals. In fact, the ambition of this project is to affect policy and to achieve a political goal: launching a long-term network of institutions, which will not dissolve after this research project, but will live on for a long period, will be extended with new entrants, and will end up in cross-border cooperation. Moreover, by developing a common methodological basis among four Universities to compare the more or less „successful“ border cities, we will be providing the basis for evaluation of national and EU policies and interventions (Leontidou 1995). The objective is to evaluate European policy, Structural Funds and the INTERREG initiative more particularly, and indicate uncovered areas and ways forward; to compare countries' welfare and fortification policies (nationwide), as well as acitve, place-oriented integration policies; and to present a special report with policy recommendations based on alternative scenaria of change of border status as European integration proceeds.

Creativity and productivity are not necessarily related. Our project is designed to enhance the former rather than the latter: creativity, defined as the combination of existing knowledge and information in new ways (Tornqvist in Shakar & Oberg 1990; Bailly et al. 199*), as well as knowledge creation in areas which have been defectively covered. The development of creative potential and a general diffusion of knowledge is sought, which will assist planning initiatives, rather

than market solutions per se.

Research policy on local development has much stressed local initiative and the building up of human, transport and information networks within and between cities and regions, as appropriate instruments for integration. Having participated in this debate, we are now proposing to put it into action. In a way, one of the instruments of integration will have been set in motion already as soon as the project is launched: a network among Universities and institutions of several border cities will have been formed, among them and with a core city, as a solid basis for a common learning process, exchange of experiences and positive influence among cities with similar roles, but different sizes, functions and structures.

At the end of this project we will have developed a European network, which we hope will live on, to promote social integration on the border, and will expand on every step of European integration. At a larger stage, cities outside the EU but near its border can be incorporated into the network, which have tackled the problems of integration with their border regions in various ways, in times of peace but also when war severed communication channels. We are basically investigating integration vs disintegration, order vs chaos, cooperation / competition vs hostilities on the border. Besides being instructive, the negativities of disintegration / chaos / bifurcation / hostilities will be hopefully diluted within a network of cities isolated through negativities which may be hooked again to their external web by strenghthening already existing networks or creating new ones, like the one proposed here. The political importance of such a starting point is obvious.

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A toolbox for regional integration

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Abstract

The content and the working principles of a toolbox will be described which is deemed useful for the integration of the cities into their regional environment and fabric. The toolbox includes two sets of tools: a set of enabling technology threads or building blocks which can give important contributions to new solutions for the regeneration of cities and a collection of thinking tools for the identification of the challenges to the integration of cities into their regional environment (diagnostic tools) and for the validation of new solutions and ideas (evaluation & assessment tools). The wide-ranging nature of the toolbox elements calls for a multi-disciplinary approach to cover all major technical expertise needed, to ensure highly professional skills and significant experience in teamwork.

Introduction

While it is wise to revisit the city of the past in order to learn things forgotten about urban organisation, it is also true that we seem to apply instruments that were effective a while ago but might not be any more because cities have achieved a higher order of complexity. Our tools have become blunt. We need new and sharper tools in order to increase our chances of success in facing challenges which are considerably different (and considerably worst) than yesterday's.
The content and the working principles of a toolbox will be described which is deemed useful for the integration of the cities into their regional environment and fabric. The toolbox includes two sets of tools:

- a set of **enabling technology threads** or **building blocks** which can give important contributions to new solutions for the regeneration of cities, provided that their use is accompanied by the thinking tools,
- a collection of inspection tools or thinking tools for the identification of the challenges to the integration of cities into their regional environment (diagnostic tools) and for the validation of new solutions and ideas (evaluation & assessment tools).

The building blocks include:

- demand responsive and agile transport solutions,

- transport pricing and regulation policies,
- advanced transport telematics technology,
- information and communication technology,
- interactive city,
- fairs and exhibitions as inbound/outbound information ports, and
- behavioural and institutional models.

The thinking tools (meant as new ways of looking at the old things) are as important as the building blocks (meant as new ideas which generate solutions to challenges and problems). While the latter are needed to provide solutions to cities' problems, the former are invaluable in the diagnose phase (identify the challenge that lies behind a problem) and in the evaluation and assessment phase (anticipate possible drawbacks of candidate solutions).
The thinking tools include:

- concurrent approach to problem solving as a result of the intimate understanding of the interconnectedness of problems,
- life cycle planning, life cycle cost analysis for solutions and estimation of their life expectancy,

- cost/benefit analysis based on human factors (i.e. price tagging the lack of quality in life), and
- mixed proactive/reactive approach.

The wide-ranging nature of the toolbox elements calls for a **multi-disciplinary approach** to cover all major technical expertise needed, to ensure highly professional skills and significant experience in teamwork.

Enabling technology threads

Demand responsive and agile transport solutions

Demand responsive and agile solutions are customer oriented transport modes. The service is planned in such a way as to respond, not only efficiently but also effectively, to the real transport demand. This is a good solution for intra-city links with low-demand areas, where a regularly scheduled service would not be economically justified and no service at all would isolate these areas from the rest of the city. Customer orientation can also relate to progressive discount policies based on recorded usage of public transport also known as loyalty schemes, i.e. mechanism by which 'affectionate clients' pay less. Light metros might provide a good answer as an urban/interurban interface, where most of the traffic congestion and transport management problems occur. In addition, the diversification of modes is an important factor as well as the smoothness in the transition between

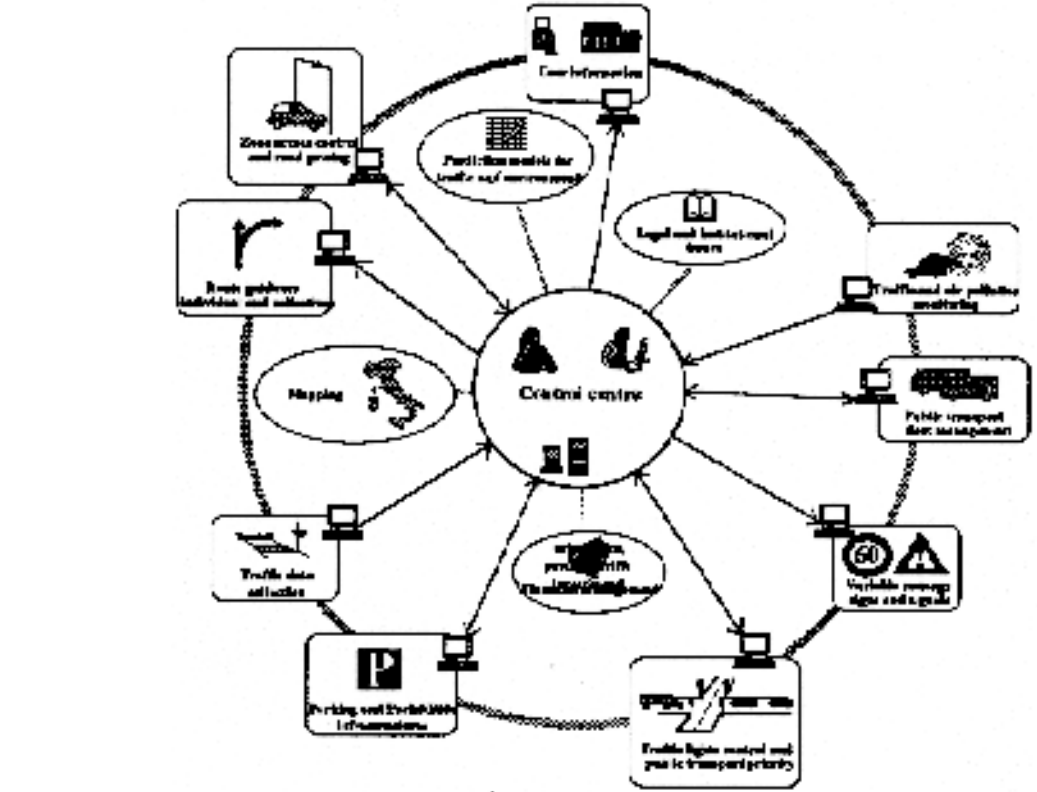
modes (intermodality).

Transport pricing and regulation policies

However, even demand responsive and agile transport solutions would not work if they are not accompanied by good policy measures. A fairer relation between the real cost of the transportation network and its real usage is badly needed in order to provide a better balance between financing public and private transportation modes. Pricing schemes and regulation schemes could be adopted, such as road pricing, zone access control, public transport (integrated) fare structures, and also employed as demand management tools. Their management rules can be put in relation with other city sub-systems (such as traffic management, pollution monitoring, and others). That is, road pricing should not be used as a revenue generation tool. On the contrary, the importance of a clear communication with the citizens about how the money raised is going cannot be overestimated. Needless to say that any coercitive measure should be accompanied by a wide and detailed awareness campaign to inform city users of the reasons behind the choices (persuasion).

Advanced transport telematics

Figure 1. Mobility management integrated system



Information and communication technologies (ICT, see also next paragraph) play a very important role when applied to transport and traffic management systems and give rise to what is known as the advanced transport telematics (ATT) technology. Its ability to provide and customise information on travel and traffic (T&T), to manage T&T, to handle electronic money (smart and integrated payment systems), to support fleet operations (whether they are public or private, for passengers or freight), and to provide links to external systems for real time decision making or decision support and for off line assessment of policies, is unique and invaluable.

Information and communication technology

Information and communication technology (ICT) plays a starring role. It is the best candidate technology (if not the only one available) to provide an alternative to travelling. As somebody says, let us have information rather than people travel. While this is probably quite a radical view, information transfer is the gateway to a wiser selection of physical movement on an individual basis. At the very least ICT will give us a choice where there was no choice before.

Goods will have to keep travelling physically since no ICT-based alternative is available (although some supporting and facilitating actions are). Fortunately, goods do not have human needs and (unless they are perishable items) they would not mind waiting at a dock or an intermodal facility even for long periods of time.

Further considerations about the world of teleactions and its best known instances teleshopping and telecommuting are given in the **An interdisciplinary approach** paragraph.

Thanks to some of its spinoffs (like knowledge-based systems, artificial intelligence, self learning

expert systems, neural networks, and the likes) ICT should also play a role in helping people filter out the valuable information (which can only be judged on a personal basis) from the waste.

Interactive city

This term should be preferred over the more widely used 'cabled city' since the astounding growth of the wireless technology and its performance has brought the accent on the ability to establish interactive and logical interconnection rather than on the laying of physical cables. A more widespread use and acceptance of wireless communication will increase people's freedom of movement, provided that this freedom is not already constrained by transport problems. At the very least, the so-called office-on-the-run concept (and its 'residential' equivalent home-on-the-run) will favour a better and more personal organisation of the workplace. The interconnected city also means that we can exchange more easily more information with people, processes, and machines at any time in any place.

Fairs and exhibitions as inbound/outbound information ports

It has been pointed out that the most common response to the globalisation challenges is an 'outbound approach to adapt the city to external changes'. And that we need 'an inbound approach which points to the existing city capabilities to react to the challenge taking advantage of its *diversity* and looking for internal leverage effects'. The move towards tertiarisation and to high technology industrial products originates from a degeneration of the previous (and 'different') economic fabric. The dissemination of information can do very well in supporting this *diversity* by letting the outer world know everything about what local people uses and customs and local businesses key features

do.

Fairs and exhibitions, i.e. the institutions which traditionally perform this task, should upgrade to the next step in the evolution ladder, becoming ports of information and favour information exchange **in both directions**:

- let everybody know what we do, and
- let us know what the people out there want.

This approach would provide even low-tech (and no-tech) organisations a bridge to reach out close and far correspondents in their business activity.

Behavioural and institutional models

At the same time, we need some estimation of the individual, social, and institutional behaviour in response to the application of a proposed solution (a proposed scenario). The importance of **user response analysis** cannot be overestimated.
Especially in the transition phase from pilot projects to full scale implementations, the ability to understand and to some extent predict the users' reactions will avoid the pitfalls of trivial misjudgement and mistakes.

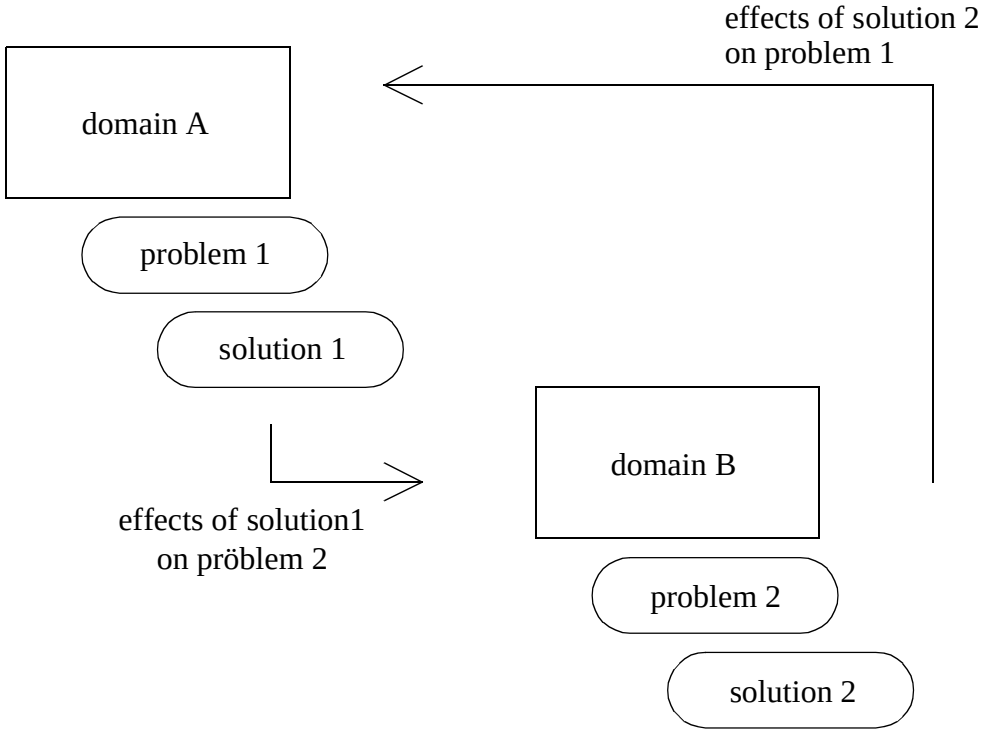
Thinking tools

The enabling technology threads are only effective if they are applied in a critical way and not according to a 'technology will save us' or 'technology can do anything' approach.

A concurrent approach

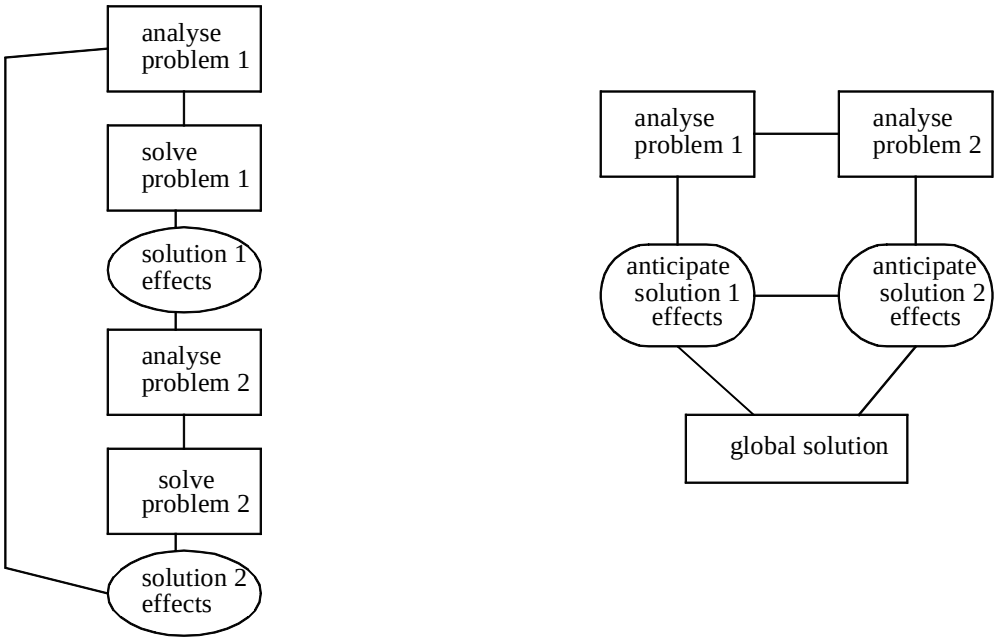
In order to grant the problem-solving approach higher chances of success the ever growing **interconnectedness** of problems should be recognised. In other words, whatever our field and perspective are, we have to understand that we live in a world of increasing complexity, where the number of the stakeholders, and the breadth and depth of their mutual relationships is growing.
Back in the old days processes were slower and changes occurred less frequently and more smoothly. The effects of the problems took time to propagate from the context that had originated them to other sectors of human activity. It did make sense to identify stable problem-context associations. A sequential approach to problem-solving, where reality could be broken down into separate domains and each domain analysed in isolation before moving on to the next one, did work.

Figure 2. Interconnectedness of problems in different domain:



Nowadays, we are living in a time of extraordinary and profound changes, which occur at a much faster pace than ever before. It does not take long before the effects of a problem spread to other domains. ***sequential approach*** ***concurrent approach***

Figure 3. Linear and concurrent approaches to problem-solving:



There is a clear need to provide **global answers** which investigate the problems from each and every angle and try to work out all the consequences of the application of a possible solution, and not just the consequences which belong to a given domain. If reality behaves like an interconnected web of relations and cause effect links, a sequential approach will simply not work.

Instead, a **concurrent** approach is needed which investigates simultaneously cause effect links belonging to different domains. Figure 3 shows a representation of these two problem solving approaches.

The mechanic application of old predictive models should also be avoided since it leads to using them even when they do not provide an acceptable representation of the reality any more. After applying a model over and over, people start thinking that the reality follows the model, rather than the other way around. Instead, global models are needed which include all factors and could be used in long-term **strategic planning**.

Life cycle planning, life cycle cost analysis for solutions and estimation of their life expectancy

Even for a large infrastructure system the initial investment for the procurement, installation, and commissioning only accounts for a fraction of the total cost of the system itself over its entire life cycle. Systems which have a cheaper entry cost might turn out more expensive at the end of the day because of higher maintenance and upgrading costs, for example.

In order to protect investments, life cycle planning and life cycle cost analysis are mandatory. Their application ensures a proper estimation of all the costs involved in the purchase and the operations of

a system. This enables the selection of the most convenient solution over its entire life cycle.

Long term effects of short term solutions should always be figured out. Solutions which prove to be good in the short run might bring about undesirable effects if they are left free to influence the system for too long. In other words, solutions, like living beings, have a **life expectancy** after which they stop working effectively.

Cost/benefit analysis based on human factors

There is a strong stress on the replanning of the city based on human factors. However, a **human-centred approach** will only be favoured if human factors are given a weight in cost/benefit analyses. For example, the level of the environment pollution in the area is considered by most people who live/work there as an important factor in the assessment of their 'quality of life'. For example, in the economic models which are normally applied there is no mechanism which converts air pollution levels into monetary costs. In this situation, a cost/benefit analysis will not necessarily award the '*greenest*' alternative until some mechanism of that type is incorporated in the model. The same holds true for most human-centred factors: since they do not have any monetary value are never considered as influencing factors in decision making processes. In current economic models, social costs like those of accidents, litigation, and health care are added as positive contributions to the GNP, rather than being subtracted. Ralph Nader's (founder and leader of the American consumers association) words 'every time there is an automobile accident, the GNP goes up' should cast doubt on the real meaning of some economic indicators. It might probably help if profit was to be redefined 'to mean only the creation of *real wealth*, rather than private or public gain won at the expense of social or

environmental exploitation'.

Mixed proactive/reactive approach

Most (if not all the) solutions which are usually proposed represent a **reaction** to a problem and try to solve the problem on a short term basis. A review of this approach which takes account of the interconnectedness factor would not give it high hopes of success in the long term. There is also a need to go in the opposite direction and anticipate problems before they show all their strength and complexity: **proaction**.

An inter-disciplinary approach

A work in progress

The proposed methodology consists in the identification of a collection of tools and their possible interrelationships. This identification activity is not a one stop process but requires continuous feedback from the experience realm.

The result, i.e. the proposed solution to a challenge or problem, come from the application of all the tools, not from the selection of the most appropriate one(s). There is not a hierarchical order within the collection. No tools are more important than others. They are all equally important.

A concurrent approach

A composite workteam is best suited to approach these problems. Its members should be sought to provide a wider perspective in cross referencing challenges and problems which will be analysed **concurrently** rather than sequentially.

An inter-disciplinary approach

The integration of cities within their regional fabric requires that **urban and regional planning** is restored as a truly strategic function which sets the guidelines for more detailed and operational action plans.

The integration of cities within their regional fabric requires the **development of good communication networks**, where the term communication refers both to **material and immaterial flows**. The former relates to the management of the mobility of people and goods, while the latter recalls the management of the mobility, accessibility, and distribution of information. In view of a concurrent approach, however, the strong interconnectedness of material and immaterial flows will emerge and will lead to the development of integrated instruments which can approach both of them simultaneously. The realm of **teleactions** is where the material and immaterial flows meet and merge. The best known instances of teleactions (but they will not remain the only ones) are identified in **teleshopping** and **telecommuting** (teleworking), even though the view of the latter is limited to working at home by using a personal computer and logging in to a remote host computer through a communication network. The way it is, this concept of telecommuting does not produce any physical

effects. A whole new world of opportunities is felt out there which is worth exploring, where teleactions do have physical and tangible effects (such as moving or manipulating objects), even though the enabling technologies (which make the opportunities come true) might not be here yet to assist.

The application of enabling technologies as thinking tools

Diagnostic, evaluation, and assessment

The thinking tools will be used as a checklist and will play two separate roles:

- as **diagnostic** instruments for a better understanding of the behaviour of urban and regional systems in the phase of challenges identification and translation into problems, and
- as **evaluation & assessment** instruments, for a preliminary validation of a proposed solution (scenario) based on a (combination of) enabling technology thread(s), before moving to a pilot project stage.

A few thinking tools have been identified and described in previous chapters. Let us recapitulate them: concurrent approach to problem solving as a result of the intimate understanding of the

interconnectedness of problems; life cycle planning, life cycle cost analysis for solutions and estimation of their life expectancy; cost/benefit analysis based on human factors (i.e. price tagging the lack of quality in life); and mixed proactive/reactive approach.

Enabling technology threads

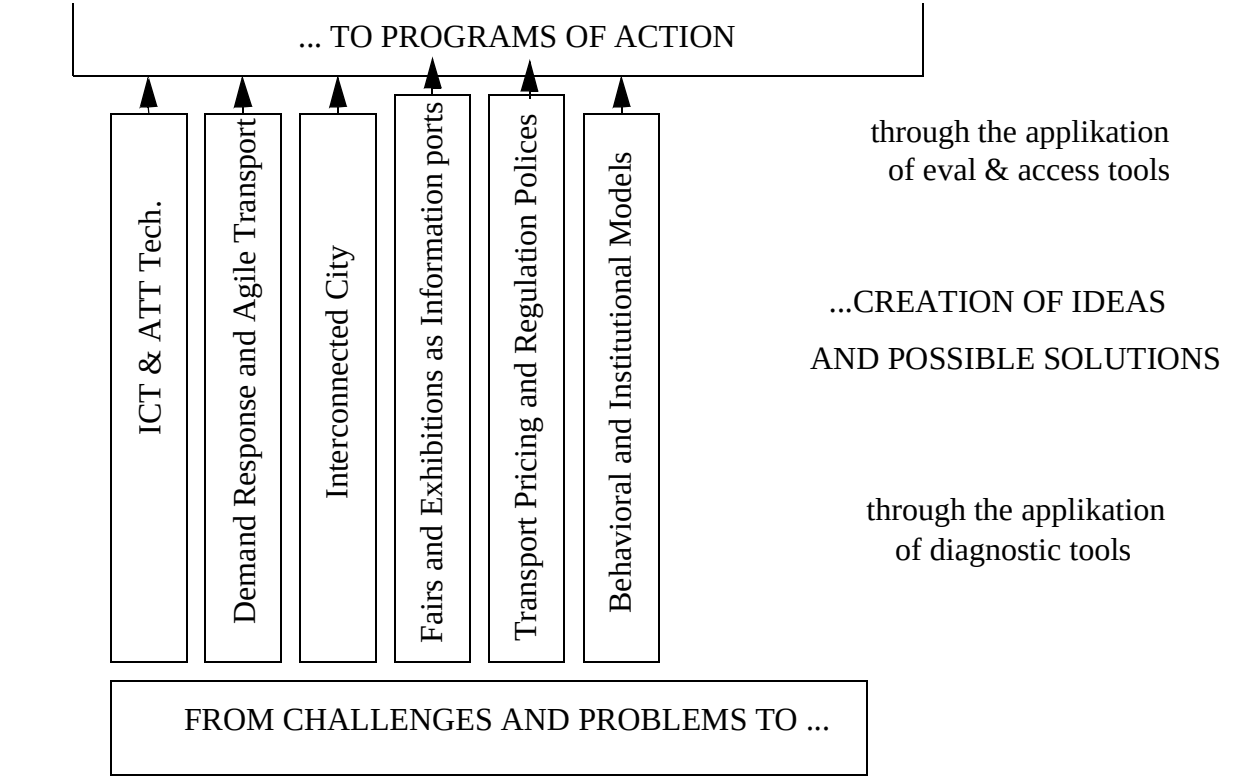
The enabling technology threads provide ideas which generate candidate solutions for a better 'exploitation of the intrinsic value of existing local and human assets'.

They have also been identified and described in the previous section. They are: demand responsive and agile transport solutions, transport pricing and regulation policies, ATT technology, ICT technology, interactive city, fairs and exhibitions as inbound/outbound information ports, and behavioural and institutional models.

Concurrent application of tools and technologies

Thinking tools and enabling technologies should be applied concurrently in the problem solving approach, as it is shown in the methodology scheme of Figure 4.

Figure 4. Concurrent application of technologies threads and inspection tools



Conclusions

Innovative technology threads have recently made available new and reliable building blocks to help solve the many problems related to the insufficient quality of life in (large) urban areas.
However, the growing complexity of the urban life organisation would deprive these new tools of most of their effectiveness unless they are applied according to a critical process.

To this end a set of 'thinking tools' has been proposed to be used as an instrument for the diagnosis, evaluation and assessment phases together with an interdisciplinary teamwork approach.
For these new building blocks to be more effective they should be applied in parallel rather than in sequence (or one by one) and their mutual influence on each other should be estimated and then assessed in field.

LABORATORI FONDAZIONE GUGLIELMO MARCONI
COMPANY PROFILE

Laboratori Fondazione Guglielmo Marconi (short name LABS) is the engineering company of Fondazione Guglielmo Marconi, a non-profit organisation which was founded to celebrate the memory of the famous scientist. LABS has been active in the communications field since the year of its foundation, 1990. The main areas of interest are local communication networks design and setup (from cabling to network level) and short range radio communication systems (radiof-

requency, microwave, and power line communication links). The company has been involved in various European R&D programmes, such as DRIVE I V1002-SMILER, DRIVE II V2024-CASH, V2027-GAUDI, V2053-ADS, V2060-MIRO, ESPRIT MEPI/MDS, ESPRIT TWIN, where it has played both a management and a technical role.

In the strategic planning field, LABS has developed a few studies about the role of information and communication technologies (with a specific stress on communication networks) in the promotion of regions, in helping the local business fabric, and the development of techno-poles.

The company has a record history of involvement in specification of trials and evaluation. On all these tasks the company has developed positive experiences in previous projects, some of which were funded by the EU (e.g. GAUDI, ADS), where real users were involved and their acceptance of the system had to be assessed.

SERGIO BONORA

CURRICULUM VITAE

Education 1987: PhD Electrical Engineering, University of Bologna (dissertation on mobile radio system planning and management). 1981: BSEE (hons) Electrical Engineering, University of Bologna.

Memberships International Institute of Electrical and Electronics Engineers (IEEE). IEEE Communications Society. IEEE Professional Communication Society. IEEE Engineering Management Society. Ordine degli Ingegneri della Provincia di Bologna (registered professional engineer P.Eng. for the national Engineering Association).

Job positions

1990-present: Managing Director (CEO) with Laboratori Fondazione Guglielmo Marconi.

1987-1990: free-lance consultant in communication systems and networks, both from a technical (system designer) and economic (system and network costs) viewpoint.

1984-1986: Post-graduate courses, University of Bologna.

1981-1983: Researcher at Fondazione Guglielmo Marconi, Pontecchio Marconi, Bologna, Italy, with grants and scholarships from Telespazio (the former national satellite carrier), SIP (now TELECOM ITALIA), and Fondazione Ugo Bordoni (the SIP research institution): study of innovative (mostly wireless, such as spread spectrum) techniques and technologies in satellite communications, health care services through telecom networks, and mobile radio communications. Technology transfer from R&D.

Other appointments Dr Bonora is currently a member of the Expert Team of the Urban Transport Telematics Forum, a joint initiative of DGXIII, ERTICO and POLIS for achieving consensus between ATT stakeholders and for the dissemination of information from the DRIVE programme. He is member of the APOS (Automatic global POSitioning satellite systems) and VESCOS (VEhicle Schedule COntrol Systems) Task Forces, where he is responsible for communication technologies and architectures in advanced public transport management systems. He has been a member of the SATIN (System Architecture and Traffic control INtegration) Task Force, where he was responsible for Automatic Debiting Systems. He has also been a member of the Technical and Scientific Committee of the Italian Distance University for distance learning (CUD).

Expertise Fourteen years experience in local and wide area communication network design and technical and economic assessment.

Profile Dr Bonora is a specialist in communication newtork (both wireless and cabled) user need analysis, specifications, and technical and economic assessment, for various applications, from distance learning to corporate networks, from transport telematics to short range control/data logging. Technologies: spread spectrum, wireless LANs, short range communications, personal and mobile communication. Experience in the evaluation and assessment of the strategic impact of new telecommunication services and applications for both residential and business users. His experience covers technical and managerial aspects of consultancy studies, including policy appraisal, forecasting, market appraisals and evaluation methods. His current position involves technical direction, project management, resource allocation and control, techno-economical analysis, and administration.

Publications Authored over forty technical papers in national and international magazines and conferences, including contributions to studies of strategic development of telecommunications.

The information society and the glocal city

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1 INTRODUCTION

The starting point in which our understanding of the evolution towards the *glocal city* must be embedded is global changes to the economy, the policy environment and socio-cultural trends. What happens in this wider context constitutes the main drivers on technology and urban environments, especially as the latter constitute both foci for innovatory trends as well as points of structural difficulties in adapting to them.

Deep structural changes in the European economy are underway, including globalisation, volatility of demand, truncated technological and product life cycles, increased commodification of services, and pressures towards the privatisation of many public goods and services. These often result in

pressures to rationalise and become more competitive, which are squeezing labour input especially into manufacturing but also into services, and which are particularly strong during times of recession. For example, the financial sector has recently been characterised by financial crises and a spate of mergers and take overs. In addition, however, there is the growth of new economic activities, based upon new technology, which is creating jobs and which appears to have a further job creation potential.

Specifically, three overall trends which seem likely to continue, and indeed quicken in pace, are recognised:

1. the power of de-regulated institutions and markets (especially financial), both domestically and internationally
2. the globalisation of trade and investment, and especially the explosion of imports from low wage manufacturing and service countries
3. the steep increase in the pace and application of technological innovation.

There exist substantial differences in the interpretation of the importance and role of technology and networks for urban environments. On the one hand there are assumptions which see technological innovation heralding a qualitative turning point in social, economic and spatial development, and which stress:

- a direct link between `information capital´/`capital flows´and productivity and growth;
- the importance of the 'Fifth Information and Communication Kondratieff' in long-wave analysis as a basis for flexible information-intensive production and service delivery systems
- the immense implications ICT has for all sectors of the economy through product and process innovations and in generating network externalities based upon interdependence between users[1];
- the trend from mass-production to flexible specialisation (the so-called "post-Fordist model" of economic development)[2] and Scott and Storper's[3] ideas concerning vertical disintegration and 'new industrial spaces'.

On the other hand, are the views which encompass the notion that technological innovation is not forcing a new phase of economic and spatial development as such, but is just one additional infrastructural element in the continuing evolution of the space economy. Innovation and networking, according to this view, tend to simply complement and support the role of existing infrastructure rather than replace them.

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1. Millard J, et al, (1995) Employment Trends Related to the Use of Advanced Communications (European Commission, DGXIII-B1)
2. Piore M & Sabel C (1984) The Second Industrial Divide (Basic Books, New York).
3. Scott A & Storpor M (1987) High technology industry and regional development: a theoretical critique and reconstruction *International Social Science Journal* 112, 215-32.

Some of the evidence we do have, mainly from the USA, indicates a differentiated spatial (as well as structural) sorting effect. This, for example, leads to the concentration in metropolitan central business districts of high level information functions, especially concerned with decision-making, finance, R&D, etc., and the decentralisation of more routine, lower level functions and market-orientated services to suburbs, secondary locations and segmented markets.[1] Such trends, if generalisable, would of course have important consequences for European cities and the policy responses required.

Whichever of the above prove to be most relevant in a European context, however, none of them provides us with easy answers concerning the likely networking impacts of technological innovation, as it is clear that their role must always be seen in a variety of spatial, sectoral and policy contexts.

2 GLOBAL AND LOCAL IN THE INFORMATION SOCIETY

The *glocal city* is defined as one which aims to achieve a balance between these globalisation processes and the valorisation of local resources and diversity. This is a worthy but slippery goal. At the end of the 20th Century, one of the emerging main areas of conflict is the struggle between the global and the local, which many commentators see as unequally and destructively weighted in favour of the former. They point to the fact that the powerful international drivers, outlined above, seem to be riding roughshod over local cohesion and needs. Cities are main players in these trends; how can

1. See for example Castells M (1989) The Informational City: Information Technology, Economic Restructuring and the Urban-Regional Process (Basil Blackwell, London)

they reassert control for the benefit of their local economies and citizenry? What opportunities and resources are available to them, and, specifically, what role can ICT (information and communication technology) networks play as one of the most significant and far-reaching technological developments driving these current changes in the movement towards the so-called global information society

Paradoxically, the de-regulation and liberalistion of ICT regimes can also be part of the solution of moving towards the harmonious *glocalisation* of cities. We are witnessing an increasingly segmented and dynamic market in search of specific solutions to specific problems. Power is being shifted to a range of competing suppliers, to specific user groups, to policy makers, particularly at sub-national levels, and to cities themselves. A pro-active approach by city governments, in cooperation with local industry and citizens, is increasingly possible and indeed necessary to achieve beneficial complementarity between global trends and local needs.

Each city environment has a unique political-economic situation and there are a variety of institutional and policy frameworks which are, and can be, applied. With the change of production and regulatory modes from *Fordist* to *Post-Fordist*, the role and significance of intra- and trans-urban network links are changing. The loss of economic momentum and the increasing competition between cities and regions leads to new concepts at the local level:

- ICT has, arguably, eroded cities' traditional comparative advantage, i.e, physical proximity, at the same time as the economic basis of most cities in Europe has shifted from

manufacturing to service-based in which information plays a much greater part. Hence we now see many examples of decentralised economic locational clusters which are not city-like in any traditional sense, such as the fashion and clothing industry of Italy's Po Valley, Silicon Glen in Scotland, and the M4 Corridor west of London. However, despite these trends, location, face-to-face contact and physical proximity can still be important for a wide variety of functions. In head quarter activities of financial services and banking, for example, many of the skills which matter are personal and based on trust and cannot be replaced by the fax machine or videoconferencing. Similarly, many of the high value added functions in both services and manufacturing, such as design, marketing, advertising, film and television, rely heavily on physical concentrations of talent and skill networks for their innovative development. Cities, in the information society, still have a vital, albeit rapidly changing, role to play.

- Cities are becoming aware of the existing knowledge assets within the local economies which are not exploited because of lack of cooperation and networking. City authorities in

these instances can take the initiative, and act as a form of *meta-organiser*, to establish networks between different actors in the city; big companies, SMEs, chambers of commerce, R&D and educational institutions, cultural institutions, labour market institutions, etc. These kinds of activities aim at the exploitation of local knowledge resources which are idle because of lack of awareness as well as direct obstacles to cooperation. With the closure of big firms and depression in various sectors, the need to use existing knowledge resources by recombining and re-engineering becomes more obvious and vital to keep up competitiveness and to prevent the erosion of the knowledge base. Structural problems in the traditional parts of city economies lead to the need to stabilise the economy and work force in order to understand the knowledge resources available and the possibilities for creating new products, services and enterprises, especially through networking.

- This realisation of greater power at city level simultaneously throws into sharp relief the limits of that power in relation to global trends, but it does provide a framework and incentive for action. City authorities are increasingly becoming aware of the role of networks

of different types and their economic, social and spatial implications (inter-firm networks, networks within public bodies, networks between public and private sector actors, etc.) Authorities are trying to react to the situation by establishing and sponsoring networks either with other local authorities within the region or even with cities in other regions.

These types of networks are characterised by competition and cooperation at the same time. Ties between participants have to be strong enough to enable cooperation and exploit the information surplus. On the other hand, they must not be too strong to lock participants in.

At present, networks seem to be a panacea for many local urban problems, and many local authorities are therefore actively considering supporting them. There is therefore a strong need for more systematic examination of the range and type of urban networks, and especially their policy contexts.

3 HOW ICT NETWORKS CAN CHANGE THE COMPARATIVE ADVANTAGE OF CITIES

Although ITC networks should be considered as additions to the existing development tools available to a city, in that they complement rather than replace existing facilities and functions, there are at least five ways in which such networks are distinct from more traditional forms of infrastructure[1]

- ICT networks not only provide increased accessibility but also involve more deep seated changes to the ways in which economic and social life are organised by requiring new and upgraded skills and competencies in the population and by promoting radically new types of activity based upon information.
- ICT networks are potentially ubiquitous in a way in which, for example, physical transport links never can be. The latter have specific and limited routes and nodes, whereas ICTs are able to connect everyone to everyone, everywhere.
- ICT networks can be cheaper to provide than more traditional forms of transport and communications infrastructures, especially when measured in terms of value-added, and costs are likely to continue to fall substantially.
- ICT networks and their use have few if any detrimental environmental effects compared with more traditional forms of transport and communications.

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1. See Millard J (1995) Promoting local and regional development (European Commission, DGXIII-C2: Telematics for Urban and Rural Areas), and Jensen-Butler C & Millard J (1995) A Framework for the Analysis of the Regional Economic Effects of Telematics (paper presented to the Regional Information Society 35th European Congress, Odense, Denmark, 22-25 August 1995).

- ICT networks can make great contributions to democracy and freedom of information because of their ubiquity and relative cheapness, if implemented and regulated with these aims in mind.

The operation of ICT networks can be a powerful tool in the process of balancing global and local trends and needs as these new technologies seem to be qualitatively different from more traditional infrastructures. An increasing awareness of these qualities is contributing strongly to the fundamental re-appraisal taking place of the *comparative advantages* of all areas, including cities. Previously such advantages were based upon the location of raw materials, agricultural hinterlands, industrial complexes, transportation infrastructures, and, above all, physical proxity and the market potential of large population concentrations. Although many of these factors can still be important, even if sometimes this is only because of historical inertia, the emphasis now is decisively shifting to a new set of locational factors:

- *human capital*: qualifications, skills, flexibility, attitudes, etc.
- *levels of local services*: including both public and private services.
- *environment*: attractive man-made and physical surroundings providing high amenity values.
- *quality of life*: a whole range of factors including many of the above, plus social and cultural facilities, a sense of community, well functioning social and cultural networks, and a lack of

congestion, pollution and crime, etc.

- *dynamic and creative economic networks*: based upon innovative communities of firms well supported by the public sector.
- *ICT infrastructures*: supporting the local economic networks and knitting them into wider systems.
- *pro-active city authorities*: in promoting the above factors, depending upon the specific comparative advantages a city has, with an emphasis on creating partnerships with the private sector and other actors both locally and with outside interests, and in attracting inward investment.

Potential power to the cities based upon their ability to network and re-order priorities in relation to the changing significance of their comparative advantages, is the new reality. But there are, of course, dangers here too. There is increasing inter-city competition as the interests which shout the loudest and receive the greatest rewards are those representing the already richest and most developed cities, the most commercialised users and the politically most important constituencies. Balancing competition with cooperation in the interests of cohesion and harmonious development is crucial. As pointed out above, awareness of the potential power for cities to act themselves also makes them aware of the limits of that power and the need to consider not just unilateral but also cooperative

action.

4 GLOBAL TRENDS IN EUROPE

At a general level, there are important changes taking place in Europe which profoundly effect urban environments, especially the prospects for vulnerable cities, and the role which technological innovation and networking can play, including:

- changes in the spatial economy, e.g. as some cities become preferred sites for the growth of new industrial formations;
- changing spatial patterns of structural unemployment and employment in growing sectors (such as software and computer services, semi-conductors, business services, etc.) related to technological changes *and* changes in the structure of markets, such as the Single Market, globalisation, privatisation, etc.;
- changes in the composition of the demographic profile, such as the ageing population, more women working, young people joining the labour force later, etc., plus associated higher demands for efficiency gains in the delivery of public services, like health, education, child

care, etc.

- the role of improved access to services and information in enhancing a city's ability to attract high income and highly qualified labour. At the same time, networking can reduce service provision costs to the local population.

Within this context of change several core issues seem to be important for the role of ICT in the glocal city:

1. **User/demand issues**: The current focus on supply problems, especially in the lagging European cities, needs to be balanced with greater attention placed on demand pull, given that, once new technology is in place, it may not be very important by itself as a locational factor. The driver in the future is thus likely to be the user interface, user preferences and human capital issues.
2. ***Immaterial* factors**: Related to 1 is the whole issue of innovation, human skills, knowledge, organisation, etc., often referred to as 'immaterial' factors. Many argue that the outcome of both competition and cooperation between European cities will in future be based on the search for the optimal local or regional balance between 'material' (i.e. infrastructure, hardware, etc.) and these immaterial resources. It's clear that Europe's core regions

and metropolitan areas have a head start in this search[1].

3. **Policy**: Much points to the fact that technology policy is driven by other policy domains and that networks need to be firmly established on policy agendas at every level from the European Commission down to local authorities. There may be a case for an urban networking development agency, especially one which seeks to establish public-private partnerships, for example in the shared use of facilities. The importance of policy is also reflected in the questions 'who owns?', 'who controls?' and 'who pays?', the balance between equity and efficiency within Europe as a whole, and overall regulatory developments and global competition. How are policies formulated which enable R&D to be translated progressively into pilots, innovations and best practice? How are policies formulated which encourage technology transfer, and the import of technology into cities with no R&D, and then into best practice?
4. **Key technologies**: Earlier research indicates that the key technologies for urban development

1. Quévit M (1992) European regional development dynamics and Community cohesion, FAST Consensus Conference. 2-4 December, on "Science, Technology and Community Cohesion" (CEC DGXII, Brussels)

may be computer networks, networked services and VANs/MANs, as part of global policies with fine local/regional tuning.

All European cities are caught up in these global trends. The challenge is set out in the former Commission President, Jacques Delors', swansong in the form of a White Paper (*Growth, Competitiveness and Employment*, December 1993) which proposed a central role for ICT in promoting new jobs, better public services, a better environment and high living standards and quality of life. This White Paper was followed up in May 1994 by the so-called Bangemann report entitled *Europe and the Global Information Society* which recommended that Europe should rapidly dismantle the old monopoly regulatory barriers within the ICT industries, invest in high capacity Trans-European Networks and support the development of new ICT services and applications. Financing should mainly take place through private sector and market initiatives, so that the role of the public sector is limited to the establishment of a suitable regulatory framework which, amongst other things, needs to ensure data security, intellectual property rights, standardisation, and the promotion of competition. Although Bangemann has been heavily criticised in some quarters for being too dominated by the interests of European big business, he has nevertheless set for agenda for a European deregulatory timetable and a checklist of applications and initiatives which are needed to keep Europe competitive.

The litmus test for the future of the European economy is turning growth into jobs through the greater flexibility of labour markets, a reduction in labour costs and overheads (especially for low value-added activities), investment in human resources, and the stimulation of new employment,

especially by focusing on SMEs and the development of new markets. The glocal city can make a significant contribution to furthering these concerns by proactively adopting ICT networking strategies.

5 LOCAL POTENTIAL

Cities vary markedly with respect to their economic base and organisation, geographical position, culture, national political framework, and social composition. Local economic, political and institutional networks will therefore differ, thereby creating a variety of shapes and forms, depending upon actors, partnerships, private-public balance, sectoral bias, and so on. The city is shaped by the networks it contains. For example, a city may contain one or more of the following network structures:

- ***the company town***: a simple network in which actors in it depend upon the patronage of a major employer. The economic network will have a hub and spoke structure revolving around the main firm.
- ***the industrial district***: a non-hierarchical economic network with many small firms and actors engaging in a complex interplay of economic, political and social interactions, based upon sectoral specialisation.
- ***the administrative city***: which is significant for regional or national public sector activities,

containing ministries, legislatures, and all the associated lobby organisations.

- ***the knowledge-intensive city***: including university towns and cities with a history of cultural and creative significance.

The competitiveness of cities and their potential will vary by location, depending upon how well their networks are developed, whether the networks match the opportunities for growth, and, to some extent, how well integrated the networks are one with another. Strong networks are not in themselves an advantage. Competitiveness depends upon the fit between the local networks, the opportunities for growth and the local policy framework.

6 ISSUES AND OBJECTIVES OF THE PROPOSED STUDY

Detailed and systematic work is needed to examine and understand how the benefits of ICT networks and services can can applied to promote the glocal city. The issues and questions articulated in the preceding discussion can be made more explicit for the purposes of shaping a study designed to do just this:

1. How do policy-led partnerships function in the process of constructing SME networks? What are existing organisations doing or not doing - that is, are we talking about the need for

(historically) new types of "networking" agencies to boost local economic development? Why are these created, what are their roles, and how do they differ between cities/countries?

2. Taxonomies of newly-constructed "networks" can be developed - as institutional innovations by function, sector, services, technology, partners, and so on. What works, what fails and why in each case?
3. Networks are forms of economic organisation or economic institutions. Partnerships are vehicles which drive specific projects - this provides a further taxonomy. We can use the three Ps of *Policies*, *Partnerships* and *Projects*.
4. Information and knowledge are given two meanings: they are external economies of development or externalities: they are public goods which can be mobilised as collective assets. Thus, we invest in education, R&D, telecoms, information services, etc., as public goods and assume that private investors will not invest as much or in the right direction to benefit the economy or society as a whole and for the long term.
5. Are "networks" public goods and do they produce positive (and negative) externalities? Clearly, what matters is the openness, exclusivity and appropriability of network resources.

Networks between firms can be just as "hierarchical" as traditional corporate structures - they can be star (centralised), tree, mesh or other geometries of economic/political power. Also, established "networking" agencies (Chambers of Commerce, trades councils, employer associations, etc.) can resist the formation of new networks. That is to say, networks are competitive and power-layered internally and externally.

6. Cities/regions are "open systems" - most SMEs, but especially outside traditional and consumer services, trade and market beyond their local economies. These transactions shape their propensity for local networking, as well as the culture (values and attitudes) of local economic development. Thus, we need to be concerned with local economic cohesion as well as social cohesion - local "linkages not leakages" and their relationship to import-substitution, export-led and general competitiveness policies.
7. How should we measure the performance of "networking" initiatives? By the number of new jobs and businesses created, by the number and representation of partners, the spatial and social impacts on urban communities? The measurement of performance given the urban policy scenario needs of jobs, environment and equity needs to be highlighted.

8. The proposed study clearly complements EU programmes generally. For example, the White Paper on *Growth, Competitiveness and Employment*, followed up by the Bangemann Report, is the blueprint for 21st century economic development in the EU. It is concerned with decentralisation, both economically and spatially, and the role of local economic development and subsidiarity. There are also "sub-frameworks" - ie "sustainable development", technology, regional/urban development and other issues.

There need to be four overall objectives of a study which can successfully address the above questions:

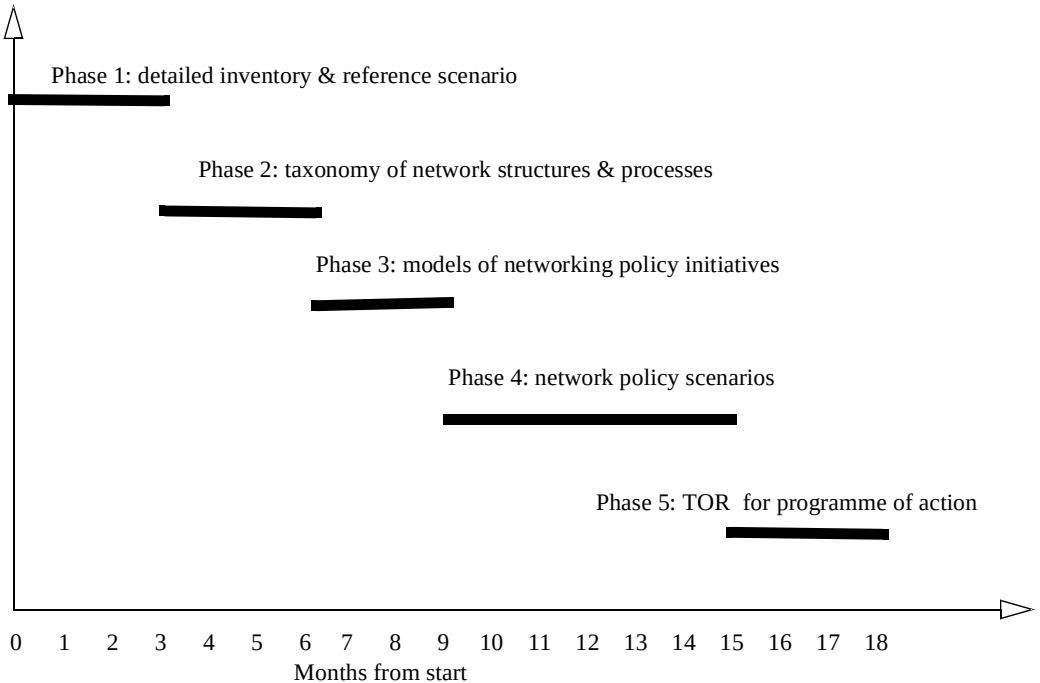
1. to identify and classify network initiatives based upon the features which differentiate them in both a local and a global context. This will be grounded in a detailed examination of the experience of network promotion initiatives across Europe, within the perspective of a balanced *glocal city* scenario and the emerging information society.
2. to develop general and partial models of network initiatives to promote local economic development.
3. to develop a framework and guidelines for economic development policy making with

respect to the creation, management and evaluation of network projects, policies and partnerships in specific localities.

4. to propose specific plans of action for typical city types which will promote the development of intra- and trans-urban networks, supported by ICT, which can assist positively in the economic, social, cultural and political development of the *glocal city*.

7 METHODOLOGY AND WORK PROGRAMME OF THE PROPOSED STUDY

Overall the methodology is based upon five phases, as described in the following:


Phase 1: detailed inventory & reference scenario
Phase 2: taxonomy of network structures & processes
Phase 3: models of networking policy initiatives
Phase 4: network policy scenarios
Phase 5: TOR for programme of action
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Months from start

Phase 1 - preparation of a detailed inventory and reference scenario

Duration: 3 months.

Phase 1 will be based on a review of existing literature, studies and experience, drawing upon wide knowledge of both theoretical and practical issues concerning network development in cities, resulting in a detailed inventory. This will be used to create a taxonomy of networking policy initiatives and thereby a series of scenarios related to different city types.

Some of the detailed questions which could be examined, commencing in Phase 1, include:

- which concepts of public, private and mixed networks exist?
- what types of cooperative activities are subsumed under the heading "networks"? What role do formal concepts of knowledge-orientated urban development play?
- Which networks are already in existence?
- Who are the key actors in these networks?

- What are the networks aiming to do?
- What are the organisational structures?
- Who are the users and who has access?
- What is new with networks? Do they represent a new type of organisation? Do they replace other types of organisation and cooperation?
- What are the strengths and weaknesses of networks?
- Are networks self-sustaining?
- Are there conflicts and competition between different networks?
- Under what circumstances is the establishment of networks feasible?
- What are the pre-conditions for the successful functioning of networks?
- What lessons can be learned from different networks, their successes and failures?
- What are the differences between countries with respect to concepts, organisation, function, number of existing networks, etc.
- What conclusions are to be drawn for European urban and regional policy?

Phase 2 - development of a taxonomy of network structures and processes

Duration: 3 months.

Phase 2 will, on the basis of the work done in Phase 1, develop a taxonomy of network structures and processes which reflects the variety of city challenges found in Europe and efforts to meet these challenges. Account will be taken of sectors, partners and leaders, history, innovation, governance/ management, mission, global/local orientation, funding and resources, etc. Examples of European city types identified in Phase 1 will be examined to provide some empirical grounding for the taxonomies developed, based upon local studies, interviews and roundtables. Some cities for possible inclusion which are undertaking or considering innovative actions include:

- Croydon (UK): a dynamic growth pole adjacent to London which has been attempting to enhance its economic growth and competitiveness using advanced communication networks.
- Other parts of London which fall under Objective 2 status, e.g. West London, Lee Valley and the East Thames Corridors.
- Manchester (UK): a 19th Century industrial "smokestack" city, built upon heavy industry and mercantile trade, undergoing dramatic, often painful, changes in an attempt to address the challenges of the service and information society of the late 20th Century.
- Cardiff and Glasgow (UK), both cities attempting to reconcile the local and global within a

context of traditional activities facing modern challenges, as well as Bristol, Walsall and Southampton.

- Berlin (Germany): the recently re-instated capital of a re-united Germany, for many years cut off from its hinterland, and now attempting to come to terms with its new political and economic potential. Problems remain, however, as its immediate hinterland of the former DDR is struggling to come to terms with dramatic re-structuring challenges.
- Copenhagen (Denmark): a capital city experiencing sluggish growth and a loss of importance within the national hierarchy, at the same time as new infrastructural projects (the Great Belt combined tunnel and bridge and similar proposal linking Copenhagen to Malmo in Sweden), hold out significant future potential growth opportunities.
- Esbjerg (Denmark): city port on the west coast of Jutland challenged by the decline in the fishing industry and its peripheral position.
- Herning (Denmark): city in mid-Jutland, traditionally home to an important textile industry which is now restructuring and going up-market in order to remain competitive in face of cheap imports. This is being done using new technology to foster new types of networks to

support the large number of SMEs.

- Vejle (Denmark): small service city in east Jutland attempting to become a computing and communications magnet for businesses and high tech growth.
- Aveiro (Portugal): coastal city at the forefront of experiments in southern Europe to develop networking possibilities, both internally and on a European basis, and supported by investments in high-speed communications facilities.

Phase 3 - specification of models of networking policy initiatives

Duration: 3 months.

Arising out of Phase 2 taxonomy development and empirical work, flexible general and partial models will be specified. These will concentrate on best practice and policy issues, especially aspects which are potentially transferable. Further empirical work in the same or additional cities will be undertaken if necessary. A database and software will be created for network analysis, built up from the information gathered in Phases 1 and 2.

Phase 4 - selection and further development of a small number of networking

policy scenarios

Duration: 6 months.

The most promising networking policy scenarios, which, from a practical, political and financial point of view, appear to have the greatest potential for resulting in action programmes, will be selected and developed in detail. This will be to the stage where strategies, goals, requirements and assumptions can be specified.

Phase 5 - preparation of terms of reference for a programme of action

Duration: 3 months.

Terms of reference for selected programmes of action will be developed for specific city types, as well as at the local, regional, national and European level. Overall weight will be placed upon specifying opportunities for best practice and policy/model transfer in order to provide clear but flexible guidelines for ways forward.

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Tele Danmark Consult A/S (TDC) is the international consulting arm of the main Danish telecommunications carrier and as such has broad technical and supply-side experience of telecommunications and information technology and is a member of European and other operator organisations. The company also has many years of consulting and project management experience around the world for a large number of clients and donor organisations, including the EU, the World Bank, the EBRD, the aid agencies of Denmark and Sweden, as well as many private clients. Many of these have been large complex projects involving all aspects of telecommunications and information technology and ranging from purely technical to organisational, training and human resource, financial and impact study projects.

The company's has more than ten years experience working with customers (both residential and business), user groups and public authorities, both in Denmark and internationally, in order to promote and assess socio-economic development. EU Programme work of relevance includes participation in COMETT, RACE, DELTA, STAR, ORA, TELEWORK and the Telematics Applications Programme. Such projects have been both impact and assessment sudies as well as application and market-oriented studies and implementation projects in collaboration with international partners as well as with public authorities in Denmark.

Tele Danmark Consult is one of the leading researchers and promoters of telematics supported development in Denmark, as well as having a strong European presence. Domestically, TDC has been

working with a large number of public authorities and companies in order to promote the take up of telematics and assist its successful introduction. For example, TDC was one of the organisers of Denmark's first national conference on teleworking in November 1995, which attracted a large number of Danish as well as foreign participants. TDC is also working closely with a number of Danish local and regional authorities within the context of the Government's "Information Society - Year 2000" Programme, and its designation of ten so-called spearpoint regions, and has published articles and given interviews to the press on a range of topics.

Participation in EU and other projects concerning information society issues

Date	Reference	Description
1986	JTAS/TFJ	Partner in RACE definition-phase, RACE-2023 ATM Network Management(DGXIII)
1986	JTAS/JM/TFJ:	Partner in DGXIII Delta Programme Initial Phase i projektet Learning System Reference Model.
1988-90	JTAS/TFJ:	Partner in the European satellite-based distance teaching programme EUROPACE.
1990	TDC/JM:	Danish Project leader in ETCO projekct, DGXIII, a study of telecoms services' regional cvariations in Europe.
1990	TDC/JM:	Member of Technical Advisory Group, appointed by DGI og DGXIII. The Group undertook feasibility studies for the PHARE Programme on telecoms in rural areas in Poland
1991	TDC/AW:	Member of the Preliminary Planning Group for the ORA Programme

(DGXIII).

1992 TDC/JM/PD/TFJProjekt Leader in TYPORA, developing a typlogy of telematics applications for rural areas, ORA-programmet - DGXIII.

1992-94 TDC/JM: Partner in RUDA- projektet, in the ORA Programme for the development of an information service for the use of telematics in rural areas (DGXIII)

1992-94 TDC/JM/CJB/TFJ:Senior-partner, responsible for methodology in ANA-GO (analysis of on-going rural development projects involving telematics systems) in the ORA Programme, DGXIII

1993 TDC/PD/TFJ:Partner in the INFOSEC project concerning security issues in telecoms networks, DGXIII.

1993-94 TDC/AW:Auditor for the ORA Programme's Technical Audit procedures

1993-94 TDC/JM: Senior partner, responsible for regional integrated development strategies for rural areas using telematics in the ORA Programme, DGXIII (FORA)

1994 TDC/JM: Analysis of the socio-economic effects of public teleophone kiosks in Mozambique for DANIDA

1994 TDC/AW:Auditor for TELEWORK '94 Programme's Technical Audit.

1994-95 TDC/JM: Senior Partner in FORADA Project concerniong dissemination of information and results from the ORA Programme (1992-94) DGXIII.

1995 TDC/JM As part of FORADA Project, author of "Using telematics to promote local and regional development" for dissemination in all European languages for DGXIII.

1995 TDC/JM/TFJ:Responsible for the Danish part of the FORADA Project, DGXIII

1994-95 TDC/JM/CJB:Senior Partner in ENVIRON, a DGXIII project concerning the emvironmental effects of advanced communications in Europe

1994-95 TDC/JM/CJB:Project Leader for AD-EMPLOY, a DGXIII project concerning the emplomentt effects of advanced communications in Europe

1995 TDC/JM: Evaluator of ACTS project proposals, March-April, for DGXIII.

1996-98 TDC/JM: Project Leader ofTWEURO, a DGXIII project providing electronic services for the Telematics Applications Programme

1996-98 TDC/JM/TFJ:Partner in TELEPROMISE, a DGXIII project investigating and implementing telematics applications for use in rural areas in Denmark, Holland and Ireland

1996 TDC/JM/CJB:Partner in MOSAICC, a DGXIII market-oriented study on advanced telecommunications services in the cohesion countries, Ireland, Spain, Portugal and Greece

1996 TDC/JM: Aarhus Cty's representative on *Telecities*

1966 TDC/CJB:As part of FORADA Project, author of "Using telematics to promote the development of cities" for dissemination in all European languages for DGXIII.

1996 TDC/JM: Contracted by DGV to prepare a background analytical report on "the future of employment in the information society" in support of the High Level Expert Group on the Social and Societal Aspects of the Information Society

from 1990TDC/JM/CJB:Regular participant and speaker at EC sponsored conferences, seminarsand workshops

C U R R I C U L U M V I T A E

Name of Person: JEREMY MILLARD

Name of Company: Tele Danmark Consult A/S

Nationality: British

Date of Birth: 17. September 1947

Profession: Social Scientist and Educationalist

Position in Company: Managing Consultant

Years with Company: Since 1986

Specialization in Company:ù socio-economic impact assessment of Telecoms and Information Technology (IT&T)
ùIT&T as tool in socio-economic development
ù user exploitation issues of IT&T
ù education and training

ù project planning, implementation and management.
ù institutional development, organisation and management

Key Qualifications: ù the role of IT&T in socio-economic and regional development
ù person-technology interaction issues
ù teaching, pedagogy, multi-media and vocational training
ù adult, distance and continuing/open education
ù project planning, implementation, monitoring, management and evaluation
ù research design and methodology, including data collection and generation, and quantitative and qualitative techniques for analysis and assessment
ù organisation and management
ù company finance

Education (post school): ù Local Government Diploma, including accounting, building construction, law, central and local government, physical planning, administration, organisation and management (1968)
ù B.Sc. Geography/Geology (London University, 1971)

- ù Course on the European Economic Community (Open University, 1974)
- ù M.Sc. Geography (London University, 1976)
- ù Company finance and Company organisation (Danish commercial courses, 1986)
- ù Tele Danmark Consult's internal education in telecommunications and project management (in cooperation with the Danish telephone companies)

Countries of Work Experience: United Kingdom, Denmark, Ireland, Italy, Portugal. Spain, Poland, Lithuania, Zimbabwe, Mozambique.

Experience in Denmark:

1991 to date Managing Consultant, Tele Danmark Consult

Apart from international assignments (listed below), responsible for a wide range of telecommunications projects around the world for the EU, World Bank, DANIDA, SIDA, and other funding agencies and clients.

1986 - 1991 Information Officer and Development Adviser, Tele Danmark Consult (formerly Danish TeleConsult International)

Responsible for external information management with international clients and partners.

1985 to present Part-time teaching at Aarhus University on the geography of East Asia, encompassing full curriculum development and student assessment.

1983 - 1986 Variety of free-lance assignments, including consultant in distance education and group dynamics, university assistant lecturer, translator and language teacher.

Experience in the UK:

1979 - 1983 Elected local government councillor, with special responsibility for planning and development issues and the

environment (part-time).

1972 - 1983 Staff Tutor (Lecturer) in Human Geography and the Social Sciences with the Open University:

- ù teaching and supervision of courses in economics, development economics, political science, psychology, geography, technology and development, sociology, history and interdisciplinary studies.
- ù research in regional/economic development, urban and rural studies, the Third World, pedagogy and geography.
- ù overall organisational, management and budgetary responsibility for Social Sciences teaching in large English region.
- ù the design and implementation of surveys and evaluation projects for educational/training demand, pedagogic needs and resource availability and utilisation, in both vocational and non-vocational sectors.

1971 - 1972 Research Assistant and Accounts Assistant with Standard Telecommunications Laboratories.

1966 - 1968 Local Government Officer Trainee.

Experience outside Denmark and the UK:

1995 Appointed as Evaluator of ACTS Project proposals, late March/early April 1995, by the European Commission (DGXIII).

1994-95 Study Director for AD-EMPLOY, a European Commission (DG XIII) project examining European employment trends relating to the use of advanced

communications.

1994-95 Senior Partner in ENVIRON, a European Commission (DG XIII) project examining the environmental implications of advanced communications in Europe.

1994-95 Senior Partner in the FORADA Project charged with disseminating the results of the European Commission's (DG XIII) ORA Programme from 1992 to 1994.

1994 Responsible for socio-economic survey of Attended Public Telephone System for Telecomunicacoes de Mocambique.

1994 Team Member in institutional development project for Public Call Office organisation survey in Zimbabwe.

1992 - 1994 Senior Partner, responsible for methodology, in ANA-GO (analysis of on-going rural development projects involving telematics systems), part of the European Commission's ORA Programme (DG XIII).

1992 - 1994 Senior Partner responsible for developing a training programme and associated teaching materials aimed at preparing and supporting Tele Danmark staff working on

international consultancy projects, partially financed by the Danish Ministry of Education.

1993 - 1994 Senior Partner, responsible for developing integrated rural and regional development strategies involving telematics systems in FORA (Forum for Opportunities in Rural Areas), part of the European Commission's ORA Programme (DG XIII).

1992 - 1993 Partner on the RUDA project, concerned with developing an information service for telematics development in rural areas, part of the European Commission's ORA Programme (DG XIII).

1992 Study Director for a project developing a typology of rural areas using telematic systems, part of the European Commission's ORA Programme (DG XIII).

1991 - 1992 Team Member of a task force investigation in Lithuania as part of coordinated programme initiated by Tele Danmark and Danish industry for contributing to the development of infrastructure, services and sector structure.

1990 Team Member of Technical Advisory Group, appointed by

the European Commission (DG I and DG XIII), for the PHARE Programme action for rural telecommunications in Poland, undertaking feasibility studies.

1990 Danish Project Manager for ETCO project for the European Commission's (DG XIII) study of regional variation in the level of telecommunications services in the European Community.

1989 - 1991 Team Member of Danish Agency of Physical Planning's team cooperating with the corresponding Portuguese authorities, involving study trips and investigations in both countries, particularly with reference to using IT&T as a tool in local and regional development.

1988 Consultant investigating the of needs of small and medium-sized enterprises for telecoms infrastructure and services in "less-favoured" areas of the European Community (Ireland, Italy, Portugal and Spain).

1986 Consultant to Danish team working on the European Commission's (DG V) Learning Systems Reference Model, for the DELTA Programme.

Professional lectures and publications:

"A framework for the analysis of the regional economic effects of telematics" (together with Chris Jensen-Butler), paper presented to the 35th European Congress of the Regional Science association, Odense, Denmark, 22-25 August 1995.

"Promoting local and regional development using telematics" a 24-brochure commissioned by the European Commission (DG XIII) for translation into all EU languages as part of the on-going ORA Dissemination Programme, aimed at disseminating results to a wide audience. 1995 (forthcoming).

"Participating in telematics research projects for the

European Commission" a 24-brochure commissioned by the European Commission (DG XIII) for translation into all EU languages as part of the on-going ORA Dissemination Programme, aimed at disseminating results to a wide audience (with Philippa Spackman) 1995 (forthcoming)

"Environmental benefits and impacts of advanced communications" published by DG XIII, EC, under the Telework '94/'95 Programme, 1995 (with Marc Bonazountas, Chris Jensen-Butler, J. Granger, D. Kallidromitou, P. Livas, A. Panethimitakis, S. Pantelis, D. Psaltopoulos).

"Employment trends related to the use of advanced communications" paper presented to Preparing Europeans for the Information Society Conference, 23-25 March 1995 in Paris, organised by DGs V and XIII and UNESCO.

"From vicious to virtuous circles", published in The European Journal of Teleworking, Volume 3, Number 1, Spring 1995.

"AD-EMPLOY: employment trends related to the use of advanaced communications: Synopsis Report", published by DG XIII, EC, under the Telework '94/'95 Programme, 1995 (with Chris Jensen-Butler, Ken Ducatel, Ian Miles, Georg Aichholzer, Johann Cas).

"ANA-GO: good practice in the use of telematics for rural development", published by DG XIII, EC, under the ORA Programme, 1995 (with Chris Jensen-Butler, Ian Goldman, Belinda Staplehurst, Georg Aichholzer, Johann Cas).

"ANA-GO: the use of telematics systems in rural development", published by DG XIII, EC, under the ORA Programme, 1995 (with Fernando Garcia Belengeur).

"ANA-GO: best practice report on distance education using telematics", published by DG XIII, EC, under the ORA Programme, 1995.

"FORA: developing an integrated strategy for telematics in rural areas", published by DG XIII, EC, under the

ORA Programme, 1995 (with Mike O'Shea).

"Work in the age of information" keynote paper presented to Turning Growth into Jobs Conference, 18-19 May 1994, Athens, Greece, sponsored by the European Commission.

"Good practice in using telematics for rural development", keynote paper presented to Trans European Rural Network Conference, Island of M›n, Denmark, 26 March 1994.

"Concepts of rural telematics typology", keynote paper presented to the European Workshop on Telematics Typology and Rural Development, Thurles, Ireland, 4-7 October 1992.

"A study on the typology of rural areas for telematics applications", published by DG XIII, EC, under the ORA Programme, 1992. (With Peter Dreyer, Thomas Frovin Jensen, John Blunden, Rees Pryce).

"Telecommunications service centres for SMEs in peripheral areas: the background and Scandinavian experience", paper given to the EC's STAR Seminar on

Applications in Advanced Telecommunications Services for SMEs, Lisbon, Portugal, 23-24 May 1990.

"Telematics and rural access to information in Europe: the problems of business and some responses", paper given to Bridging the distance: an international conference on regional development in the information age, St. John's, Newfoundland, Canada, 6-8 May 1990.

"The role of information technology and telecommunications in regional planning and development", paper given to a Seminar on Physical Planning as part of a cooperation agreement between the Danish and Portuguese planning authorities (Lisbon, Portugal, 6-7 November 1989).

About 15 publications in distance education and in geography from 1976 to 1986.

Language - Capability: (Excellent, Good, Fair, Poor)

Speaking Reading Writing

English	Mother tongue		
German	Poor	Good	Fair
French	Poor	Good	Poor

Professional societies: Institute of British Geographers.

METROPOLISES IN TRANSITION, METROPOLISES IN COMPETITION: GLOBALIZATION OF CENTRAL EUROPEAN CITIES AND THEIR INTEGRATION INTO EUROPEAN URBAN NETWORK

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1. Introduction

This paper presents the background knowledge and key concepts for the research of contemporary changes in four Central European metropolises, Budapest, Prague, Vienna and Warsaw. The research is focused on two major issues. First, it attempts to uncover the mechanisms and reveal processes and patterns of change in the internal organization of metropolitan areas of the four cities. Second, it approaches the issue of integration of the Central European metropolises to European urban network. Both areas on which the research is focused are determined by two distinct processes. The first is globalization as the dominant general trend changing the organization of society on the world level. The second is a specific process of transition in Central East Europe directly involves three of the four cities (Budapest, Prague and Warsaw) and has a strong influence on Vienna as well. Globalization and transition present a context in which the internal restructuring and the integration of the four Central European cities to wider urban network is studied. The design of research agenda is grounded in the understanding of key developments as presented below.

Many localities in the world have been penetrated by the process of globalization. Some place are predominantly recipients of global forces. In other localities, globalization is actively generated. Most of the actors which are the key proponents of globalization are concentrated in large world metropolises. New York, London and Tokyo become to be known as the Global Cities (Sassen, 1991). The actors, which are constitutive of globalization, gradually diffuse their activities to the lower levels of world urban hierarchy. Los Angeles (Soja, 1991), Paris or Frankfurt (Keil, Ronneberg, 1994) already concentrate a substantial portion of functions which actively produce globalization. The

diffusion of such activities continues to lower rank cities, such as cities of Randstad (Thrift, 1994), Vienna (Lichtenberger, 1993) or Munich, and already exhibit its presence in capital cities of Central East Europe (Sce which creates the new 'global' hierarchy of large settlement centres. Major cities are being on the world scale linked to a large urban network through the operation of actors participating in the globalization process.

The performance of cities and regions is increasingly affected as well as constituted by processes and forces external to their geographical areas and even to boundaries of their states. The agents of globalization become the dominant actors which influence the contemporary restructuring of local places and large cities in particular. The local urban restructuring is determined by a large number of mechanisms, which function on local, regional, national as well as global scales. However, the mechanisms which link urban areas with processes that operate on the global level are rapidly gaining on importance.

Large capital cities in Central East Europe[1] have a very specific position in relation to globalization. Due to a long period of isolation from the world economy, they have not been directly affected by globalization processes prior to the 1990s. Transformations of political and economic systems in Central East European countries created preconditions for a rapid link of their territories to global space.

1. Central East Europe (CEE) is defined throughout this paper as the Czech Republic, Hungary, Poland, Slovakia and Slovenia. Large capital cities in CEE include Budapest, Prague and Warsaw.

The societies of Central East Europe are currently undergoing a double transformation. First, there are specific processes of transformation from totalitarian to democratic political system and from centrally planed to market economy. Second, these government directed transformations create preconditions for more general processes of economic and social restructuring, which are similar to transition in the internal organization of developed societies. This spontaneous transformation is characterized by the integration of the economic organization of local society to that on the international and global scales and by replication of economic and social processes and patterns known from developed countries on the territory of CEE states.

How transformation processes influence the contemporary urban restructuring, namely the changes in the physical, functional and social aspects of land use pattern, in Central and East European metropolises? How are Budapest, Prague and Warsaw being related to the global? What is the impact of external forces and what role is played by local actors (local governments, local firms, etc.)? Are there local development programs reacting on changing conditions and attempting to adopt the local development to new circumstances? Do these programs use a concept of competition and are there any attempts for cooperation among those cities? These are just a few selected questions from the research agenda of CEE metropolises.

Certain conceptual issues need to be discussed to design a comprehensible research framework for the study of the impact of globalization on Central East European metropolises and their integration to a wider urban network. The concept of globalization will be outline with a special focus on the historical roots of globalization, its emergence, major actors participating in the process and the role of state and international regulations in promoting globalization. The relation between global and

local will be examined in detail with particular attention devoted to urban areas. Preconditions for globalization of Central and East Europe created through implementation of political and economic reforms will be examined and the first signs of the impact of globalization on Central and East European metropolises will be described. The possible mechanism of integration of Central East European metropolises to the network of European cities will be examined. The notions of competition and cooperation will be discussed in particular. Finally, the research agenda will be designed and presented.

2. Globalization

Globalization is a spontaneous process of integration of human activities on larger geographical scale than during the preceding phase of development. The process of globalization is natural, unavoidable and to a certain extend predictable. However its form, speed and consequences can vary significantly and can be modified by the intervention of society through a variety of international, state and local regulations. Globalization is a process of change from a national to a global scale of integration of production, exchange and consumption. "The word globalization symbolizes the destination of the move, while the real integration is being achieved rather at an international level or within a few sub-global systems" (Sykora, 1994, p. 1152).

The backbone of globalization is a process in which management and organization of production and its supporting services (financial, legal, consultant) are being integrated throughout the world. While most of the economic functions have been until recently organized and integrated within state

boundaries, since the 1970s processes of rapid internationalization of ownership and management led to the increasing interdependentness and integration on the global scale. The major actors of this development were transnational corporations (TNCs). The power and resources is increasingly accumulated by a limited number of companies, which are able to operate on the world\global scale.

The basic ground for globalization was created after the Second World War, when national economies became increasingly integrated within an international system of production, distribution and exchange. The process was to a certain degree speed up by developments which occurred by the end of 1960s and in the early 1970s. The more radical pace of globalization was a reaction to several factors and developments. There was a general slow-down in the growth of national economies of developed countries throughout the 1960s. There also occurred important problems within the system of international trade leading to the break up of the Bretton Woods agreement. The subsequent oil crisis and substantial economic recession of the early 1970s created an environment which required certain strategies to secure profit-making and accumulation of capital by large corporations. The dissolution of international trade regulations through the break up of Bretton Woods agreement and the transition from a welfare state system to a more liberal and deregulated mode of state politics enabled and promoted them to pursue such strategies.

The key aspect of adaptation and rationalization strategies pursued by large corporations was relocation of production to new regions, where labour power was cheap, well-disciplined and abundant. Frobel et al. (1980) refer to a new international division of labour (NIDL). The manufacturing production, once located in core regions of developed countries, was relocated to developing and underdeveloped countries, namely to the newly industrialized countries (NIC). At the

same time, the control functions of production remain located in the original places of large cities in developed countries (Sassen, 1991). The production was reorganized to be integrated on transnational\global scale.

The globalization was enabled by the technological informational revolution (Castells, 1993), that provided the basic infrastructure for the formation of global economy. The technological information revolution has two crucial aspects. First, there is the growing role of knowledge and information for profit-making. The internationalization of economic activities requires high professional expertise of new markets based in the knowledge of international economy and law as well as local circumstances. Second were developments in technology which enabled quick and effective transfers of information and finance. Computers and means of telecommunication are the most important technical inventions in this field. The development of technology facilitated the exchange of information as well as quick transfers of finance needed for management of transnational organized production. Furthermore, it provided means of efficient communication used for professional expertise of new markets and transfers of international investments to new regions explored by transnational corporations.

The faster development of globalization since the 1970s was permitted and encouraged by changes in international and state regulations of commodity and capital flows. With the break up of Bretton Woods system, the international monetary and financial order with a strong control of capital flows was replaced by deregulated regime characterized by virtually no control over capital movements on international scale. This development was endorsed by political preferences of state governments. Helleiner (1995) identifies three ways in which states supported financial globalization. First, by granting freedom to market actors through liberalization. Second, through preventing major

international financial crises. Third, choosing not to implement more effective controls on financial movements. Consequently, "cross-border movements of private capital have grown from almost nothing to a volume where they now dwarf international trade flows" (Helleiner, 1995, p. 315). The internationalization of financial flows become the major vehicle of globalization process.

3. Globalization and localities

The process of globalization incorporates very different actors, including various firms, organizations, households and individuals. There are two basic ways how the actors are involved into globalization. First, the operation of some actors can actively form the globalization process; for instance, when a transnational company expands its production into a new region or it withdraws its activities from certain locality. This act will have important implications for the link of the locality to global economic environment as well as for the economic performance and social characteristics of the area. There is, however, only a limited number of activities which have power to become indigenous sources of globalization. The actors with such activities are, on the one hand, in command of processes that are constitutive to globalization. On the other hand, globalization processes, that are produced by actors which are in command of global space, also compose an external environment in which they operate.

Second, most actors, their functions, by them generated processes and created patterns are influenced by globalization while they have no control over processes contributing to globalization. Globalization form the external environment for behavior of these actors. They attempt to adopt to

changing circumstances and by their own preferences (often consumption preferences) they can influence the form of changes in some aspects of globalization. The distinction between those who are in command and constitutive to globalization and those who do not have such power is important for understanding of the globalization impact on any locality.

The notion of locality can be different for various actors. There are those who operate on the global level. For them, the global is a locality, a basic geographically delimited unit over which their operations are extended and in which they are integrated. For those who does not have enough power, sources and influence to expand their activities behind the scale of their village, neighborhood, city, region or state, the global presents the external force. In this case there is an unequal relation between those capable to operate on global scale and actors limited to their localities. For example, the transnational company has a wide choice for selecting a new subcontractor for its production program or to expand its production to a new region. Local firms are competing to gain such contract and\or local government attempt to attract new establishment, which can help to revitalize the local economy and improve its performance. In competition with other localities, favourable conditions for the entrance of TNCs are offered. Reductions in the local government incomes due to tax holidays or other measures used to attract new production unit redistribute existing sources in favour of strong and powerful companies. Locality can benefit from the presence of new production capacity. However, this can be suddenly withdrawn from the locality, if better conditions emerge in another place.

The globalization, on the one hand, contributes to some kind of homogenization through integration on a global scale. This side of globalization is visible namely on growing uniformity of

consumption patterns, based in the supply of basic goods by mass and standardized production. Goods from the same well-known producers are available in many corners of the contemporary world. On the other hand, globalization does not always have uniform effects on all countries, regions and localities. The globalization is characterized by an uneven integration of different regions and localities to the global system. There is a very specific situation of large cities, in which most of the actors, that are constitutive of globalization, are located. At the same places, many of those, who are mostly absent from processes which contribute to globalization, are concentrated as well. The interplay between globally and locally embedded actors plays the decisive role in the contemporary restructuring of local places.

"The crucial feature of globalization-localization is the growing interpenetration of processes operating at different geographical scales within particular local places" (Sng role in determining local happenings. The contemporary process of local restructuring in large cities is increasingly influenced by interests of those actors who are constitutive to globalization. These actors are gaining control over reshaping local material forms, legal conditions and social relations. Giddens (1990, p.19) states that "locales are thoroughly penetrated and shaped in terms of social influences quite distant from them".

Within the market based society, individual actors are searching for comparative advantages by exploring local differences and utilizing those which can significantly contribute to their competitiveness within the market. In the context of globalization, this process is extended over state boundaries to an international and even global level. The global actors are highly selective in entrance to particular places. Consequently, the dynamic of change driven by actors in command of globalization processes has a very selective impact within large cities. Globalization brings

revitalization and major reshaping of urban form only to a limited number of zones within cities, while much of their territories are largely omitted.

Globalization has a profound impact on internal restructuring of localities involved in the process. Especially, the performance of large cities is increasingly affected and constituted by processes and forces external to their geographical areas, and even to boundaries of their states. The most important processes of change in large cities, which are influenced by globalization, are: (1) increasing internationalization in terms of both capital and labour; (2) changing power relations between public and private sectors, which is characterized by deregulation of planning control and other local regulations, promoting entrepreneurialism and attracting foreign direct investments; (3) the shift in production patterns and labour structures, characterized by the deindustrialization and by the growth of command and control functions; (4) increasing social and economic polarization, characterized by simultaneous concentration of executive-professional-managerial technocracy and urban underclass in the same places; (5) changes in the aesthetics of urban form in the case of newly constructed and reconstructed urban spaces characterized by postmodern approach to design and architecture.

These trends are further strengthened by other processes which have substantial impact on contemporary cities. For example, the social differentiation and polarization is evenmore strengthened by the impact of massive international migration from less developed countries. International migrants are contributing not only to increasing social duality, but also to duality of economic structures of large urban centres (globalized corporate businesses versus shadow informal economy of immigrants).

4. Transformations in Central East Europe: opening gates for globalization processes

Central East European (CEE) countries of the former Communist block have been undergoing substantial transformations attempting to create political, economic and legal systems compatible with developed countries. The internal transformation processes prescribe to a certain degree the future position of these countries in the international division of labour. The crucial question is how the internal transformations from totalitarian to democratic political regimes, and from centrally planed to market economies will relate those countries to the world economic and political system and what implications will internationalization and globalization have for those countries and specific territories within them. The focus of this paper is on capital cities on Budapest, Prague and Warsaw.

The transformations in the Czech Republic, Hungary and Poland are generally seen as the most successful, largely accomplished and promising for the future development. In those countries, the foreign trade barriers were significantly removed and international exchange of commodities was liberalized. Furthermore, the deregulation of the state involvement into decision-making, government directed privatization programs and liberalization of prices created internal competitive market environment (S stabilized and all the three countries now enjoys reasonable inflation and economic growth. The general economic liberalization attracted a substantial amount of foreign direct investments. Involvement of Philip Morris, Procter & Gamble, Volkswagen, Nestlé, Siemens or Robert Bosch are but a few examples from the Czech Republic.

In all the three countries, banking systems underwent a substantial reform and trading on stock exchanges was established. The transformation of state owned enterprises on stock holding companies and their privatization allowed for trading with property rights to industrial and service firms and consequent concentration of capital assets. There are cases of strong entrance of foreign speculative investments on Prague stock exchange. More systematic acquisitions of substantial portions of shares by foreign investors were reported recently. The entrance of transnational companies and foreign institutional investors has not been as radical as expected few years ago. However, the internationalization of ownership and management of production capacities has already shown profound impact on Czech, Hungarian and Polish economies and societies in general.

Furthermore, a substantial number of foreign firms were established to expand the provision of their goods and services to domestic firms and population of CEE states with the aim to expand their business. There is a wide spectrum of such activities, starting from banks and insurance companies, going through travel, retail and catering services and including all the branches of trade businesses.

The internationalization of production does not have direct impact on the changes in physical, functional and social environment of capital cities, as the production capacities are spread across the state territory. However, there are significant indirect links between the internationalization of production and changes in the internal structures of capital cities. Most of the headquarters of industrial and service firms are located in large urban centres. New managers tend to bring decision-making from old industrial regions to capital cities. The hierarchical division of labour or what Massey (1984) calls the spatial divisions of labour is being developed. Furthermore, there has been a quite rapid development of producer (business) services, which function as the supporting

infrastructure (based on knowledge, information and expertise) for internationalization of production. The establishment and growth of producer services was almost exclusively concentrated to capital cities. Their development had probably the highest impact on the restructuring of the metropolitan areas of Central East European cities.

The most required produces services by the foreign investors are financial services, namely banking, consultant services, especially law and accounting firms, and real estate services. Other supporting services, such as translation and employment firms, media and advertisement agencies as well as international schools teaching in foreign languages, also belong to a group of institutions directly linked to the process of internationalization. While the state and domestic capital kept a significant influence on the development of financial sector, the other types of producer services focused on foreign customers are largely provided by firms in foreign ownership.

The rapid development of producer services as well as the expansion of the operational influence of other types of foreign firms to Central and East Europe was mostly concentrated to capital cities. The entrance of new foreign firms to capital cities importantly influenced their internal urban restructuring. The most important factors stimulating changes in physical appearance, functional and social aspects of land use in urban centres were the demand for office space generated by firms' requirements and demand for residential space generated by foreign employees. The newly established real estate markets become the main mediators between the need of foreign firms and foreign employees (actors constitutive of internationalization and globalization) and changes in the physical, functional and social patterns of the urban land use.

Despite certain differences between the development in Budapest, Prague and Warsaw, important similarities can be traced. Central parts of their urban areas are being highly commercialized. While changes in retail sector were the quicker and first visible, the most important role is played by new developments of commercial projects. Newly constructed as well as refurbished office buildings are rapidly changing the physical appearance and functional use of central areas. The commercialization of town centres has also a profound impact on changes in social structures. Residential function is diminishing and local population is stimulated to leave central areas.

Foreign employees on managerial positions are searching for housing in suitable residential areas. With incomes several times higher than is the average for local population, they have relatively wide choice. Their interest is focused on selected neighborhoods. In such places, economic and social revitalization is progressing rapidly. The demand of foreign managers and professional experts for living in former bourgeois neighborhoods of inner city stimulates housing renovation and replacement of local tenants with richer newcomers. Foreigners led gentrification is starting to change physical appearance and social structure of certain central and inner city areas.

Commercialization of the central city and starting gentrification in some limited inner city areas are clear expressions of the impact of actors who are constitutive of internationalization and globalization on local urban restructuring. However, globalization has also had an important effect on mechanisms of transformation and trajectories on which the CEE states are moving towards standards of developed societies. In the west, globalization influenced the move from welfare state politics to new post-welfare policies based on economic liberalism. The political and economic reforms in Poland, Hungary and especially in the Czech Republic were strongly influenced by the liberal politics.

Globalization thus had an important impact on the design of national economic and social regulations established in CEE countries. These regulations helped to link the local economies to the world economic system. However, appropriate regulatory mechanisms to tackle the uneven impact of this integration on particular segments of local societies were not developed. This form of transformation enabled the globalization of Central East Europe but did not prevent those who are not in command of globalization from its potential negative effects. This development has its expression in the internal economic and social restructuring of urban areas. While some parts of capital cities are revitalized through commercialization and gentrification, large zones of housing and industrial areas are characterized by severe dilapidation. The lack of interest of private investors in the redevelopment of these areas needs an active involvement of the state through programs of regional, urban, housing or environmental policies. However, this kind of intervention into the market led development was not seen as desirable and in accord with the new ideological orthodoxy of economic liberalism.

The only tool used for the management of urban development is physical planning. Master Plans were redesigned in Budapest, Prague and Warsaw towards new priorities and changing needs. However, their nature remained in zoning procedures. Physical planning is not accompanied by economic tools which would stimulate desirable developments. Legal procedures which would protect some undesirable consequences of new developments are not functioning well or are not in operation at all. Politicians perceive the market led developments as a natural process which should not be disturbed by government interventions. The establishment of regulatory mechanisms which would be able to mediate and reconcile desires of new internationally based actors with needs of locally based actors will take a long time on the way to a fully developed society. In the meantime,

the forces of international actors will change the face of some parts of urban areas in CEE capital cities in favour of their visions without being required to take seriously the needs of local community into their considerations.

The example can be given from Prague. In 1992-95, nearly three quarters of the newly constructed and high quality refurbished office space was located in the historical core of the city. The effort to abolish pedestrian zone in the central shopping district to allow for car traffic serving major banks and office centres was successfully opposed. However, major office developments include large underground parking places. More cars are drawn to the street network of historical core which was created in middle ages. The environmental and social conflicts between cars, residents and pedestrians is highly visible. The situation will worsen with the accomplishment of new large commercial projects in coming years. In some cases, the abolition of pedestrian zones is planed. Furthermore, a powerful lobby of large banks and a major construction company submitted a project which intends to build an underground tunnel with parking lots under the major pedestrian zone. These developments show where the power is vested and indicate who are the major actors changing the character of urban space in Central East European cities.

In the context of globalization, the local authorities have a double-edged task. On the one hand, they have to create environment, which will attract foreign investments; the strategy of paramount importance in times of growing international competition between European cities and regions. On the other hand, they have to solve an array of problems inherited from forty years of Communism as well as to control and regulate undesirable consequences of market operations. At present time, local government authorities are rather powerless bodies with only a very limited legal and financial means

to steer market led developments. Furthermore, after forty years of Communism, a proper know-how in local decision making is missing and local representatives are 'learning by doing' how to react to radically changing circumstances.

5. Globalization and the integration of Central European cities to European urban network

With the fall of the Iron Curtain and the development of democratic political regimes and market based economies in Central East European states, questions were raised about the future position of large Central European capital cities (Budapest, Prague Vienna and Warsaw) within the European urban hierarchy and about their integration into the European urban network. Furthermore, it is also appreciated that the opening of Central and East Europe can have a significant impact on the future development of European urban system. The mechanisms of integration, its possible trajectories and outcomes are in the focus of our research agenda.

The network of cities is a relational structure which evolves through a long history. Individual parts of the network (cities) are linked together by mutual relationships. The nature of these relationships differ by the intensity of mutual contacts between cities and power relations involved in these contacts. The character of the network of cities is formed by interrelationships structured by different degrees and forms of power and influence exercised by individual cities. The influence of cities is based in the concentration of progressive functions influential in the development of economy and

politics. At present times, the actors which are in the command of globalization are determining the relations within urban networks.

The basic form of relations between cities is hierarchical. The hierarchical organization of settlement structures has been developed namely within territories of individual states. In the age of globalization, a new hierarchical level of global cities was developed. Furthermore, globalization processes are influential in the restructuring of the existing hierarchy of urban centres. Different studies were undertaken to account for the changes in the concentration of most progressive functions (TNCs headquarters, for example) in European cities. The empirical results shows relative shifts within the hierarchy of cities in Europe. These are understood as a consequence of recent developments in the reorganization of production and services towards the hierarchical (spatial) division of labour.

The changing positions within the hierarchy is also seen as a consequence of competition between European cities for the new progressive functions. Those cities which can provide better infrastructure, offer more favourable economic conditions and exhibit some specific features can attract more new investments than the other cities. Individual cities compete against each other to sustain or improve their economic and social well being. Budapest, Prague, Vienna and Warsaw are attempting to attract headquarters of new firms and institutions coming to Central Europe. There is a believe of some researchers and politicians that these four cities compete to increase their regional influence. The issue for the research agenda is whether there are purposefully designed local development policies which attempt to increase the regional influence of each particular city, whether a kind of competition exists and whether the long term outcomes of such competition may bring

changes in the contemporary position of Central European cities.

Globalization brings a higher intensification of economic and social contacts between cities on an international level. The developments within the simple hierarchy of self-standing cities is complemented by the emergence of integrated systems of cities. Unfortunately, most studies are rather based on the morphological aspects of urbanization. They identify concentration of population and other functions to particular zones, for example bananas and other kind of shapes. The functional aspects of settlement integration within such zones (commuting within an integrated labour market, integration of firms to mutually interlinked system of production and services, etc.) were largely omitted by the research.

The openness of Central and Eastern Europe and the political and economic transformation in the former Communist block countries creates a potential for the establishment of new progressive functions in Central European Capitals as well as for their integration to the (west) European urban network. Several expectations were raises about the form of integration and the role of Central European cities in the wider urban network.

Dostál and Hampl (1992) suggest that the urban regions on the axis Copenhagen-Berlin-Leipzig-Dresden-Prague-Vienna-Budapest could be integrated to form a zone of intensified urbanization. This geo-economic zone will then represent a base for the eastward extension of modernization processes from the core regions of western Europe. Enyedi (1994) thinks that Central European capitals should develop gateway functions for eastern and southern Europe. Musil (1993, p. 905) expects the "situation based on intensive interaction and symbiotic competition between all the capital cities" in

Central East Europe.

The political preconditions for the integration have been created through the political and economic reforms. The major force behind the integration are economic processes, now. The rapid increase in contacts and relations is, however, limited by the capacity of infrastructure which will allow higher level of contacts between distant partners (means of telecommunication, transport connections, fast financial transfers) and is needed for the location of foreign actors in Central East European cities (local user friendly infrastructure, provision of quality real estate, etc.). The development of infrastructure is the major task for central and local governments of individual sates as well as a significant challenge for a joint action on the international level, that can speed up the process of integration not only in legal but also in economic and physical terms. It is a question for the research agenda. Will the development of infrastructure and its provision be seen as a vehicle for competition among cities and political decision will be taken separately in individual countries and their capital cities or, will the development of infrastructure be coordinated as a joined work of interurban cooperation with the aim of creating a technical background for the intensification of mutual contacts leading to emergence of such integrated systems of cities as indicated by Dostál and Hampl (1992)?

6. The formulation of research agenda

The first task for the research is to summarize and present the background knowledge and basic concept. The key general concepts utilized for the study of metropolises in transition are globalization,

globalization impact on localities and transformations in CEE countries. The key concepts employed in looking at metropolises in competition are European urban network, urban hierarchy, integration, competition and cooperation.

There are four major tasks for the research of metropolises in transition. First, identify functions that are constitutive of globalization and measure they presence, using time-space perspective, in Central European cities. Second, trace the impact of globalization on economic and social development and changes in the internal structure of Central European cities. Third, identify specificities given by a different form of transformation policies and compare the development in Vienna and the three cities within countries under transformation. Four, attempt to draw implication for decision-making of governments on local, national and international levels aimed at reconciliation of positive (physical revitalization, economic progress) and negative (highly selective and uneven development) effects of globalization.

The four tasks for the research of metropolises in competition are as follows. First, discuss strengths and weaknesses of Central European cities in relation to their attractiveness for location of new international businesses and institutions. Second, measure the competitiveness through the presence of progressive functions in the cities. Third, investigate possibilities for potential cooperation. Four, inquire whether the local development strategies of the Central European cities include programs promoting their competitiveness, integration to wider urban network, and\or cooperation with other Central European cities.

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KNOWLEDGE CAPACITY OF CITIES:TOWARD AN IMPROVED PERFORMANCE

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1. Introduction

Europe is currently facing an unprecedented disappearance of many man-made political borders. The European Union is undertaking further steps towards its integration, whereas Eastern Europe is

going through a process of transformation in which closer linkages are being sought with nations of the European Union. Whether these developments lead to an open society for the benefit of all actors involved remains, however, to be seen.

European cities are increasingly losing the protection provided by national borders. Vanishing borders mean the opening of regional economies to new networks and new social and economic influences, introducing particularly an increased competition between cities (cf. Cheshire and Gordon 1995). Such a competition creating win-lose situations, may imply the increase of regional disparities in employment levels and welfare. At the same time, there is a growing awareness of the environmental challenge and needs for a sustainable urban development.

It is increasingly realized that the actual competitive advantage of city regions is brought about by the local presence of science and technology, particularly in research laboratories and enterprises (Hingel 1993). In Western and Eastern Europe, the economic base of cities is being transformed from commodity-based activities in the production sector to knowledge-based activities in the knowledge sector (or broadly, the service-sector). Science therefore, needs to be regarded and treated by urban planners and politicians as a source of economic power (Knight 1995). Accordingly, it is a major challenge for European cities to formulate policies for enhancing and valorizing their knowledge cultures and transforming knowledge into local economic development.

A well-developed knowledge capacity improves the innovativeness of city regions and hence their economic development. Despite its importance, the urban knowledge capacity as an **integrative** concept - including the generation, availability, access, use and management of diverse knowledge

sources and users - has seldomly been investigated empirically in relation to urban innovation.

Each city has a knowledge base. The urban knowledge base is much more than that contributed by formal processes of education and training of the urban labour force. Knowledge in the urban economy comes from a plethora of internal and external sources: from training and education, accumulated experience, from suppliers, advisors and customers, from professional meetings and casual conversation, from local research and development, from migrant companies and intracompany transfer, from media, libraries, musea, exhibitions, and data bases.

Size and structure of the knowledge capacity may be different between cities of a different size and socio-economic history. Although large cities continue to perform their role as knowledge centres, a new 'generation' of knowledge centres is emerging in recent times. The latter are usually smaller cities with strongly developed creativity functions (intellectual fields and art and crafts) and benefits from good network links such as with European high speed transport. These new knowledge centres are denoted as C-cities, including communication, creativity and competence (Andersson 1991, Nijkamp et al. 1992).

First, the paper will discuss the relevance of local knowledge sources and networks for innovative companies (Section 2). It will then turn to a conceptual exploration of the knowledge capacity by using an integrative approach (Section 3). Particular attention will be given to barriers which prevent a good use of the knowledge capacity (Section 4). Following these explorations, various future lines of research will be given, with a particular focus on the measurement of the urban knowledge capacity (Section 5). In a final section, it will be indicated how a targeted management of the urban knowledge

capacity can contribute to an improved use.

This paper does not offer the results of a thorough investigation of cities and their knowledge capacity. It merely tries to attract attention to this important research field and to develop a number of lines for future research.

2. Relevance of the Urban Knowledge Base

The city itself is a major local user of knowledge in view of many challenges and threats to a sustainable growth. To mention a few areas for knowledge use: efficiency of the city transport system, energy efficiency of housing and living quarters, local ecological principles, effectiveness of various local policies.

In addition, there is a demand for various types of knowledge among local companies. Companies are facing a growing complexity in their economic environment. The pervasive nature of new technologies (such as information and communication technology), the shortening of technology life cycles and the increasing global competition contribute to this phenomenon. Different kinds of knowledge are relevant in coping with this complexity, i.e. technical knowledge related to product and process innovation, commercial knowledge related to markets and finance, and management knowledge involving internal and external relationships and human resources. In an entrepreneurial context, knowledge flows encompass various different vehicles (Dosi 1988; Geenhuizen 1994), namely:

- human capital (ideas, expertise, skills and routines residing in employees and managers)
- written language (data files, manuals, patents, scientific journals)
- oral language (on-site instruction, audio representation)
- hardware (devices, equipment, materials)
- tacit or visual representation (transfer by observing, doing and imaging).

Companies derive new knowledge from a large number of sources. Internal sources are in-house R and D and practical experience in daily operations ('implicit' innovation). In the past decennia, a trend for an increased use of external sources has become evident. There are many different external sources:

- licences and new means of production (machinery, equipment)
- acquisition of companies
- networking in various configurations, including competitors, suppliers, customers, and research institutes (casual cooperation, joint ventures, strategic alliances)
- outsourcing of R and D to consultancies and research institutes
- human resource management (attracting new employees, retraining existing workforce)

- informal contacts and networking.

The role of the city in corporate innovation rests first and foremost in the urban labour market. This can be illustrated with a European-wide study (Traxler et al. 1994), in which the labour market (actual skills and potential skills) is ranked first among various urban attributes (Table 1).

Managing technological change involves more than acquiring new technology. It includes the ability of the company to transform the knowledge into new products and processes. Thus, workers that operate new equipment or perform new laboratory experiments have to be found in the local (regional) labour market. But lower levels of management have also to be filled from this labour market. A shortage of qualified and experienced personnel on various levels seems to be the most important problem here (Geenhuizen and Nijkamp 1995). Therefore, the importance of the labour market for technology management in companies is strongly related to the ability of local (regional) educational institutes to deliver educated persons on the desired level and in the desired numbers. But the role of the local labour market is also dependent upon the quality level of the urban housing market, particularly the ability to offer good housing for highly educated workforce (and to prevent a brain drain) (Knight 1995).

A further important position is held by network attributes of the urban environment, witness the high ranking of the quality of telecommunication (representing immaterial network access) and specific (technology) links with local universities (Table 1).

Table 1 The ten most important urban assets (a) according to firms in various European cities

in relation to innovation (rank order)

	Product Innovation	Process Innovation
Skills in labour market	1	1
Skills training support	2	2
Quality of telecommunication	3	3
Technology links with local universities	4	5
Quality of int. transport links	5	9
Local customers	6	11
Local suppliers	7	8
Local investment subsidies	8	6
Favourable attitude of local politicians	9	7
Local business services supporting technology	10	4
Available land and buildings	11	10

(a) Out of 21 assets. N = 488.
Source: Adapted from Traxler et al. 1994, Table 2.

The remaining part of this section will now shortly focus on the local university as a supportive

actor in innovation. Attention will be given to participation in formal links (commercial transfer) and use of labour market links (human resource management). A further distinction is made between casual and structural links, short-term use and more comprehensive recruitment of staff.

Regarding commercial transfer, one can observe a difference in participation dependent upon the strength of the link (Table 2). Services on casual request are more popular than (semi)permanent relationships based upon contracts or agreements on ownership, witness the average participant shares of around 32% and 12% in each category respectively. Similarly, human resource links including upgrading of skills (expertise) of sitting employees are more popular than recruiting new employees from universities. This can be illustrated with the participation in training for technical qualifications and short courses (shares of 51 and 46% respectively) and the recruitment of technical and management staff (shares of 27 and 14% respectively).

Table 2 Firm participation in university links in various European cities (a) (percentage share)

	Share (%)
COMMERCIAL TRANSFER	
Casual	
- Consultancy and advice	32.9
- Testing and analysis	31.6
Structural	
- Sub-contracting	13.9

- Joint ventures	9.3
HUMAN RESOURCE MANAGEMENT	
(Re)training	
- Short courses	46.0
- Technical qualification	51.0
- Management qualification	36.1
- Workshops	26.4
- Seminars	30.9
Staff recruitment	
- Technically qualified staff	27.0
- Management trainees	13.9

(a) N = 240.
Source:Adapted from Damman 1994, Table 5.1.

The previous figures underline the importance of the urban environment in terms of labour market potentials. It also stresses an overall preference of companies for casual and short term links.

3. Knowledge Capacity as an Integrative Concept

Knowledge capacity can be defined as the capacity of urban actors to create knowledge, attract knowledge from elsewhere, store, transfer and use knowledge, and link various actors in the field with each other. Knowledge includes technology, but also managerial and policy knowledge, arts and (traditional) crafts.

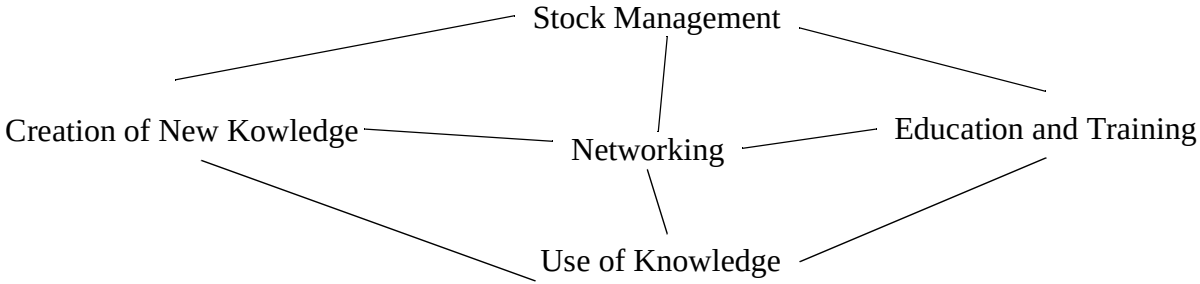
The urban knowledge capacity includes five essential activities (Figure 1):

- **Management of stocks of knowledge**. This includes providing access to knowledge in archives, libraries, etc., and modernizing skills of the resident population and labour force.
- **Creation of new knowledge**. This activity occurs well-structured and planned in universities, research institutes, and companies. However, new knowledge is also the result of unexpected events and processes in widely different situations, such as a casual meeting in a pub and a failure in a research experiment.
- **Use of knowledge**. Major users of knowledge are companies and governments.
- **Education and training**. This includes formal education such as by universities, higher educational institutes, schools of art, and company schools. It also includes training and

elaboration of regional (local) crafts using informal channels.

- **Networking**. Networking is not only important in the transfer of knowledge from creator to user but also in the creation of synergy between different actors and disciplines. Networking is needed to improve the integration of the knowledge capacity in the local society and to connect local actors with regional and global actors.

Figure 1Knowledge capacity and activities



One can distinguish the following major clusters of actors in the urban knowledge capacity: universities and higher educational institutes (including art schools); research facilities and consultancy firms; manufactoring and services firms; transfer institutions, brokers in network contacts and other intermediaries; the local government. The performance of these actors is rather

complex and difficult to understand, due to the following characteristics of the urban knowledge capacity:

- multiple actor and multiple role situation
- -multi-faceted
- multi-layer policy (management) framework.

The different actors involved in the urban knowledge capacity have usually diverse aims in relation to knowledge, such as improving the competitive edge (firms) and creation of high-tech jobs (local governments). In addition, particular actors perform different roles at the same time. Universities are often involved in all activities (sometimes also including commercial use of knowledge). Local governments are involved in the management of stock (e.g. libraries) and in supplying channels (meeting places) for networking. Local governments are also important users of locally derived knowledge. To further illustrate the complexity: companies are both active as in-house creators of knowledge and users of knowledge from outside.

The urban knowledge capacity is multi-faceted, leading to the need for a multidisciplinary approach. It involves, for example, aspects of science dynamics and serendipity, micro-economic behaviour of firms, sociology of clubs and informal networks, and economics of public finance. A further cause of complexity follows from the policy (or management) framework of the urban knowledge capacity which is essentially multi-layered. The local municipality is important as it sets particular local conditions to the knowledge capacity, such as the availability of premises for

companies and housing for particular income groups. At the same time, public and private actors at higher spatial scale levels influence the urban knowledge capacity to a considerable degree. For example, multinationals can decide to open or close down a local laboratory, while national governments can decide to increase or cut down research budgets at universities, and to fix the maximum number of new students or keep this free.

Networking seems to be the most important activity to fully use the urban knowledge capacity. In networking, particularly industrial relations, one can observe a basic difference between horizontal coordination on the one hand and vertical integration (centralization) on the other hand (Saxenian 1994). The former enables much easier a flexible response to fast moving changes, while the latter causes much more rigidity between actors. Such differences in network culture are essentially rooted in the socio-economic history of cities and regions.

The next section will now particularly focus on an important threat to the urban knowledge capacity, namely barriers to networking.

4. Barriers in Knowledge Networking

Networking is an essential activity in view of the use and valorization of urban knowledge. It involves actors located in the city itself and actors (networks) at higher spatial scale levels.

Barriers in knowledge networking have widely different origins (Charles and Howells 1992; Geenhuizen 1994; Nijkamp et al. 1990; Suarez-Villa et al. 1992). By considering the urban context,

a distinction can be made between the knowledge self, senders and receivers in communication, institutional factors, and urban space (Table 3).

Particular barriers are inherent in the nature of networks. A common example is the general inertia of networks in view of expansion with new participants (cf. Håkansson 1988). Many other barriers follow from the communication component in networking, such as low skill levels among senders and receivers, and different organisational cultures (such as between universities and enterprises). In addition, the nature of the knowledge self (complexity, price) may well contribute to friction in communication.

A very important barrier is based upon diverse aims of actors and indifference of actors toward each other (Charles and Howells 1992). Conditions in the urban space constitute a further source of barriers. For example, congestion may arise when demand and supply of space (channels) do not match. Other spatial barriers may rest on physical distance and separation. A further important category of barriers is the one based upon institutional factors. One particular objective of this type of barriers is the protection of knowledge for economic reasons. For example, patent protection prevents others than the patent holder to produce the involved product for a certain number of years.

Table 3Potential barriers in the urban knowledge capacity (examples)

Knowledge	High cost
	High complexity

	Low (perceived) benefits
	Inadequate vehicle used
	Disciplinary boundaries
Sender/Receiver	Small skill to identify demand/supply
	Low image building skills
	Low marketing skills (sender)
	Language differences
	Organizational culture differences
	Differences in aims
Institutional	Market regulation
	Intellectual property protection
	Segmentation in policy
Urban Space	Missing network links (nodes)
	Small network capacity
	Physical distance (separation)

Many barriers in communication have a socio-cultural background and affect both senders and receivers. Language is far the most important barrier here, preventing an adequate (de)coding of messages. Language barriers include spoken, written and computer language, as well as the vocabulary used in communication. The latter barrier type follows, for example, from different stages

in the development of technology (basic and applied) and from differences between disciplines (Williams and Gibson 1990; Knight 1995). A further category of barriers is concerned with social group (class) differences, such as based upon educational and income divergencies. In these cases, access to knowledge may be prevented by means of exclusive membership such as of schools and clubs. In the literature on communication, it is emphasized that socio-cultural barriers increase in importance while other barriers (spatial and political) tend to disappear.

5. Contours of Future Research

A wise policy for knowledge capacities is a sine qua non for European cities. A thorough understanding of the urban knowledge capacity deserves, therefore, strong attention.

Research on the urban knowledge capacity using an integrative approach is not entirely new. A conceptual framework and methodology have recently been established in a mainly qualitative study (Knight 1995). However, in addition to a qualitative approach, future research needs also to adopt a quantitative approach in order to sharpen the understanding of problems, to provide a quantitative basis for policy design and monitoring, and to support cross-national comparative analysis. Given the shortage of empirical insights into the urban knowledge capacity and the relevance of the urban labour market, the following lines for future research can be sketched:

1. To develop a set of indicators to identify the knowledge capacity of cities with regard to its internal structure and its position in larger knowledge networks.

2. To identify differences in the structure of the knowledge capacity in smaller towns and large cities, in a cross-national comparative way.
3. To identify labour market dynamics which are crucial in the knowledge capacity (matching of demand and supply, in- and out-migration of knowledge workers and knowledge companies).
4. To link innovative behaviour of companies with specific characteristics of the knowledge capacity of the host cities.
5. To link innovative policies of local governments with specific characteristics of the knowledge capacity of their cities.
6. To develop a methodology to identify barriers to the integration of knowledge actors in their cities, particularly barriers to knowledge transfer and synergy.
7. To develop action oriented network policies to bridge these barriers. Such policies will tune in on structural differences in knowledge capacities and will mainly be addressed to city governments.

The focus of the research will be on conditions that facilitate a better use of local knowledge resources, based on a 'network logic' among local actors. These conditions may be different between large cities and small or medium-sized (university) towns, and between various European countries.

Given the above lines of research, four sets of empirical data are needed, i.e. (a) general data on the local stock of knowledge, knowledge creating actors and actors in education and training (size and nature), (b) specific data on networking and barriers, based on quantitative measurement (such as contact frequencies, network participation) and qualitative interviews with local experts, such as from the university, large knowledge companies, Chambers of Commerce, (c) specific labour market statistics and statistics on migration of households and firms, and (d) micro data on local (corporate) innovation and use of knowledge sources. Annex 1 gives various examples of data on the stock of knowledge, on knowledge creation and networking.

6. Contours of Local Knowledge Policy

Local policy in European cities is facing an extremely important and challenging task in the next coming years. With the increasing role of knowledge-based activities in the economy, there is an urgent need to formulate policies for enhancing and valorizing the local knowledge capacity.

In view of the multi-actor and multi-faceted nature of knowledge capacity, there is a need for a multidisciplinary policy approach. There is also a need for a broad commitment across local society. This calls for the participation of all actors involved, as early as possible. In general terms, the

following policy aims need to be reached:

- to define and understand the urban knowledge capacity
- in a self-diagnosis, to identify and understand barriers in knowledge networking
- to give priority to improve the knowledge capacity
- to satisfy various conditions, such as to upgrade the image of knowledge in society, to promote local achievements toward the outside world.

Dependent upon the precise problem diagnosis, various targeted policy measures may be developed. To mention a few examples:

- to stop processes of downgrading (net migration loss of educated people and artists, and knowledge firms) by a targeted housing policy and favourable policies for local business
- to match corporate needs for training with the supply of courses (within a regional framework) by a targeted educational policy
- to advance creativity in the community (intellectual, crafts, art), by recognizing and developing talents (providing stipendia, awards, prizes, degrees, etc.) and by promoting "permanent education"

- to advance networking, particularly where local institutional and disciplinary barriers prevent spontaneous processes (support of meetings).

Many of the above policy measures are not new for most municipalities. What is new, however, is knowledge as a guiding principle in a large number of policy fields. For this reason, it would be wise to benefit from cross-national learning which may be realized by the establishment of standardized data across Europe.

Annex 1

With regard to the stock of knowledge in the **residential population** the following indicators may be useful:

- education and 'quality of education' (according to the international science test of population)
- function in employment
- -receptivity to learning (participation in courses, workshops, etc).

With regard to creation of knowledge in **research institutes,** a distinction can be made between input and output indicators, such as:

Input

- budget for R and D
- number of workers in R and D

Output

- number of finished research projects
- number of publications (journals, textbooks, dissertations, etc.)
- number of inventions (patents awarded).

With regard to **telecommunication** the following indicators for (potential) networking may be useful:

- cable density
- number of connections (subscribers)
- range of multimedia services
- investment in public telecommunication infrastructure
- private investment in hardware.

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With respect to **transfer institutes** or intermediaries (public/private) we can again make a distinction between input and output:

- budgets
- turnover, employment
- number of transfer projects, number of networks, frequency of contact

With regard to generation and use of knowledge by **local firms**:

- type of firm regarding level of technology (high, medium, low), type of firm regarding knowledge intensity (e.g. high knowledge is a publisher)
- employment structure (high, medium, low technology)
- R and D budget (internal R and D, outsourcing)
- numbers of patents awarded, numbers of licences bought and sold
- investment in other immaterial assets
- investment in material assets (equipment)

Regarding **(in)formal 'interfaces'** between sources and between sources and users:

- number of clubs, quality circles, platforms, etc.
- number of local fairs, exhibitions, workshops, conferences, musea and libraries.

Regarding **physical planning**

- initiatives such as Science Parks, Transferia (aimed at exchange and transfer)

5.Toward Improved Performace

zie ook Urban Studies : action research

The main analytical framework to be used in the last stage of the approach will be based on the so-called **Pentagon Prism**, which has demonstrated its validity in various European infrastructure policy analysis (cf. Giaoutzi and Nijkamp, 1994). The approach includes a systematic investigation into five necessary conditions (critical success factors) which are to be satisfied in order to make policy successful. These conditions involve both characteristics of the current knowledge capacity of the cities in question and characteristics of local policies.

The necessary conditions can be summarized as follows:

. **hardware**:stocks of knowledge, knowledge creating and education and training institutes

. **software**:channels to make available knowledge accessible, and instruments to raise the receptivity of the local population (work force) and business world
. **orgware**:coordination (consistency) of policy initiatives regarding various sources, intermediaries and receivers of knowledge
. **ecoware**:favourable conditions in terms of high quality residential areas, cultural amenities, etc.
. **finware**:creative ways of financing new transfer channels (intermediaries) and synergy places.

The above two dimensions now form the basis for a tentative two-way classification of knowledge capacities of cities (Figure 2). Box 1 and 3 represent cities with unfavourable conditions on one of the two dimensions, while Box 2 represents the worse case with both a low usefulness of urban knowledge and a rigid networking. Box 4 represents the best case with a maximum output. Whether and how moves toward Box 4 can be advanced is still open to debate. The type of education produced cannot be changed overnight. Local institutions and culture are also difficult to change, in view of the ability to flexible networking. However, there are some useful strategies to generate a move, for example, starting with self-understanding of the situation by the participating actors. Such strategies will be discussed in the final section.

Figure 2A two-way classification of urban knowledge capacity

Small potentials
for knowledge use

1

Flexible Networking

2

Rigid Networking

4

Large potentials for knowledge use

3

Company Profile
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The Department of Regional Economics operates under the Economic and Social Institute (ESI) of the Free University Amsterdam, which is a non-profit research institute in the fields of economics and business administration. ESI provides a link between academic research and applied studies. It is partly funded by the Department of Economics and Econometrics of the Free University on the basis of grants for five-year research programmes. These programmes benefit the externally funded research projects: they ensure that ESI is experienced in innovative research and that a project is firmly rooted in up-to-date economic and business administration theory. The scientific research programme also benefits from the practical experience gained in applied studies as it provides opportunities to test theories.

The areas of expertise of the Department of Regional Economics are:

Regional policy: this theme concerns the strategy and methodology of regional policy analysis. Concerning the strategy, research is inter alia carried out on the effectivity of regional policy, regional planning evaluation and the relation between infrastructure and regional development; concerning the methodology, use is made of multiple goal methods, multicriteria analyses, 'soft econometrics' and latent-variables methods.

Analyses of regional-economic structures: under this theme in particular in-depth analysis of the regional structure of regions and cities is applied. The focus is on the investigation of the main deter-

minants of the regional structure and its dynamics. Use is made of spatial impact analysis.

Methods and techniques of spatial-economic research and policy: this theme mainly concerns the design of new operational methods and techniques for spatial economics. The focus is on the following fields: spatial interaction models, dynamic models, individual choice models, logit- and probit analysis, effect analysis, soft datamethods, cluster-analysis and multiple goal methods.

Environment and resources: this theme concerns changes in nature and environment ('the new scarcity'). Attention is paid to socio-economic and technological forces behind these changes as well as the spatial and environmental consequences.

Urban economics: this theme concerns the functioning of the city in its spatial -economic aspects. Fields of interest are inter alia building of houses, urban traffic and urban development patterns.

Logistic organisation: technological and economic developments generate changes in the logistic organisation within and between companies. These changes are important for spatial restructuring and the transport sector.

Transport economics and transport policy: this theme concerns topics related to the development of various transport systems. These are inter alia the demand, production methods, use of production factors, cost structure and targets, as well as the role of public authorities.

Transport and spatial development: the relation between transport and the (spread of) activities of human beings (working, living) is widely acknowledged. This relationship is investigated at the ur-

ban, regional, national and international level.

Infrastructure/ networks: bottlenecks in infrastructure may slow down economic development. In addition to traditional infrastructure, research is carried out on the feasibility of modern forms of infrastructure such as telecommunication and high speed rail systems.

Telecommunication: information and knowledge form an important production factor. Extensive research is carried out on the role of these factors in economic development.

Geographic information systems (GIS): the department has its own GIS laboratory. GIS have become very important in spatial research. With these techniques it is possible to systematically visualise spatial patterns and processes.

In the past years, various projects have been carried out for the European Commission. Examples are: the strong involvement in COST 328 (Integrated Strategic Infrastructure Networks in Europe), the HCM project on European Transport and Communication, the strong involvement in two transport telematics projects (BATT,MARTA), and various environmental, energy and urban projects on sustainable development (DG XII).

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Publications 1990-1995

Articles and chapters in books mainly in English, in the field of regional economic policy, regional innovation and industrial organisation, and transport studies.

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UTOPIES URBAINES, DES OUTILS POUR LA RENAISSANCE DE LA VILLE EN EUROPE

DES RESEAUX DE COOPERATION TRADITIONNELS AUX RESEAUX ET SERVICES TELEMATIQUES POUR LE DEVELOPPEMENT DE LA VILLE GLOCALE

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INTRODUCTION

Les villes européennes se trouvent aujourd'hui confrontées à d'importants défis qu'elles doivent

relever:

- des défis internes : développement de la précarisation des populations et de l'exclusion sociale et leurs effets, maintien de la coexistence de groupes sociaux parfois en situation antagonique, violences urbaines, éclatement, voire "dilution" des territoires, atomisation des fonctions urbaines, concurrence, modification profonde des rapports à l'économie, asphyxie et congestion des centres-villes ...;

- des défis externes : concurrences de plus en plus fortes entre villes sur le plan économique et de l'image, effets de la mondialisation de l'économie et des échanges sur lesquelles elles ont peu de prise, développement de la production immatérielle (services télématiques) qui peu à peu pénètre la vie urbaine, économique, sociale, culturelle.

Ces défis posent inexorablement la question de ce que sera la ville européenne de demain et de ce qui fera sa "valeur ajoutée" par rapport aux autres territoires. Sera-t-elle ville ouverte sur le monde ou ville repliée sur elle-même ? Sera-t-elle encore centre économique comme elle l'a toujours été depuis sa naissance ou simple lieu de tourisme et de culture ("ville-musée") ? Sera-t-elle ville "vivable" ou ville asphyxiée et progressivement désertée ?

Même si de telles questions ne sont pas nouvelles, ces défis interrogent sur les moyens et outils que les villes pourraient mettre en oeuvre dans une perspective d'innnovation urbaine pour rendre la ville agréable, ouverte sur le monde et glocale. A cet égard, les réseaux et leurs usages, en particulier les réseaux et services télématiques (télécommunications et informatiques) peuvent apparaître comme des outils possibles d'une renaissance urbaine fondée sur une meilleure intégration de la ville dans son environnement (relation local/local) et sur une meilleure articulation local/global.

L'objectif général du projet est d'examiner comment les réseaux, en particulier les réseaux et services télématiques, fondés sur une logique de coopération, peuvent ainsi contribuer à valoriser les territoires urbains et à permettre une meilleure articulation entre le local et le global. Après avoir présenté brièvement le contexte général du développement des réseaux, on mettra en évidence les différents axes de notre proposition.

LA LENTE ET DIFFICILE EMERGENCE DES RESEAUX DANS LE CHAMP URBAIN

La notion de "réseau" est relativement récente malgré son ancienneté puisque les territoires, les territoires urbains en premier lieu, se sont historiquement bâtis sur et organisés en réseaux: les réseaux de voie de communication à l'intérieur des villes et entre les villes dès l'Antiquité (les "via" romaines), les missives comme moyens de transport de l'information à partir du Moyen-Age, l'organisation des professions en corporations économiques fondées sur des pratiques identitaires à cette même époque, la constitution, puis le développement des réseaux de transport et urbains au XIXème siècle, l'émergence des réseaux télégraphiques, puis téléphoniques comme outils d'acheminement de l'information immatérielle et de développement économique (voir par exemple le rôle du télégraphe dans le développement des places boursières et financières) sont ainsi quelques exemples de réseaux organisés selon des modalités variées et obéissant à des motivations et des règles de fonctionnement différentes. Bref, les réseaux ont historiquement structuré la vie sociale, économique et urbaine sans que les acteurs se soient même posé la question de leur existence et de leur efficacité.

La complexification des sociétés et des économies (atomisation, mondialisation, concurrences) et l'accélération des processus économiques sont certainement à l'origine d'une prise de conscience de la nécessité de s'organiser en réseau pour répondre aux nouveaux défis intra- et inter-urbains.

Les années 80 ont ainsi vu se développer de nouvelles pratiques et logiques d'organisation et de travail en "réseau" dans les différents secteurs de la vie économique et sociale ainsi qu'un discours sur le réseau comme nouveau mode d'organisation. Réseaux économiques, réseaux sociaux, réseaux humains, réseaux de villes, réseaux d'échanges, de compétences et de savoirs, réseaux de diffusion... sont ainsi apparus progressivement en s'appuyant parfois sur une structuration par les réseaux immatériels (réseaux télématiques) comme outils de valorisation et d'accompagnement de ces réseaux.

Ces logiques et pratiques ont favorisé l'émergence de fonctions, métiers et organisations nouvelles: partenariats centres de recherche et universités-entreprises, fonctions de coordination, gestion de projets, solidarités sociales, coopération entre entreprises et organisations sociales, entre entreprises et institutions culturelles, entre organisations sociales et institutions culturelles, réseaux et services partagés, coopération entre villes...

Cependant, le discours économico-politique (souvent lié à d'autres discours par exemple sur l'expérimentation sociale) qui a accompagné l'émergence des nouvelles pratiques de réseaux s'est caractérisé par une certaine opacité mettant davantage en évidence les vertus "naturelles" de la fonction "réseau" qu'explicitant les conditions pratiques de la constitution du réseau. On présuppose le réseau avant même de travailler sur son contenu, sur ses conditions d'émergence et de son

fonctionnement, sur sa composition. Partant, ce discours a parfois brouillé plus qu'il n'a aidé le développement des réseaux. Il en est ainsi du discours sur les réseaux de villes en France, survalorisant la fonction réseau par rapport à sa réalité concrète comme mode d'organisation et d'échanges entre les villes.

Ces nouvelles pratiques de réseaux sont venues perturber et heurter, par leur transversalité, des systèmes et modes d'organisation économiques, sociaux, territoriaux traditionnels caractérisés par la verticalité et le cloisonnement. Ces systèmes, produits de pratiques culturelles et d'organisation, ont constitué des freins et des obstacles à des nouveaux modes de coopération. Un exemple illustre parfaitement cette opposition entre anciennes et nouvelles pratiques: l'organisation centralisée des administrations publiques nationales a souvent, par la complexité des circuits de décision et de financement, retardé et freiné dans des pays comme la France la mise en place de projets de services utilisant les Technologies de l'Information.

Par ailleurs, les réseaux et services télématiques sont venus tardivement concrétiser sur le plan technique les formes de travail en réseau puisque leur création demeure récente. Les transformations techniques permettant d'envisager de véritables liaisons interactives permanentes entre le local et le global et de transporter sur un même support un volume compressé d'informations sous forme de voix, de données et d'images sont elles-mêmes encore neuves. Enfin, la prise de conscience des potentialités qu'offrent les réseaux par les acteurs s'effectue progressivement alors que le développement de ces réseaux et services bouleverse les repères traditionnels et les modes de pensée et d'action traditionnels.

Le développement des réseaux, lent et partiel, rencontre ainsi des contextes difficiles:

*** de résistance au changement et de prédominance de logiques de pouvoir** freinant les mécanismes de coopération dans des contextes de concurrence forts; les exemples de la concurrence entre entreprises ou entre villes sont caractéristiques, ces dernières années, de la difficulté à mettre en place des réseaux économico-industriels et des réseaux de villes au fonctionnement efficace; l'émiettement des pouvoirs, leurs concurrences et les conflits de compétences (voir, par exemple, en France les effets de la décentralisation administrative ou l'atomisation des compétences entre agences dans le domaine du développement économique en Grande-Bretagne) favorise de telles résistances. Dans la mesure où la fonction réseau suppose la coopération et l'échange entre partenaires et l'égalité d'accès au réseau, l'émergence d'un pouvoir fort neutralise le réseau et l'étouffe dans un rapport de dominance;

*** d'éclatement des fonctions urbaines de plus en plus spécialisées** et parcellisées dont la cohérence se révèle de plus en plus difficile à assurer: la séparation lieux-dortoirs/résidentiels, lieux de consommation et de culture et lieux de travail et les flux intra- et inter-urbains qu'elle entraîne est un exemple de cette spécialisation; cet éclatement pose aujourd'hui clairement la question de ce que sera la ville de demain, de sa cohérence, de sa dynamique et de sa "valeur ajoutée";

*** d'éclatement des territoires sous l'effet de transformations économiques radicales:** passage d'une économie de production à une économie de services, externalisation de la production, indifférenciation de la localisation du travail rendue possible par le développement des réseaux de télécommunications alors que la ville a toujours été depuis sa naissance un creuset économique "naturel"... Ces transformations obscurcissent la frontière entre l'urbain et le non-urbain et consacrent ainsi un divorce progressif entre le territoire et l'économie;

*** de maintien d'une cohésion urbaine menacée par des tendances centrifuges fortes** qui fragilisent les réseaux sociaux et culturels, voire des ruptures drastiques. Les villes européennes, en particulier, celles qui ont connu de graves crises industrielles, se caractérisent ainsi par une multitude de micro-réseaux sociaux qui ne s'interconnectent pas nécessairement parce qu'ils s'inscrivent dans des processus d'exclusion et d'auto-exclusion sociales. Ces micro-réseaux fonctionnent de façon endogène et, comme tels, ne participent pas à la vie sociale collective. S'arc-boutant sur des lieux ou des territoires (par exemple tel ou tel quartier de la banlieue) qui participent de leur identité, ils s'auto-entretiennent et ignorent le global. L'action d'autres réseaux, qui peuvent eux-mêmes se concurrencer (les réseaux humanitaires et caritatifs), peut venir également contrecarrer l'action de ces micro-réseaux, ou, au contraire, les orienter et les accompagner;

*** de méconnaissance de la fonction réseau et des possibilités qu'elle peut offrir en tant qu'instrument d'ouverture et d'articulation local/global.** Cet élément pose la question de la formation et de la culture des acteurs. A titre d'exemple, les réseaux et services télématiques sont encore très souvent perçus par les acteurs de l'urbain comme des outils purement techniques ayant fonction de rationalisation ou d'amélioration de la productivité interne des organisations. C'est d'ailleurs la raison pour laquelle le processus d'informatisation et de "télématisation" dans les villes a d'abord concerné la gestion interne des administrations locales. En revanche, l'absence de "culture réseau" qui comprend notamment cette capacité d'appréhension multidimensionnelle du local et du global, ne permet pas d'imaginer l'apport socio-économique des téléservices. De fait, le développement des téléservices (par exemple l'utilisation de réseaux internationaux comme Internet) s'effectue psychologiquement et culturellement chez des acteurs qui ont déjà intégré la mobilité et le

lien entre le local et le global. Elle constitue aujourd'hui un frein majeur au développement des réseaux de coopération.

Ainsi, le champ urbain économique et social semble aujourd'hui davantage marqué:

*** par une superposition et une intrication de réseaux** économiques, sociaux, culturels, urbains, technologiques, que par un maillage effectif et des interconnexions efficaces; ces réseaux se concurrencent, se parasitent, se neutralisent, fonctionnent de façon aléatoire ou partielle, meurent par entropie. Il en est ainsi de réseaux et services télématiques dans les villes, d'actions de coopération économique entre les villes; cette superposition crée un désordre , facteur de désorganisation urbaine, dont on peut penser que son accroissement est une réelle menace pour la survie des villes;

*** par une incapacité à articuler de façon équilibrée le "global" et le "local"**, cette articulation, constituée par l'interconnexion des réseaux intra- et trans-urbains, de réseaux de natures et de niveaux différents, devant permettre le développement des logiques et pratiques de réseau. A l'opposé, on constate aujourd'hui une immixtion du global dans le local qui consacre un rapport déséquilibré sans que le local soit capable de s'articuler au global : les effets de la mondialisation de l'économie sur les territoires (délocalisations, accroissement du chômage par disparition des emplois....), la pénétration des réseaux internationaux immatériels qui déversent sur le local des masses énormes d'informations sans contrôle, ni maîtrise possible des acteurs locaux (collectivités locales) témoignent de ce déséquilibre;

*** en définitive par une inadéquation, voire un divorce entre identités économiques, identités territoriales et identités sociales** résultant de l'absence ou de l'inefficience des interconnexions.

Alors que la ville se caractérisait dans le passé par une adéquation entre territoires, lieux de production et lieux sociaux, cet éclatement des identités, ballottées et constamment tiraillées par des forces centrifuges, est également une menace pour la cohérence et la cohésion des territoires urbains.

Cependant, un certain nombre d'éléments qui sont autant d'opportunités militent en faveur du développement des réseaux de coopération, en particulier des réseaux et services télématiques et créent ainsi une pression dont les effets semblent d'ores et déjà irréversibles :

*** l'accélération du processus d'échanges et son internationalisation :** cette accélération est un facteur de dynamisation économique et sociale dans la mesure où elle conduit à repenser les rapports entre les organisations et à susciter une pression forte sur les acteurs; elle est rendue possible par le développement des réseaux internationaux de communication qui incitent eux-mêmes au développement des pratiques de réseaux ou épousent ce développement déjà existant;

*** l'accroissement de la production immatérielle :** la généralisation de l'immatériel dans la production économique incite également à construire de nouveaux modes de coopération qui peuvent intégrer la distance en recherchant les meilleures compétences, les meilleurs sous-traitants, les meilleurs partenaires: délocalisation des activités, activité d'ensemblier réunissant des productions différentes, télépendulaire, flux tendus (JIT, Kan-Ban...) sont parmi les nouveaux modes de coopération fondés sur une organisation en réseau. Ils participent d'une articulation local/global;

*** le développement de nouveaux outils d'échanges (réseaux télématiques) et leur mobilité :** ces nouveaux outils pénètrent progressivement les usages économiques et sociaux. Parfaitement mobiles en raison du développement de la portabilité de certains d'entre eux, ils contribuent à une

transformation encore lente, mais certaine des rapports économiques et sociaux. Partant, ils obscurcissent les frontières entre sphère publique et sphère privée et donnent une nouvelle dimension aux échanges et à leur localisation. Les réseaux se modifient et bougent d'autant plus facilement que l'accès aux réseaux s'élargit et que les outils sont mobiles (téléphone GSM, notepads...);

*** les transformations techniques :** le développement technologique (compression numérique, portabilité des terminaux, développements multimédia...) permet progressivement d'accroître la fiabilité des réseaux et des systèmes de communication et le transport d'informations voix-données-images de plus en plus important. Le développement des interconnexions et de l'interopérabilité des réseaux sur lesquels la Commission Européenne insiste d'ailleurs à travers ses différents programmes devraient dans les prochaines années faciliter la multiplication des réseaux de coopération fondés sur l'utilisation des Technologies de l'Information.

Ce cadre d'analyse posé permet de présenter les différents axes de notre réflexion.

LES RESEAUX DANS L'ARTICULATION GLOBAL/ LOCAL

Le projet que nous avons présenté repose sur un partenariat franco-italien composé d'experts et de collectivités locales.

Ce partenariat s'appuie sur la connaissance par les experts des questions urbaines économiques,

sociales et culturelles et du développement des téléservices et des Technologies de l'Information dans les différents pays européens, et sur la compétence en matière de gestion urbaine des collectivités locales associées.

Les experts sont URBA 2000 pour la France, organisme spécialisé dans l'étude et le développement des Technologies de l'Information appliquées à la gestion des territoires et la Fondation CENSIS pour l'Italie, institut de recherche socio-économique. Ils ont, en particulier, mené des recherches sur l'impact des Technologies de l'Information et des téléservices sur la ville, ses populations, ses activités, ses territoires (notamment Programme de la Commission Européenne (D.G.XIII) "Exploratory Actions on Telematics for Urban Areas" - Projet C.A.P.A.Cities - Consolidated Actions of Public Authorities for European Cities in the New "Information Society").

Les collectivités locales sont les villes de Roubaix pour la France et de Modène pour l'Italie. Ces deux villes, de taille similaire (environ 100 000 habitants), offrent des terrains d'observation et des expériences de structuration (Modène) ou de restructuration (Roubaix) particulièrement intéressants à travers la constitution de nouveaux réseaux économiques, sociaux, culturels de coopération intégrant un objectif d'articulation du local et du global, même si elles connaissent des situations économiques radicalement différentes, pour trois raisons au moins :

- Roubaix comprend des secteurs industriels - elle est capitale mondiale de la laine et capitale européenne de la Vente A Distance - sur lesquels s'est construit jadis son développement (ex: textile) et au sein desquels des firmes ont pu jouer et jouent encore des rôles majeurs d'organisation de réseau; confrontée à un important défi social constitué par l'exclusion sociale de certaines populations (taux

de chômage le plus élevé de France, supérieur à 30%), elle connaît aujourd'hui un processus de reconversion important dans lequel s'inscrivent des pratiques de réseau novatrices visant à articuler le global et le local (ex: réseau Euro-Info-Tex, Eurozone, Eurotéléport de Roubaix); par ailleurs, Roubaix est aujourd'hui engagée dans une dynamique transfrontalière de coopération en association avec les communes belges voisines (mise en place de réseaux de coopération transfrontaliers); elle a également contribué à encourager le développement de réseaux sociaux et éducatifs en s'appuyant sur de nouvelles pratiques (réseaux d'échanges et de savoir, service éducatif pour les écoles accessible par le réseau câblé); enfin, la ville de Roubaix a mis en place, il y a plusieurs années, un Centre International de la Communication, également partenaire du projet au côté de la ville, dont l'objectif est de favoriser le développement de nouveaux usages des Technologies de l'Information et de nouveaux mécanismes de coopération entre acteurs grâce à ces technologies dans le domaine social et économique;

- Modène renferme un tissu industriel particulièrement riche (environ 50 000 entreprises) au sein duquel se construisent des modes de coopération qui portent en eux des mécanismes de fonctionnement en réseau. La nécessité d'un fonctionnement en réseau est liée au besoin de rationaliser les flux de mobilité résultant de l'intensité des flux de marchandises et de personnes afin de mieux accompagner la dynamique de développement de la ville. De ce point de vue, Modène représente un terrain particulièrement fécond. Elle est en outre associée à une dynamique de mise en réseau entre les villes italiennes moyennes, elle est d'ailleurs l'une des fondatrices du réseau des villes moyennes (Club Delle Citta Intermedie);

- par-delà leurs différences, ces deux villes recèlent des capacités locales (industries, services,

recherche, social, culture,_) qui sont susceptibles de contribuer à l'émergence et au renforcement de pratiques structurées de réseau de coopération innovantes.

La réflexion développée par les partenaires comprend quatre axes de travail :

1. Rechercher quelles ont été historiquement et sont aujourd'hui les conditions de fonctionnement d'une logique de réseau permettant une coopération efficace entre acteurs économiques, sociaux, culturels, urbains à l'échelle tant intra-urbaine que trans-urbaine.

2. Identifier les défis auxquels se trouvent aujourd'hui confrontées les villes européennes dans la perspective du développement de nouveaux réseaux de coopération trans-urbaine et intra-urbaine.

3. Montrer comment de nouveaux services et fonctions peuvent contribuer à développer des systèmes croisés de coopération prenant en compte à la fois les différents domaines d'intervention et les niveaux d'exercice possibles de la coopération (niveaux infra-local, local, local/régional, national, européen).

4. Identifier quel rôle les autorités publiques peuvent jouer dans le développement des réseaux de coopération et la recherche de solutions nouvelles adaptées aux défis à relever et quelles politiques peuvent être mises en oeuvre pour favoriser un tel développement .

1. Quelles ont été historiquement et quelles sont les conditions de fonctionnement d'une logique de réseau ?

L'histoire montre que les villes se sont développées économiquement, socialement et

culturellement sur des modèles de coopération/concurrence tant en ce qui concerne leur organisation interne (coopération/concurrence entre groupes sociaux et économiques) que pour leurs relations économiques. Très tôt, les villes ont développé leurs relations entre elles par exemple en ce qui concerne la complémentarité entre lieux de production et lieux de commercialisation et de diffusion (ports); de même, elles se sont progressivement spécialisées et concurrencées : concurrence entre ports (exemple de la République de Venise), entre Bourses ... Plus proche de nous, au XIXème siècle, le textile a fondé son développement sur la coopération entre techniques nouvelles de production (peignage, cardage, tissage, teinture...) et entre lieux de production et lieux de commercialisation et de diffusion généralement implantés sur des mêmes territoires ou des territoires relativement proches (coopération trans-urbaine).

Ces modes d'organisation ont imprimé la vie économique et sociale; ils ont produit des modèles sociaux et culturels dominants et prégnants agissant comme normes sociales de référence au point d'imprégner l'urbanisme, le commerce, la vie culturelle, le territoire urbain, les comportements même des hommes; les villes se sont elles-mêmes modelé selon les contraintes imposées par ces modèles en adaptant leurs structures (infrastructures, urbanisme, commerce) aux activités économiques dominantes. Ainsi que le montre l'évolution des villes dans la période de la Révolution Industrielle par exemple en France, en Grande-Bretagne ou en Allemagne, de tels développements se sont inscrits dans un modèle concurrentiel dicté par les règles du libéralisme économique qui a pu tantôt freiner ou empêcher de nouvelles coopérations, tantôt les faciliter ou les accélérer.

Ce constat conduit à rechercher à l'échelle trans-urbaine et intra-urbaine:

* l'existence de pratiques de réseau de coopération à travers l'histoire économique et sociale de villes européennes en prenant l'exemple de domaines d'activités dominantes et très organisatrices telles que le textile, l'automobile ou la métallurgie;

* les caractéristiques et la nature de ces pratiques: objets, formes, facteurs, niveaux, motivations, objectifs, stratégies; comment ces pratiques se sont-elles révélé dans des activités comme le textile ou l'automobile ?

* leur inscription dans le local;

* la ou les autorités organisatrices des réseaux de coopération; dans des secteurs très prégnants où elles fonctionnaient comme mono-industries, des entreprises du textile ou de l'automobile ont impulsé leurs propres réseaux économiques, sociaux, culturels en organisant leur sous-traitance, la vie de leurs salariés, en créant des équipements, des structures de formation, des logements... L'organisation d'une entreprise comme Peugeot et son rôle dans la vie locale d'une ville comme Sochaux-Montbéliard illustrent bien la puissance de l'autorité organisatrice de l'entreprise dans un contexte dominant;

* le rôle de la concurrence dans les espaces de coopération et son incidence;

* les raisons et conditions de l'émergence et surtout de l'affaiblissement ou de la disparition des pratiques de coopération; la crise économique a révélé, à cet égard, la place que certaines entreprises occupaient en tant que modèle dominant sur un territoire donné; corollairement, la transformation des pratiques des organisations sous l'effet de l'évolution économique a pu infléchir l'évolution de ce type d'organisation et assouplir son emprise en tant qu'autorité organisatrice sur le local jusqu'à la faire

disparaître;

* le rôle de la technologie dans l'émergence et la disparition de réseaux: l'apparition de nouvelles techniques, par exemple au XIXème siècle, contribue-t-elle à créer, renforcer ou faire disparaître des réseaux ? L'introduction de nouvelles techniques a, par exemple, modifié les réseaux de coopération dans le domaine de la sous-traitance ou de la diffusion;

* les éventuels mécanismes de substitution à ces réseaux de coopération;

* l'existence de scénarios de référence illustrant des fonctionnements particulièrement réussis de réseaux de coopération.

Cette analyse historique permet d'éclairer la réalité actuelle des réseaux de coopération, de révéler des facteurs d'émergence et de développement de réseaux de coopération et de scénarios de référence dont la connaissance est utile dans le cadre d'une analyse prospective. Mais elle met surtout en évidence la différence de structure des réseaux et leur caractère majoritairement local/local:

- si les réseaux de coopération traditionnels du XIXème siècle s'organisent selon un modèle principalement vertical en raison de la dominance de l'autorité organisatrice dans la vie urbaine, les réseaux d'aujourd'hui, en particulier ceux utilisant les Technologies de l'Information se caractérisent davantage par leur horizontalité et leur transversalité, l'autorité organisatrice (animateur du service, opérateur) n'ayant qu'un rôle d'obligation d'acheminement de l'information, de bon fonctionnement ou d'enrichissement du service;

- la mondialisation des échanges depuis une dizaine d'années a eu pour effet le développement de réseaux économiques et immatériels à l'échelle mondiale. Le rôle des réseaux télématiques dans un cadre global/global ou local/global permet la mondialisation, la virtualité et l'accélération des informations et des échanges alors que, par le passé, les réseaux de coopération avaient essentiellement une dimension locale, notamment dans le domaine social et culturel. Le secteur financier et son mode d'organisation à l'échelle planétaire à travers des réseaux comme Globex ou Nasdaq sont un exemple de la virtualité des échanges ("corbeille" immatérielle) et de cette articulation global/global et local/global (relation place financière/"corbeille").

Il est possible de bâtir des scénarios de référence qui mettraient en évidence cette différence de structure des réseaux et leurs mécanismes d'inscription dans le local ainsi que leur articulation local/global.

2. Quels sont les défis que les villes européennes doivent relever dans la perspective de développement de logiques de coopération ?

A. Les années 80 ont vu se développer de nouvelles pratiques de réseaux économiques, culturels et sociaux, de nouveaux réseaux technologiques (réseaux télématiques), et émerger un discours sur les réseaux et leur capacité de dynamisation des territoires et de l'économie.

Afin de mesurer la réalité de ces pratiques, il est indispensable de préciser préalablement:

* ce que recouvre la notion de réseau: réseaux de villes, réseaux économiques, réseaux sociaux, réseaux culturels, réseaux de connaissance, de recherche et d'échanges...; qu'est-ce qu'un réseau de

coopération et quelles sont les conditions de son existence (organisation, maillage...)? Dans les faits, on s'aperçoit que les réseaux de coopération recouvrent des réalités très différentes qui résultent de la nature des acteurs et de leurs motivations. Partant, on peut se demander quel est le corpus commun qui caractérise ces réseaux, ce corpus disposant de traits identitaires minimaux: existence de plusieurs acteurs, motivations identiques, recherche de complémentarités, organisation de système où l'information joue un rôle souvent déterminant...

* les fonctions et objets de ces réseaux : sur quels domaines d'activités portent-ils ? A quelles logiques obéissent-ils ? Quelles fonctions remplissent-ils ? Comment s'entrecroisent-ils ?

* ce qui motive l'apparition de ces réseaux et le discours qui l'accompagne dans un contexte économique de concurrence économique de plus en plus forte et de bouleversement social, culturel et économique résultant de nouvelles donnes: externalisation de la production, concentrations et délocalisations, développement de l'immatériel...;

* les défis que sous-tendent les réseaux de coopération et ce qu'ils induisent.

Cette recherche est guidée par la prise en compte de réseaux existants, quelle que soit leur nature, et de fonctions de réseaux se caractérisant par une réalité de fonctionnement tangible et une efficacité économique, sociale et/ou culturelle reconnue par leurs utilisateurs.

B. Les villes sont au coeur de cette problématique des réseaux et de transformations économiques et urbaines majeures qui constituent autant de défis d'importance à relever, dans la mesure où elles font figure de nodaux et de lieux d'interconnexion entre réseaux locaux d'une part et entre réseaux

locaux et réseaux internationaux (articulation local/global), en particulier:

* le développement d'une concurrence intra- et trans-urbaine de plus en plus forte;

* l'éclatement des fonctions urbaines et cloisonnement des actions et politiques urbaines;

* l'éclatement des territoires et mutation des activités sous l'effet de la mondialisation de l'économie, de l'externalisation de la production et du développement de l'immatériel;

* la précarisation de certaines populations et développement de mécanismes d'exclusion/auto-exclusion économique, sociale et culturelle qui pèsent lourdement sur la cohésion sociale au sein des villes;

Des villes comme Roubaix et Modène fournissent, par là-même, un terrain d'observation particulièrement précieux.

A travers l'exemple de ces villes, il est intéressant de:

* analyser (analyse d'évaluation), lorsqu'ils existent, la réalité, l'organisation et le fonctionnement des réseaux de coopération dans le cadre trans-urbain (réseaux de villes, réseaux de transport, réseaux culturels, de solidarité, économiques, de santé, de communication...) et intra-urbain (réseaux de transport, réseaux culturels, de solidarité, économiques, de santé, de communication...); quels sont, en particulier, les logiques et modes de coopération qui prévalent dans le secteur industriel, administratif, des services et de la recherche: formes, objets, objectifs, motivations, stratégies, niveaux, modes de développement et d'appropriation ?

* examiner comment ces réseaux se superposent, s'entrecroisent, s'interpénètrent, s'interconnectent et comment les logiques de coopération s'articulent entre elles sur le plan local (liaisons espaces/ fonctions des réseaux) et dans la dimension local/global ? En particulier, comment les réseaux et services télématiques épousent-ils, structurent-ils, accompagnent-ils le développement de réseaux de coopération existants ? Quelles modifications apportent-ils dans la nature des échanges et dans la structuration des rapports au sein du réseau de coopération ? Quelle "valeur ajoutée" apportent-ils ? A titre d'exemple, un nouveau service appelé "babillard électronique" a été mis en place sur BBS entre des acteurs sociaux de la Ville de Roubaix (services et associations sociales) : comment ce réseau électronique aide-t-il à la dynamisation du réseau associatif existant ? De même, quelle valeur ajoutée économique apportent les services offerts par l'Eurotéléport de Roubaix dans la structuration des rapports économiques existants?

* rechercher quels sont les services (et les projets de services) développés s'appuyant aujourd'hui sur des réseaux de coopération et quelles sont les nouvelles fonctions engendrées et créées par l'utilisation des réseaux qui constituent autant de solutions proposées ou adoptées par les villes ? Les réseaux télématiques voient naître de plus en plus de nouveaux services à l'initiative d'opérateurs et fournisseurs de services différents (opérateurs nationaux, opérateurs privés, collectivités locales...); ils suscitent de nouvelles fonctions d'autorité organisatrice (opérateur technique), d'autorité de régulation (opérateur de service, commission d'éthique...) et surtout d'animation (opérateur de service) qui n'existent pas nécessairement dans les réseaux de coopération traditionnels;

* identifier les mécanismes de passage de pratiques anciennes à ces nouvelles pratiques de réseaux et les conditions de leur émergence; la mise en oeuvre de nouveaux services télématiques créent

parfois des résistances culturelles et psychologiques même lorsque des mécanismes de coopération existaient antérieurement : dès lors, le facteur technique, considéré comme menaçant et non maîtrisable, n'est-il pas caractéristique d'un mécanisme de passage des anciennes aux nouvelles pratiques ?

* identifier les freins et les limites au développement des réseaux de coopération sur le plan économique, culturel, social, sociologique, territorial, organisationnel, psychologique, stratégique et juridique et rechercher quels sont les obstacles prédominants. Le développement des réseaux télématiques, de la production de l'immatériel, l'externalisation de la production, la délocalisation du travail ne constituent-ils pas des freins au renforcement des coopérations trans-urbaines et intra-urbaines alors que l'apparition de nouveaux réseaux de communication devrait logiquement contribuer à ce renforcement ou, à l'opposé, ces transformations économiques annoncent-elles de nouveaux modes de coopération ? En d'autres termes, quelles limites la concurrence fixe-t-elle aux mécanismes de coopération à travers les réseaux et services télématiques ? La coopération inter-villes dans le cadre du réseau Telecities est intéressante à analyser à plusieurs titres: d'une part, parce qu'elle s'inscrit dans le cadre d'une articulation local/global, d'autre part, parce que la coopération entre les villes comporte ses propres limites qui résident dans la recherche de complémentarités, enfin parce que la coopération instaurée entre les villes ne s'est pas réellement traduite par un service télématique inter-cités (seules quelques villes disposent de leurs propres services sur le WWW Internet); de même l'utilisation du réseau City-Net demeure relativement limitée à un groupe de villes dont la sensibilisation aux Technologies de l'Informatiion est déjà importante;

* rechercher les modèles de réseaux de coopération dans les villes européennes qui fonctionnent

particulièrement bien et ont contribué à un développement harmonieux de la vie économique, sociale et culturelle, les facteurs positifs de leur fonctionnement et les solutions proposées ou adoptées par les villes qui répondent aux défis relevés. Dans le domaine télématique, plusieurs villes européennes mettent en place des M.A.N. (Metropolitan Area Network) fédérant un ensemble de services (santé, services publics, informations aux citoyens, formation...) à l'image de la Ville d'Anvers par exemple.

Cette analyse devrait permettre d'établir un état des solutions proposées ou adoptées par les villes en matière de coopération intra- et trans-urbaine notamment à travers les réseaux télématiques.

3. On peut penser que des nouvelles pratiques de réseaux peuvent dans une perspective d'articulation local/global constituer un facteur de développement de nouvelles dynamiques économiques, sociales, culturelles créatrices de richesses pour les territoires et activités urbaines, et suggérer ainsi de nouvelles solutions.

Il convient dès lors de rechercher quelles sont les conditions d'une optimisation de la fonction réseau dans le champ urbain, économique, social et culturel susceptibles de catalyser le développement de réseaux de coopération.

Si les pratiques de réseaux apparues ces dernières années ont pu créer de nouvelles logiques sur le plan trans-urbain et intra-urbain, il est utile de rechercher:

* quels services pourraient naître de ces logiques de coopération (services partagés, offres spécifiques en réseau, réseaux de solidarité sociale...) et quelles fonctions nouvelles pourraient être

ainsi créées (autorité organisatrice de la fonction réseau, animation...) ? Le domaine des téléservices est un secteur encore neuf : nouveaux modes de travail, nouveaux emplois, nouveaux métiers, nouvelles qualifications vont progressivement apparaître au fur et à mesure du développement des nouveaux services; ils induisent de nouveaux modes de coopération qui peuvent à leur tour susciter de nouveaux services, parmi lesquels des services télématiques;

* quel est l'apport des Technologies de l'Information dans ces réseaux en terme de rapport global/ local et d'impact sur les pratiques d'échanges; en quoi le développement de réseaux comme Internet, Renater,_ et des "autoroutes électroniques de l'information" peuvent-ils modifier la donne des échanges existants, ou autoriser de nouveaux modes de coopération sociale, économique, culturelle ? En d'autres termes quelles nouvelles opportunités peuvent fournir les Technologies de l'Information par rapport aux réseaux de coopération traditionnels (démultiplication des échanges et élargissement des champs de coopération, accélération, précision accrue des informations, modification des échanges, internationalisation...) ? L'une des caractéristiques majeures des réseaux télématiques internationaux comme Internet réside dans un système de navigation qui permet d'interconnecter à tous moments le local et le global sans intermédiaire et d'élargir les champs de communication possibles dans un mouvement d'interaction permanent;

* quelles sont les conditions de mise en place de ces services et nouvelles fonctions de réseaux et quelles sont les connexions nécessaires pour permettre un fonctionnement des réseaux fondée sur une articulation global/local;

* quelles conséquences et impacts peuvent avoir de nouveaux services et réseaux fondés sur des

logiques de coopération plus étoffées sur les territoires des villes, les activités économiques, sociales, culturelles, sur les populations et sur les utilisateurs des services et réseaux. Une évaluation de ces impacts devrait permettre d'identifier en termes prospectifs l'apport réel de ces nouveaux services et réseaux. Ainsi que nous l'avons montré dans le cadre du projet européen C.A.P.A.Cities ("Consolidated Actions of Public Authorities for European Cities in the New 'Information Society'") qui réunit experts et associations nationales de villes de quatre pays (France, Italie, Allemagne, Grande-Bretagne) (Programme "Exploratory Actions on Telematics for Urban Areas" - Commission Européenne - D.G.XIII), l'impact des nouveaux services télématiques sur les villes est encore faible en raison de son caractère récent. Néanmoins, la pénétration des téléservices dans la vie urbaine, économique, sociale et culturelle s'affiche comme un mouvement qui semble irréversible et qui emportera dans les prochaines années des conséquences importantes pour les villes en termes d'opportunités (valorisation des savoir-faire locaux, meilleure insertion dans les réseaux économiques mondiaux, valeur ajoutée économique...) et de risques (aggravation des fractures sociales, déséquilibres territoriaux...).

* quelle valeur ajoutée peuvent apporter de nouveaux réseaux de coopération, en particulier les réseaux et services télématiques, dans le développement des villes, leurs relations, le développement des territoires dans lesquels elles s'inscrivent, des activités économiques, sociales et culturelles ? Une analyse prospective des externalités de réseaux devrait mettre en évidence l'importance de cette valeur ajoutée constituée par la valeur d'usage des réseaux.

Cette analyse peut conduire à l'établissement d'un certain nombre de solutions envisageables sous forme de scénarios de développement de nouvelles logiques et réseaux de coopération intégrant les

Technologies de l'Information à l'échelle trans-urbaine et intra-urbaine.

4. Même si elles n'en ont peut-être clairement conscience aujourd'hui, les autorités publiques peuvent jouer un rôle majeur dans le développement de nouvelles pratiques de réseaux de coopération.

On assiste dans les villes européennes à une prise de conscience progressive des autorités publiques, en particulier des responsables des villes:

* de la nécessité d'endiguer les effets souvent dramatiques des transformations économiques actuelles sur les territoires, les activités et les populations;

* de la nécessité de rechercher de nouvelles solutions qui ne répondent plus aux critères et modèles traditionnels de développement connus jusqu'alors;

* d'un développement croissant des Technologies de l'Information dont les effets sur la structuration des territoires ne sont pas neutres.

Dans la mesure où elles se trouvent aux prises avec cette nouvelle donne et où elles constituent des nodaux de réseaux, il est essentiel que les villes soient associées à la définition d'un cahier des charges de solutions opérationnelles et à la définition d'un programme d'action regroupant ces solutions qui pourrait être appliqué dans une ville et diffusé par la suite à l'échelle européenne. Cette définition pourrait s'effectuer à partir d'ateliers de travail et de séminaires réunissant les principaux acteurs des villes, en premier lieu les villes partenaires du projet (collectivités locales, acteurs économiques,

sociaux, culturels, de la recherche...). Les solutions pourraient être ultérieurement testées auprès d'un panel de villes choisies à partir de critères ciblés (potentiel de recherche, précarité sociale, zone en situation de reconversion urbaine et économique...).

CONCLUSION

Deux remarques s'imposent:

- le développement des nouveaux réseaux de coopération fondées sur les Technologies de l'Information transforme les perspectives et la vision traditionnelle du territoire et des échanges entre territoires parce que ces réseaux sont liés à des pratiques de communication articulant local et global. Ces réseaux incitent au développement de "communautés virtuelles supra-locales" territorialement éclatées dont l'identité repose sur la nature des activités et des besoins et sur des motivations identiques : communautés de chercheurs, de médecins, de scientifiques, communautés de populations (Juifs, Bengalis...). Cette situation entre en conflit avec la notion de territoire qui devient économiquement et culturellement secondaire. Dès lors, on peut se demander si le développement croissant de ces réseaux et services n'est pas à long terme une menace pour une articulation équilibrée du global et du local, le local s'effaçant au profit du global. De même, le phénomène de fragmentation sociale que l'on connaît dans les villes européennes (cités duales) se trouve accru par le développement des téléservices en l'absence de politiques de formation et d'information des populations, entre des populations pouvant accéder à l'information et correctement insérées dans un espace global et des populations culturellement et économiquement démunies, privées de cet accès et

limitées à l'espace local. Là encore, il appartient aux responsables politiques d'imaginer des "block systems" permettant d'éviter les risques de déséquilibre entre le global et le local;

- les villes se trouvent aujourd'hui projetées dans un contexte multidimensionnel par le développement des réseaux et services télématiques qui les obligent à prendre en compte le global, l'international et à agir davantage dans ce champ. Dans le passé, cette action était plus limitée, circonscrite à certains types de villes (ports...) et à certaines activités; le temps nécessaire à la construction de réseaux de coopération était également plus long. Aujourd'hui, l'accélération et la mondialisation des échanges grâce aux réseaux immatériels contraignent les villes à mettre en place des stratégies plus globales et internationales réunissant des facteurs externes (concurrences, image...) et à nouer des coopérations dans des temps plus restreints. De nouvelles perspectives s'ouvrent selon des logiques de marché: les villes européennes, dont certaines comme Manchester ont développé des hubs, peuvent-elles devenir opérateurs de réseaux et de services télématiques à l'image de la stratégie vers laquelle s'oriente Anvers ? Peuvent-elles développer une stratégie d'offre et de demande, d'achat et de vente de services à l'instar de n'importe quelle entreprise, comme le fait la "cité électronique" de Singapour ?

Ces deux remarques mettent en évidence les limites du rôle des réseaux et services télématiques dans une perspective d'articulation équilibrée entre le global et le local. Elles posent par là-même la question de l'autorité organisatrice de la régulation glocale. Mais n'atteint-on pas là les limites même du scénario glocal confronté aux réalités économiques ?

Mundane and Dirty: Changing Spaces of London's Heavy Service Economy

Mark Brearley

The current deficiencies of the theoretical and practical appreciation of cities are especially pronounced in the analysis of the peripheral industrial areas which service the city. 150 years after Henry Mayhew researched his voluminous London Labour and the London Poor, there is still no parallel to his documentary of economic activity and its spatial and social form. Mayhew showed no bias when selecting activities to describe. His meticulous analysis of dust and rubbish collection, its after use and the industry's needs, for example, sharply contrasts against the lack of understanding, and the areas of prejudice, which characterise current planning practice.

The lower Thames area is London's largest concentration of heavy service industry, and a remarkable other place, once-removed from the experience of most Londoners. This section of the city extends for approximately 24 km, between the old dock district, east of central London, and the towns which abut the open landscape of the Thames estuary. Development of the area during the last hundred years has been structured by the locational needs of manufacturing, river and port related industries, mineral extraction, and the infrastructure of utilities including power generation and

sewage disposal. Low land costs and the lack of outspoken residential communities have made the area an attractive location for a wide range of mundane and dirty low density uses, including supply, storage and waste disposal. Fragments of grazing marsh and small historic settlements survive in the area. The dominant industries have undergone a dramatic restructuring in recent years, adjusting their land requirements. A range of marginal uses retain a forceful presence, including small holdings, allotment gardens, travellers sites and showmenis winter quarters. During the last decade the completion of Londonis orbital motorway has brought modern peripheral housing and retail development. The combination of these diverse elements has resulted in a fragmented landscape notable for its heterogeneity.

Mayhew's documentation of the London dust industry of the 1850s included analysis of the economics, calculations of quantities and employment, explanation of locations, disection of the recycling markets:

" A dust-heap, therefore, may be briefly said to be composed of the following things, which are severally applied to the following uses:
'soil', or fine dust, sold to brickmakers for making bricks, and to farmers
for manure, especially for clover.

1. 'Brieze', or cinders, sold to brickmakers, for burning bricks.
2. Rags, bones, and old metal, sold to marine-store dealers.
3. Old tin and iron vessels, sold for 'clamps' to trunks, &c., and for making

4. copperas.
5. Old bricks and oyster shells, sold to builders, for sinking foundations,
6. and forming roads.
7. Old boots and shoes, sold to Prussian-blue manufacturers.
8. Money and jewellery, kept, or sold to Jews.

The dust-yards, or places where the dust is collected and sifted, are generally situated in the suburbs, and they may be found all round London, sometimes occupying open spaces adjoining back streets and lanes, and surrounded by low mean houses of the poor; frequently, however, they cover a large extent of ground in the fields, and there the dust is piled up to a great height in a conical heap, and having much the appearance of a volcanic mountain. The reason why the dust-heaps are confined principally to the suburbs is, that more space is to be found in the out-skirts than in a thickly-peopled and central locality. Moreover, the fear of indictments for nuisance has had considerable influence in the matter, for it was not unusual for the yards in former times, to be located within the boundaries of the city. They are now, however, scattered round London, and always placed as near as possible to the river, or to some canal communicating therewith."

Today's understanding of the equivalent industries is not so painstaking nor so generous. Much of the established industry in the lower Thames area is widely perceived to be anachronistic or in terminal decline; an entrenched view which has had direct influence on governmental policy decisions

and planning; paralleled by an attitude of contempt for the places as they are. These ways of thinking have stubbornly resisted the few alternative voices. In reality, this complex area remains the UK's largest port; well located to build on its existing European trade. The manufacturing industries are large, modern, and expanding. The area is ideally suited to a continuing role in the heavy servicing of London, for which the Thames provides an excellent transport artery. It is paradoxical that so many of the activities taking place here, viewed by many as an environmental nuisance, are a vital basis on which to build a sustainable city economy. These services effectively recycle and utilise waste, and deliver materials close to the places of use by water based transport, thereby causing minimal environmental damage. A high proportion of London's supplies of aggregates, cement, steel, oil, and forest products are delivered along the Thames. Domestic waste, paper for recycling, scrap metal, and building rubble for recrushing are transported out of London by the same means via the lower Thames area.

At the start of the 1990s the issue of this area's future surfaced in public discussion, with ministerial pronouncements, and talk of the need to adjust the inbalance of development momentum and prosperity between the west and the east of London. There was talk of strategy, interpreted as the re-birth of careful planning following its denial during the 80s; the UK's right wing decade. But the specifics of the place itself were hardly mentioned. Instead it was characterised as a derelict void, reminding us of the old notions of wilderness: an ill-defined zone beyond, awaiting exploitation. The government produced only a mock strategy; no more than a dissapointing policy statement. The dominant pre-occupations have continued throughout, expressed in an extraordinary succession of booster conferences and congratulatory articles in the planning journals: Erase the image of this place;

fill the spaces; develop the land.

Development interest has now come to this area. Large sites have become available and new land uses are being introduced. This has been prompted by the separate ambitions of land owners, and of local and national government, and the anticipation of programmed investment in new roads, channel tunnel rail link and fast commuter rail services. A massive re-negotiation of land use within the area is taking place, in many cases displacing established activities, which are unable to compete in the land market, and are offered little support by the planning authorities. The economic sectors which have characterised the area could be offered a more certain future, integrating their needs into the process of change. For this to be possible, however, our understanding of the actual and potential economic and social opportunities within the area needs to be expanded, and imaginative options explored. Sadly, this is not happening. Development scenarios are emerging which disregard the validity and potential of the existing economy, and which fail to build imaginatively on the given spatial, ecological, and cultural conditions. The emerging condition is a mean whisper of the actual possibilities. The situation provides a disturbing indicator of how ill-equiped the key players are to take on this vast project of urban re-structuring.

When we put together a research proposal for submission to the European Commission, it was to explore these issues, refering to this section of London which, though particular, is confronted by issues of generic relevance. The modern city exists in order to further the needs and requirements of a complex network of human associations. If a liveable and sustainable city is to be achieved, each separate network must be found an appropriate place. This understanding is central to our argument in two ways. First, it encourages a genuine openess to the claims of varied networks for space and

presence. Second, it welcomes spatial diversity as an inevitable consequence of the overlapping of networks and typologies. Each existing space within the city can be valued both as a special local condition and as a vital part of the whole city.

These general principles inform our highlighting of the non-glamorous economic networks in the belief that they are in need of re-evaluation and assistance. These aspects of the city have a large physical presence and continuing significance for the local and regional economy, despite being often downplayed by recent discussions of the world-city model. Policies towards a truly sustainable city must acknowledge mundane and unfashionable activities, integrate and celebrate them. These activities, and their spaces, provide a test case for wider questions about urban futures; about the possibilities for urban change based on accommodating and re-validating, rather than displacing or erasing.Of our local example we can say things which can be said of so many other European city peripheries. Here it is in fact the whole situation which has been labelled mundane and dirty; denied a positive identity; interpreted as little more than a vast stockyard of land on which to build. There remains this urgent need to expand understanding of the place, and to provide more sophisticated conceptual guidance, allowing options for change to be better judged. Methods need advancing for defining valid space and locational needs in the context of competing demands for land, and for linking this process with a generous consideration of the cultural and spatial conditions of place. This requires an ambitious opening up of planning practice; a welcoming in of documentary, of community and economy; a provocation of ideas about ways to modify, based on a fuller respect for what there is, for the unique reality of all situations.

Our thinking about these peripheral areas has included the following questions: How can the uses

present be made to participate in the urbanity of the places they service, and the spaces and networks to which they relate? Should familiar forms of urban development be allowed to swamp the slack spaces, and the voids left by industrial restructuring and changes of infrastructure, or have such grey areas, regularly abandoned to an indeterminate future, an identity and a potential of their own? These questions point to issues about proximity, and about the valuing of slack space. Questions which are offered here as a prompt for an expanded discussion:

Proximity has been a central concern of modern urban planning since its 19th century origin, responding to the dis-functions of expanding industrial cities. A dominant aim has been the separation of uses. An orderly and well segregated disposition of functional areas was a recurring model of the ideal metropolis; as much an objective of actual re-orderings as it was a part of utopian schemes. Only in the last few decades has a different voice taken hold, acknowledging the importance of contact. Fascination with a dense mixed-use urbanism has pulled much of the conversation towards a dissapointing new architype, based on a glance at the historical european city. The range of actual city spaces and configurations of use reminds us that the reality is richer, and more complex. The areas down the Thames, and the way they are transforming, emphasise the challenge of proximity. There are spectacular opportunities for bringing together the un-alike, revealing new associations; the steel wharf and the flower garden, marshland and the supermarket, the meeting room and the river's bigness; but there are also areas of conflict between incompatible uses, creating pressures for displacement. Each proximity needs to be considered, and resolved. The city we might aim for has a diverse range of separations, adjacencies, and overlaps.

Cities have always re-structured to accommodate change; moved to occupy the land left behind as

activities migrate, or contract. The changes of this type over the last forty years have been on a vast scale. Whole infrastructures of distribution have transformed, railways contracted, ports and markets re-located. Utilities and industries have consolidated, often departing from urban locations. Huge sites producing gas and electricity for the city have become redundant. Coinciding with a period when governments have taken un-precedented powers of land accumulation and clearance, this has been the great period of urban voids. Cities became places which included a network of slack spaces; where land could be appropriated for un-classified uses, and could be afforded by the economically marginal; where the wild returned. In 1988 the film-maker Wim Wenders spoke memorably of the open land which was to the north of Berlin's Mehringplatz:

"If you stand in the middle, where the circus was, you have completely different views coming out of four directions; really strange views of the past or of what remains from the past, witnesses of everything that has happened... In the city as centrifuge, this was the peaceful core, the eye of the hurricane. A great tranquility reigned in the space, and suddenly rabbits and mice appeared, and even our elephant could move about there. Children played, and it was possible to see the city in the background like an open history book."

These new city places have had a short life. Pushing in another direction has been a less conspicuous process. With social control of development rights it became possible, for the first time, to enforce a clear cut physical boundary between large cities and their surrounding countryside, directing development to the area within, controlling the supply of land. The intentions can be respected, but the consequence is a slow removal of slackness. Low value uses are being squeezed out together with the wild, the illicit, and the marginal. Downriver Thames is not just a place where voids

have opened, as extractive industries have consolidated, the military departed, power generating re-located. This section of the city has an open spatial structure. There has never been a continuous carpet of development, spreading outwards; but rather a series of fragments, each with special determinants, brushing against each other, or held apart by remnants of a previous landscape. This has been a place which dispenses with familiar urban connectivity. Here ground has been available for the city's other spaces, for its servicing, its storage, pieces of wilderness, cultivation, everyday recreation. The drive to re-figure this place as a conventional urban interior is relentless. It is now vital to asked:

What value does the slackness of space, the open structure, have in city culture and economy? How might the place be treated differently.So many of the spaces found in the modern city have been traditionally omitted from urban typologies. They have as yet unrecognised cultural, economic, and spatial qualities. That observation is the key starting point for a new openess to the value of all places; an openess which can serve to challenge the transformation of places so that they match a simplistic typology of use and form, squeezing out any slackness of space, erasing the varied densities of use; re-configurations of the type in progress down the Thames; proceeding blind to the spatial diversity which exists; careless of questions about proximity, and the rich possibilities; indifferent to that broader range of claims for space, presence and identity.

CITIES AS ENGINES OF REGIONAL ECONOMIES - THE ROLE OF INFORMATION AND COMMUNICATIONS TECHNOLOGIES IN SUPPORTING ECONOMIC REGENERATION AND URBAN DEVELOPMENT.

Dave Carter

Manchester

This discussion paper outlines the strategic importance of exploiting the opportunities offered to cities by new information and communications technologies (ICTs or 'telematics') to support economic regeneration and urban development. It aims to identify ways in which the applications and

services being developed using advanced ICTs/telematics should be made more accessible at the local level in urban areas, both to businesses and the wider community. It highlights the potential for new approaches to teleworking which will enable the benefits of the development of the 'information society' to be maximised at a local level.

1. THE IMPACT OF THE INFORMATION SUPERHIGHWAY IN THE URBAN CONTEXT.

New information and communications technologies are playing an increasingly important role, as a key growth sector, in the regeneration of urban economies. This sector is providing the dynamic for the emerging "information economy", or "information society", where multimedia based teleservices (services utilising the integration of sound, text and image) and teleworking represent a major economic change comparable to a new industrial revolution.

Certain cities are well placed to capitalise on this both through having, or gaining, experience and expertise in using these technologies and by having a concentration of existing telematics projects which provides a base for the development of a 'critical mass' in the future. The priority, especially for city councils, is to ensure that these technologies become a means for generating economic growth, employment and an enhanced quality of life through the provision of local access to the facilities and services available on the developing 'information superhighway'.

In terms of urban policy making this is partly a response to the trends identified in both the European Commission's White Paper, "Growth, Competitiveness, Employment", and in the Bangemann Report, "Europe and the global information society", where success in urban regeneration is increasingly linked to the availability of an easy access to appropriate telematics infrastructures and the associated skill levels in the local population. It also reflects recent changes in emphasis in policy making at both national and international levels, especially within the European Union (EU), in relation to strategies for economic regeneration and urban development. There is a move away from economic growth as an end in itself towards employment generation and quality of life issues associated with economic growth. These ideas are influencing the current policy debates about the concept of the 'information society' and how it can best be used in support of wider strategic aims and objectives for economic and social development.

The main scenario being debated is essentially an optimistic one where the information superhighway will be able to support a wide range of new services which will empower citizens and provide for their full participation in an emerging 'digital democracy'. There is a serious danger, however, that this ignores the realities of power which support an 'information aristocracy' rather than a 'digital democracy'. If citizens are not able to have access to the new telematic infrastuctures and services, the outcome will simply reinforce existing patterns of inequalities with 'information haves and have nots' in our communities.

At the same time, the development of new services and applications which take advantage of upgraded and enhanced infrastructures is currently dominated by the multinational corporate sector - either as suppliers or users - leading to a pattern of 'development from above'. If the new

infrastructures are to benefit a much wider spectrum of people than is currently the case, there is a need for public support at the local level to support ‘development from below’ in applications and services.

One of the main constraints on the current development of advanced communications services is the lack of new applications which can generate enough demand to reach a critical mass of users. To extend the ‘electronic highways’ metaphor, while it is important that the ‘superhighways’are constructed, there needs to be just as much, if not more, attention given to the building of ‘slip-roads’, to the development of low-cost, easy to use ‘cars’ and ‘public transport’ and to meeting training needs through readily available and high quality ‘driving lessons’ in order to support people in exploiting the opportunities which the ‘superhighway’ should offer.

There is, then, a distinct ‘applications gap’ at the level of the local citizen. The most effective way of bridging this gap is by experimentation, through field trials and demonstrator projects, working closely with the final users at the local level. Such initiatives could provide a wide range of insights which can be usefully drawn upon by others in developing alternative systems, geared to different local needs in different places. Local experimentation therefore becomes part of city-wide ‘learning networks’ whereby the insight gained in one environment can be transferred with suitable adjustments to another. If these ‘learning-networks’ can link up - regionally , nationally and internationally (especially at the European level) - then there is the basis for a potentially powerful counter-balance to vested insterests, in terms of corporate and state authority, which can be pro-active in taking an advocacy role in relation to consumer, citizen and wider democratic interests.

Developments in advanced communications need to be accompanied by a strategy for development from below which seeks to realise the indigenous potential of cities and regions. Social innovation in the community - involving local government, schools and colleges, public libraries, the voluntary sector, consumer groups and the trade unions is a necessary counterpart to organisational innovation led by industry, commerce and government departments.

A key principle here is the concept of universal access to telematics services. If there are to be benefits to be gained form the development of the information economy with positive effects on employment distribution, e. g. through teleworking, and the ability to use such services in fully interactive ways, then everyone - regardless of whether they personally have a phone, a TV or a computer (or the money to buy one) - must have the right to access these facilities as a public service. The best way of providing such public services will vary enormously from area to area, region to region and country to country. There are, however, some good examples emerging from some of the cities which are developing work in this area, e. g. Amsterdam, Bologna and Manchester, based on the following priorities:

- developing community access centres - sometimes called local telecentres or electronic village halls; providing the facilities, together with training, advice and support, for local people and organisations to access the ‘superhighway’ and, in many cases, to develop teleworking opportunities; on the basis of people working in social settings, e. g. a neighbourhood telework centre, rather than at home:

- setting up teledemocracy pilot projects; establishing e-mail and bulletin board communications with decision-makers, e. g. councillors, MPs and MEPs and running trials of on-line conferencing and consultation projects based on access through community facilities (e. g. access centres, libraries, schools, CABs etc.) as well as with individuals with the capacity to do this;
- demonstration projects on using the information potential of the community; ensuring that local organisations and people can put information into the system just as easily as they can take it out and that key organisations, such as local authorities, TECs, Health Trusts, Business Links etc., are fully committed to publishing public information on the 'Net' as part of a commitment to public accountability.

These ideas are based not only on assessments of the likely impact of these technologies on the urban environment but also on analyses of the likely role of cities in the future. This includes a critique of what might be termed the "utopian school" of future "cyber-lifestyles" which (Bill Gates of Microsoft included) sees cities becoming depopulated, "instant electronic democracy" replacing the need for governmental structures and services and a predominantly "ruralist" lifestyle emerging, at least for a dominant "majority" of the population.

An alternative view is being put forward by networks of cities, such as the Telecities initiative which currently links together 58 cities across Europe, the central themes of which include:

- cities becoming more, rather than less, active as centres of creative activity and sustainable economic, social and cultural growth;

- setting up facilities to provide access to the information superhighway, e. g. access centres, information networks, teleworking centres, within cities, in order to encourage people to continue to use the city but in more flexible ways;
- decentralising workplaces and services within the city rather than transferring facilities out of the city;
- supporting greater flexibility for people working and/or living in the city through extending opening hours of all services, including promoting the evening economy and the idea of the 24-hour city, more residential housing in city centres, improved childcare facilities and better, more-integrated public transport.

2. TELEMATICS AND URBAN REGENERATION: A CASE STUDY OF MANCHESTER.

Manchester City Council, together with organisations with which it is involved through local partnerships, has had a policy commitment to supporting work in this area since 1989. Historically Manchester has had, and retains today, a high concentration of technological expertise in computing and related information technologies, particularly within the local universities, e. g. the invention of the modern computer at Manchester University in 1948 (nb. there are plans to celebrate this with a 50th anniversary international "Festival of the Universal Machine" in 1998). This enabled Manchester to become a centre of excellence in many aspects of the development and use of these technologies and to built up a strong image as such which, in turn, is used to promote the city.

This is only the first stage, however, as the shift in policy making outlined above requires the development of new applications and services which directly support employment generation, new training opportunities and social and cultural initiatives. Manchester City Council recognised this in its Economic Development Strategy produced in 1991, where the development of ICTs/telematics was established as a core strategic objective for all future work. In the same year Manchester launched the UK's first public-access computer communications and information system, the Manchester Host, providing electronic mail (with Internet and X400 messaging), bulletin boards and on-line databases as a public service.

Subsequently Manchester City Council has worked in partnership with Manchester Metropolitan

University, the other universities and colleges in the city, a network of some twenty voluntary sector organisations and other agencies (including the Chamber of Commerce) to develop new telematics applications and services to support the idea of “Manchester - The Information City”. The emphasis is to establish pilot and demonstration projects that provide practical services for real users, ensuring that these are based on a proper analysis of user needs and local research. This is backed up by a commitment to the involvement of users, and potential users, at all stages of project development, including initial planning, implementation, validation in real-life environments and the dissemination of results and ‘good practice’ guidelines.

It is this commitment and the development of strong partnerships with the educational, private and voluntary sectors which has enabled Manchester to ensure the sustainability of being a centre of excellence for these technologies. The challenge now is to maintain this role in the face of the rapid acceleration of technological change and the increasing priority that these issues have at national and international level. One result of all of this which must be taken very seriously is that the resources available for economic development, and certain aspects of social and cultural development, particularly at national and European level, will increasingly be associated with telematics and the implementation of the ‘information society’ (as outlined in the Bangemann Report). In order to be able to take advantage of these opportunities cities need to be able to demonstrate a strong track-record in terms of the development and implementation of telematics related applications and services which reflect user needs rather than technological requirements.

It is important to stress, however, that it is not the telematics per se which creates employment and economic growth but the context within which these technologies are developed and implemented.

This means that maximum support is given to the concept of universal access to telematics - that is, all people in the Manchester area (whether from community based facilities, from home, from a school or college or from an office) should be able to access telematics resources and services on a low-cost and effective basis for a variety of applications ranging from education and training, business, public information, arts and culture, entertainment, healthcare or environmental services. Equally specific projects must be developed to ensure a direct benefit to the local economy from enhanced applications of telematics. Manchester's commitment has been to built up as strongly as possible a culture of awareness and use of telematics, especially basic services, by as wide a cross-section of society. Only then can we be confident that people and organisations will start to use the more advanced applications of telematics as they become available.

This commitment has led to the establishment of the Manchester Telematics and Teleworking Partnership (MTTP) in 1995. This is a partnership between Manchester City Council, Manchester Metropolitan University, the local business community, local voluntary sector and other community based organisations and a number of individuals and small companies working in the multimedia sector. The Partnership aims to develop local pilot and demonstration projects which will 'showcase' advanced telematics based services and to use these to stimulate the development of the local 'information superhighway'.

The priorities for the Manchester Telematics and Teleworking Partnership are:

1. to enhance the telematics infrastructure of the city to enable greater multimedia capabilities and to maximise access to the information superhighway and related interactive information

services;

2. to support the development of new economic activity, particularly through greater use of electronic trading networks and teleworking, with networking at both regional and inter-regional levels;
3. to use both the enhanced infrastructure and the results of pilot and demonstration projects to promote the use of advanced telematics to support growth and innovation in other sectors, including training, cultural industries, healthcare and transport.

The main focus of this work is to develop a network of local telematics access centres around the city which will give local people and organisations direct access to the information superhighway, provide training, advice and technical support and develop new employment opportunities through support for teleworking and electronic trading networks. The initial proposal is to develop 12 local centres, linked to a new Multimedia Centre at the Manchester Metropolitan University (MMU). Four of the 12 proposed Access Centres will be based on upgrading the facilities at the four existing Telematics Access Centres, known as Electronic Village Halls (EVHs), while 8 will be new facilities. The project will also upgrade the Manchester Host computer communications and information system to full multimedia capabilities providing Manchester with a “digital city” system closely linked with the systems developed by Amsterdam and Bologna.

The network aims to:

1. expand the existing centres which will provide a city-wide service with initiatives supporting work in the City Pride area, Greater Manchester and the North West region, e. g.:
   - the Telematics and Teleworking Centre at the Metropolitan University;
   - the Womens Electronic Village Hall and Telework Centre;
   - Bangladesh House Telematics and Telework Centre;
2. expand the existing centres providing targeted geographical support in key inner city areas, e.g.:
   - Chorlton Workshop Telematics Access Centre (which covers the south of the inner city area);
   - East Manchester Electronic Village Hall;
3. develop new centres with a wide area focus, e. g. :
   - a network in the city centre to support teleworking and the cultural industries based on 4 or 5 new sites;
   - a Disabled Peoples Electronic Village Hall and Telework Centre based within the inner

city;

4. develop new centres with a targeted geographical coverage. Currently discussions are taking place about the development of telematics access and teleworking centres covering both inner-city districts (‘wards’) and more peripheral ‘outer-city’ areas.

The Manchester Partnership has also been working with a number of cultural organisations, individuals and small businesses in the media and cultural sectors to exploit opportunities for the growth and development of this sector through the use of advanced telematics applications and services. The market situation in Manchester is a dynamic one in which an increasing number of businesses and other organisations are beginning to exploit opportunities for growth and economic development through the use of innovative telematics applications and services. The Manchester Partnership focuses on two key areas within that process, i. e. the role of micro- and small businesses and of the cultural industries sector. The arts and cultural sector in particular in Manchester plays an increasingly significant economic role, employing tens of thousands of people and having a turnover of hundreds of millions of pounds although there is still a lot of scope for their potential to be developed further. Linked to this is the increasing economic significance of tourism and the potential for multimedia telematics applications and services to exploit the inter-relationship between tourism and cultural industries.

The Manchester Partnership aims to exploit this potential both at a regional and inter-regional

(European) level by demonstrating the transferability of local responses to these market demands throughout the UK and the EU. The aim here is to ensure that market developments enhance the opportunities for employment for people rather than undermine them. As the market is European-wide, and increasingly becoming global, then responses must be national and European-wide. Action at a local level in isolation is insufficient to respond to this market situation, which is why the Manchester Partnership aims to respond proactively to market developments through collaborative projects with other key players across Europe through networks such as Telecities and the EU Inter-Regional Information Society Initiative (IRISI).

This includes:

- providing support for new initiatives in the media and cultural sectors;
- promoting networking and collective initiatives within these sectors;
- encouraging the development of activities which use, develop and promote multimedia telematics applications and services.

The objective is to use telematics applications in order to develop opportunities for training and employment in European cities based on the expansion of cultural industries through:

1. the development of local and regional cultural heritage and the encouragement of its wider use;

2. enhancing the sense of place and urban culture;
3. promoting wider participation in cultural activities;
4. encouraging long-term growth and employment opportunities, especially teleworking, through a co-ordinated strategy for developing and promoting cultural industries;
5. promoting economic growth through more effective networking and collaboration within the cultural industries.

At a different level there also has to be a commitment to the 'cyberspace' equivalent of public service broadcasting. It would be very easy to respond to the criticisms of the current user bias of systems by talking about how making applications and services more relevant to the 'mass of ordinary people' is about greater commercialisation, the 'virtual Las Vegas' approach where everyone has access to unlimited teleshopping, video-on-demand and 'virtual lotteries', as indeed most of the major manufacturers and suppliers are now pushing for. The challenge is to be critical of both situations while attempting to build experimental systems, on the 'digital city' or 'virtual city' model, which provide practical demonstrations of alternatives to the dominant models stressing not only empowerment and emancipation but also access and accountability.

3. EXTENDING THE HORIZONS OF THE 'VIRTUAL CITY' - TOWARDS A NEW VISION OF TELEWORKING

The main challenge facing cities like Manchester at the end of this century and into the next is how to respond to the massive economic restructuring that has taken place while, at the same time, developing innovative and practical solutions which bring real economic and social benefits to local businesses and local people. This paper has highlighted ways in which imaginative uses of ICTs/ telematics can provide vital tools to aid that process. The key to success is, however, to ensure that such solutions are sustainable. It is for this reason that we have developed a rather different and critical vision of the role of teleworking in this process.

We believe that there is much too much of an emphasis on teleworking being about the redistribution of work away from workplaces into the domestic environment and away from urban areas to areas defined as 'peripheral' as well as being a 'natural' solution to traffic congestion and resultant environmental pollution. As a city with an explicit agenda that includes making our city a livelier, busier, more productive but still sustainable centre we are concerned that the pursuit of (what we would term) the traditional telework agenda is in danger of further undermining the fragile social cohesion of our cities rather then strengthening it. We do not want a 'green' but dead city, rather we see opportunities for promoting sustainable development while at the same time using strategies, including teleworking, which tackle social exclusion and support intensive but more flexible uses of

the urban environment.

The Manchester Partnership is currently involved in a series of studies of the employment and training needs of local people, especially those who face discrimination and marginalisation in the labour market, and of employers which may be able to support new employment and training opportunities. Even at this early stage it is clear that a number of trends are emerging from this work, including:

a)**home-based telework**: a key finding amongst socially excluded groups, e.g. disabled people, women and other parents/carers with childcare responsibilities and people in the poorest areas of the city is that they do not want to work from home - their prime concern is to "get out of the house" and to get access to the social and cultural support which they see a 'workplace' as providing. What they do want more than anything is access to training, proper childcare facilities and good public transport which will support them achieving this. Similarly the housing accomodation of many people in these categories is seen by them as totally unsuitable for working from home, especially (again) in terms of the lack of locally available childcare facilities and security concerns, i. e. fears that they will be targeted for burglary if they have "valuable equipment" in the house.

b)**the core/periphery divide within cities**: the positive potential for cities to be engines of their regional economies can also have a negative effect on employment distribution within the city, where employees, especially those with greater skill levels, increasingly commute in from suburban and even rural areas. This can leave concentrations of low-skill levels and unemployment, and consequently of poverty, both within the inner city and in poorer 'outer city' areas. The commitment

to teleworking models which redistribute work even further away from people who live in these areas can only exacerbate these forms of social exclusion in cities.

c)**the role of commuting:** in order to generate a level of sustainable economic activity that provides employment for sufficient numbers of those who wish, or need, to commute **plus** those who want and need jobs who live in the city there must be people both living in and working in our cities. In Manchester we want to see 10,000 people living in the city centre by the end of the century (as compared to about 2,000 now) with their needs for goods and services generating new employment opportunities. In addition we believe there is the capacity to support a further 100,000 more people working in the city, providing changes can be made to travel patterns where people do not all have to travel between 8am and 9am and out between 5pm and 6pm. Consequently telework strategies should be about facilitating increasing but more flexible uses of the city not about encouraging people to stay out of the city.

All of these factors demonstrate the need for cities to think more imaginatively and to act in more dynamic and proactive ways than ever before. The idea of a 24-hour city is not new but it does have a new significance in the age of the information society. Why should local people, business visitors and tourists not take advantage of the opportunities of participating in a working day that starts at 4pm and finishes at 2am one day and starts at 4am and finishes at 2pm another day. Office facilities, retail outlets, public services - especially public transport, educational resources, cultural and entertainment services could use ICTs/telematics to ensure that the majority of services are available on a 24 hours a day basis. People could combine work, education/training and leisure activities in even more flexible ways.

Open telecentres, both in city centres and other localities throughout the city, could provide the basis for flexible working, business networking, lifelong learning and access to public and commercial information and transaction services - from booking theatre tickets to paying local taxes. Interactive video links could provide the opportunity for remote access to consult a doctor, social worker or confidential advisor enabling such workers to operate more flexibly and efficiently. Employers, especially larger companies and public services, could decentralise their operations **within** the city, offering opportunities for marginalised groups, e. g. disabled people, to have access to high quality, better paid and more permanent employment within a more supportive social and cultural setting by working from a telecentre near their home, backed up by training and childcare facilities. This is just as much 'teleworking' as the 'traditional model' bit its potential impact on improving the life-chances of socially excluded groups is much more significant, we would argue.

The success of more innovative models of teleworking, and teleservices, will depend on the ability to establish electronic networks at all levels (local, regional, national, international) that owe their existence to active policy making through democratic and accountable action, e. g. on the part of local authorities, community organisations, trade unions, comsumer groups and alliances of individuals, rather than to corporate business interests, governments or the whims of rich and powerful individuals. There is no technological 'short-cut' to the establishment of such networks but rather the long, hard slog of alliance building, experimentation, negotiation, campaigning and self-organisation. Market forces will not naturally develop either the quantity or quality of applications and services based on ICTs/telematics that is required to meet our requirements but neither will they naturally facilitate the type of surveillance and control increasingly required by state and other interests and

feared by users. The ‘anarchy of the market place’ does at least provide space in which to manoeuvre and to create experimental areas of collective space to support social and cultural innovation and to provide real services that could be seen as the interactive multimedia equivalent of public service broadcasting.

The alliances which are beginning to emerge between social forces and (at least) some representative structures (including local authorities) working in this area, which could be broadly termed ‘socially useful cyberspace’, may not be able to transform the forces of global capitalism but they are not without power and influence. Their role in determining how questions of employment distribution and the fight against social exclusion can be resolved should be not underestimated. The ability of small-scale initiatives in cities and regions to use the advantages of the technologies, to use ‘cyberspace’, to create communication and activity networks free from the usual spatial and temporal constraints is a crucial element in providing a democratic counter-balance to other technological and global trends. The essential starting point for this must, however, be a commitment to creating services and applications that are easy (and cheap) to use, that grab people’s interest and imagination so that they want to use them and that, having used them, they become part of their lives enough that they would fight any attempt to limit them or take them away. It is in this context that the use of ICTs/ telematics needs to be debated backed up by practical examples of how people and organisations are working to achieve liberation and empowerment through innovatory explorations of new applications and services based around these technologies.

Developpement d’un modèle de simulation pour les Villes Européennes de taille moyenne

Marie-Luce SAILLARD

1 Les systemes urbains

La gestion des villes est devenue une tâche de plus en plus difficile pour les autorités locales, du fait du nombre et de la complexité des problèmes urbains. Les interconnexions entre ces différents problèmes sont elles aussi de plus en plus fréquentes. Les stratégies à mettre en place se doivent alors d’être multiples, diversifiées et cohérentes. Ce qui nécessite de développer des connaissances dans des domaines de plus en plus nombreux.

Or les Municipalités ou Syndicats de Villes ne disposent pas toujours des moyens suffisants pour enrayer les processus de détérioration sur leur territoire. Si la volonté effective existe de lutter contre les maux (exclusion, détérioration de la qualité de la vie, bruit, etc.) ou de favoriser l’intégration sociale, en revanche, les Villes ne sont pas toujours prêtes à y faire face, faute de ne pas avoir une bonne vision globale des problèmes, de ne pas disposer des moyens suffisants ou surtout de ne pas

connaître correctement les situations et leurs inter-relations.

Il apparaît alors urgent d'améliorer les outils qui permettent de mieux comprendre et donc mieux appréhender le fonctionnement des différents systèmes urbains afin d'agir plus efficacement pour la résolution des problèmes actuels dont tout laisse à penser qu'ils vont s'amplifier à l'avenir.

Ces outils se réfèrent à des concepts de la Ville :

- **la Ville Agora** centrée sur l'homme qui prône une relation harmonieuse entre l'homme et l'espace urbain ;
- **la Ville Glocale** bâtie sur un meilleur équilibre entre le processus de globalisation et la capacité de valoriser les ressources locales et leur diversité ;
- **la Ville Durable** qui internalise les problèmes afin de mieux les solutionner.

Certaines Municipalités appuyées parfois par l'Etat, la Région, ont déjà entrepris des initiatives allant dans le sens d'une meilleure compréhension des systèmes urbains en collaboration avec des laboratoires de recherche, des consultants qui peuvent leur apporter une contribution externe intéressante.

De telles initiatives sont engagées dans des domaines très diversifiés. Parmi celles-ci, certaines concernent l'amélioration de l'efficacité énergétique et la protection de l'environnement afin de préserver la qualité de la vie.

2 L’énergie et l’environnement dans la Ville

La concentration urbaine, démographique, économique, induit assurément une concentration des consommations d’énergie dans les villes. 75% de l’énergie consommée en Europe l’est en milieu urbain. Elles engendrent des nuisances et notamment elles sont à l’origine des émissions de pollutions atmosphériques dont les effets peuvent être locaux, régionaux et planétaires. Par exemple les émissions de CO2 ont des incidences sur l’effet de serre qui ne sont plus à démontrer.

Afin de lutter contre ce phénomène, la majorité des villes ont entrepris des actions visant à améliorer l’efficacité énergétique. Ces actions étaient et sont encore trop souvent ponctuelles. Elles concernent des secteurs précis, tels que la production d’énergie, les bâtiments communaux, les transports, sans être empreintes d’une véritable politique énergétique globale intégrée.

En outre, certaines Municipalités développent une approche généralistique afin de ne pas concevoir la résolution du problème environnemental sans intégrer les autres niveaux.

Cela semble cependant une tâche plus aisée pour des Villes disposant d’un pouvoir local plus fort, comme c’est le cas dans les pays à tradition fédérale (Allemagne, Suisse,...) par rapport à d’autres à tradition centralisée (Italie, Espagne, France,...) ; l’histoire, la culture, le niveau de développement économique, le contexte politique, juridique, administratif et énergétique ont leur importance.

Les villes, pour seules raisons que l’essentiel de l’énergie consommée et des émissions de polluants se trouvent concentrés sur leur territoire et donc qu’elles sont le lieu où s’appliquent les politiques, ne doivent pas être investies seules de toute la responsabilité de la gestion de ce problème. Les politiques

communautaires, nationales et locales, la recherche de nouvelles technologies, de nouveaux savoir-faire relèvent bien évidemment d'autres niveaux de décision. Mais le rôle des Municipalités est essentiel, car elles représentent le niveau décisionnel le plus proche des différents agents et acteurs économiques. Elles peuvent donc appliquer au mieux les politiques énergétiques en leur donnant une autre dimension : partir des besoins à satisfaire et de la demande d'énergie que cela engendre pour définir ensuite une politique d'offre d'énergie adaptée aux besoins réels et mobiliser les ressources énergétiques locales.

3 La gestion de l'énergie et de l'environnement par les Villes

Trop de villes ne se sentent pas encore investies de ce pouvoir ou surtout croient ne pas disposer des moyens nécessaires pour appliquer ces politiques globales. Les Villes européennes disposent pourtant d'atouts suffisants pour répondre à ces besoins, à condition qu'elles aient été sensibilisées et qu'on leur apporte des éléments complémentaires à leur connaissance.

Les Villes les plus avancées en matière de gestion énergétique et de réduction des émissions de polluants s'appuient sur l'amélioration de l'efficacité énergétique à l'échelle de l'ensemble des acteurs et pas seulement pour leur patrimoine (bâtiments communaux et services). Elle tentent d'appréhender les incidences de ces améliorations au niveau du développement économique local, de l'urbanisation, de l'emploi, du développement social.

Afin d'évaluer les effets de leur politique énergétique et environnementale, elles ont développé des modèles de connaissance et de simulations qui sont encore très souvent à l'échelle expérimentale :

- Temis développé par öko Institut (Munich, Newcastle upon Tyne, Berlin, ...) ;
- Projet Brundland (Aalborg) ;
- Nantes-Air (Nantes) ;
- Polyen (Communauté Urbaine de Lyon) ;

Ces modèles permettent de :

- dresser un bilan de la situation actuelle des consommations d'énergie et des émissions de polluants atmosphériques associées au niveau global de l'aire urbaine et par îlot ;
- d'aider à la décision des autorités locales pour les orientations collectives ayant un impact sur la qualité de la vie ;
- de définir des actions de sensibilisation auprès des différents types d'acteurs économiques qui consomment de l'énergie (c'est à dire tout le monde) et qui émettent des polluants atmosphériques.

Or, ces modèles de simulation sont encore trop souvent réservés à des Villes européennes de grande taille qui disposent déjà d'une expérience riche en matière de gestion énergétique et de personnel suffisant pour mettre en place ce type d'outil.

L'objectif que nous nous fixons, est donc de permettre aux Villes de taille moyenne, qui ne disposent pas toujours des moyens financiers et humains, de disposer d'un modèle de simulation des consommations d'énergie et des émissions de polluants atmosphériques afin qu'elles puissent accéder à un outil d'aide à la décision et par conséquent de les aider à développer une véritable stratégie énergétique globale urbaine. Ce modèle doit permettre de :

- recenser avec un grande précision les informations nécessaires et suffisantes pour appréhender globalement la réalité énergétique sur le territoire ;
- réunir, traiter et analyser ces informations pour améliorer la compréhension globale du système énergétique et environnemental urbain ;
- suivre dans le temps l'évolution des différents paramètres utilisés et des indicateurs de ce modèle ;
- favoriser la construction d'une stratégie globale et en particulier pouvoir :
- dresser un état de l'art de toutes les opérations qui peuvent être entreprises par la Municipalité en direct ;

- définir des actions de sensibilisation en direction des principaux secteurs et surtout des consommateurs en tant qu'acteurs ;
- formuler les résultats à atteindre et les mesurer clairement ;
- mesurer les impacts énergétiques, environnementaux et socio-économiques des mesures prises.

Ce modèle de simulation doit être simple et facile d'accès afin de pouvoir être développé dans un grand nombre de Villes européennes. Il doit inclure une partie commune à l'ensemble de ces villes sans négliger les spécificités de chacune d'elles en matière de structuration, d'évaluation, etc.

4 Un modèle de suivi des consommations d'energie et des émissions de polluants atmospheriques pour les Villes de taille moyenne

L'élaboration de ce modèle comprend alors :

- la réalisation d'un état de l'art des modèles existants incluant une analyse :
- des motivations initiales ;

- de son utilisation effective (qui, pourquoi, comment) ;
- des freins rencontrés (politique, technique, ...) ;
- de leurs performances développer des scénarios, ...
- la définition des éléments nécessaires à l'élaboration et à la réalisation d'un modèle de connaissance et de simulation dans une Ville européenne moyenne. Ce qui implique de :
- recenser les informations structurelles indispensables à chaque Ville ou agglomération. C'est ce que l'on nommera les variables endogènes ;
- rechercher les sites les plus favorables à l'utilisation de ce modèle, c'est à dire ceux qui peuvent accéder aisément aux informations indispensables à sa mise en place ;
- intégrer les informations spécifiques permettant d'évaluer le cadrage local de chacune des villes retenues. C'est ce qu'on nommera les variables exogènes ;
- conserver des degrés de liberté afin d'intégrer d'autres éléments au cours de l'utilisation du modèle.

L'ensemble de ces informations sont regroupés dans un cahier des charges, qui se doit d'être évolutif et variable, afin de créer un modèle composé :

- d’un tronc commun relatif aux variables endogènes, c’est à dire communes à l’ensemble des Villes ;
- de ramifications composées par les variables exogènes qui définissent les spécificités de chacune des villes.

4 - 1 Etat de l’art

Les modèles de simulation, parfois réalisés sous l’égide de la Commission Européenne, permettent aux Villes de mieux appréhender et de mieux connaître les comportements du système urbain. Ils représentent une alternative intéressante pour l’aide à la décision des Villes. Ces modèles de simulation permettent d’orienter les actions envisagées, en mesurant dès à présent les impacts futurs. Les Municipalités peuvent alors s’appuyer sur ces mesures d’impacts de leur politique en matière de gestion énergétique et de réduction des émissions de pollution atmosphérique, afin d’évaluer aussi précisément que possible les quantités de pollutions évitées en mettant en place par exemple :

- un réseau de chaleur ;
- un système de cogénération ;
- la restriction de l’usage de la voiture dans son centre-ville ;
- l’usage accru des énergies renouvelables pour la production de chaleur, d’eau chaude

sanitaire, etc. ;

- l'installation des filtres aux cheminées ; etc.

La développement de ce type de modèle implique le plus souvent pour les Municipalités de s'associer avec des partenaires locaux, jouant un rôle prédominant en matière de gestion énergétique, et/ ou des consultants extérieurs.

Le constat initial qui fait agir les Villes et les pousse à mettre en place un modèle de simulation des consommations d'énergie et des émissions de polluants atmosphériques associées, c'est qu'elles doivent agir sur l'ensemble de leur territoire et pas seulement sur leur patrimoine. Cette prise de conscience est basée sur le fait que les Villes doivent jouer dorénavant deux rôles importants. Elles doivent :

- sensibiliser l'ensemble des acteurs aux méthodes plus efficaces de gestion des consommations d'énergie en vue d'améliorer la qualité de la vie ;
- intégrer dans l'ensemble du processus décisionnel sur leur territoire afin de veiller à une meilleure intégration des méthodes qu'elles préconisent et de renforcer leurs actions de sensibilisation.

Afin de développer un modèle adapté aux villes européennes de taille moyenne, il semble

intéressant de faire un état de l'art des modèles déjà mis en place afin d'évaluer :

- quelles sont les similitudes qui peuvent exister entre ces différents modèles ;
- quels semblent être les aspects les mieux traités et pourquoi ;
- quels ont été les effets et sont-ils mesurables ;
- quels sont les atouts et les défauts de chacun d'eux afin, respectivement, de les développer ou de les éviter.

Il s'agit donc de créer un questionnaire basé notamment sur :

- la genèse des modèles et les motivations qui ont permis leur conception (Villes, Commission Européenne, consultants, partenaires locaux, etc.) ;
- leur environnement informatique ;
- leur coût global et les modes de financement ;
- le niveau de détail des modèles ;
- la complexité ou la facilité d'usage ;
- le fonctionnement des modèles ;
- les sources d'informations pour les données structurelles et les données unitaires de

consommations d'énergie et d'émissions de polluants atmosphériques (locales, nationales, internationales) ;

- les résultats attendus et ceux présentés ;
- la phase opérationnelle.

Les réponses sont analysées grâce à une grille de lecture analogue pour l'ensemble des modèles de simulation étudiés.

4 - 2 Elaboration et réalisation d'un modèle de simulation énergétique et environnementale pour les Villes européennes de taille moyenne

A partir de cette grille d'analyse il s'agit de définir les critères indispensables pour réaliser un modèle de simulation qui s'adresse à une Ville moyenne européenne.

Il s'agit donc de :

- déterminer les informations indispensables à la création d'un tronc commun ;
- développer les ramifications possibles intégrant les données spécifiques à chacune des Villes.

Recensement des variables endogènes

Les variables endogènes sont indispensables à la création du tronc commun du modèle pour l'ensemble des Villes. Sans ces données, une Collectivé Locale ne pourrait pas assurer l'installation d'un modèle de simulation des consommations d'énergie et des émissions de polluants.

Ces variables concernent la structure des différents secteurs étudiés, les consommations unitaires d'énergie et les facteurs d'émissions de polluants atmosphériques fournies pour l'ensemble par les banques de données de la Commission Européenne.

Les variables endogènes pour l'ensemble des secteurs sont (la liste n'est pas exhaustive) :

pour l'Industrie :

- le nombre d'entreprises par branche d'activité ;
- les consommations unitaires par produit et par usage ;
- la définition des différents usages énergétiques (chauffage, process, etc.) ;
- les facteurs unitaires des polluants atmosphériques ;

pour le Résidentiel :

- le nombre de logements ;

- leur date de construction ;
- le mode de chauffage utilisé ;
- les différents usages énergétiques (chauffage, eau chaude sanitaire, etc.) ;
- les facteurs unitaires des polluants atmosphériques ;
- les consommations unitaires par produit et par usage ;
- les données climatiques ;
- les données de surfaces ; ...

pour le Tertiaire :

- le nombre de bâtiments par secteur d'activité (commerces, cafés-hôtels-restaurants, hôpitaux, collèges, administrations, bâtiments sportifs, ...) ;
- l'usage des énergies utilisées (chauffage, éclairage, cuisson, etc.) ;
- les facteurs unitaires des polluants atmosphériques ;
- les consommations unitaires par produit et par usage ; ...

pour les Transports :

- le nombre de déplacements journaliers ;
- les flux de véhicules (journaliers et en heure de pointe) ;
- les facteurs unitaires des polluants atmosphériques ;
- les consommations unitaires pour chaque catégorie de véhicules (voitures, poids lourds, bus, ...) et par carburant utilisé (essence, essence sans plomb, diesel) ;
- les catégories de voies ; ...

Les variables exogènes expriment le cadre spécifique de l'action des Villes en fonction des différentes contraintes institutionnelles, juridiques, techniques, des ressources accessibles ou non, etc.

Ces variables sont alors répertoriées de la manière la plus exhaustive possible pour les Municipalités retenues.

Les variables exogènes permettent la conception des ramifications du modèle en intégrant les spécificités locales afin que l'outil puisse être utilisé dans des endroits diversifiés.

Les variables exogènes portent notamment sur :

les compétences des Villes en matière énergétique :

- la production ;

- la distribution ;
- l'aménagement ;
- l'organisation urbaine et sa réglementation (Plan d'Occupation des Sols, Schéma Directeur d'Aménagement du Territoire, ...) ;
- la tarification ; ...

l'Industrie :

- la tarification ;
- les choix énergétiques ;
- la réglementation ; ...

le Résidentiel :

- la réglementation thermique ;
- la tarification ;
- les choix énergétiques ;

- la politique nationale en matière d'efficacité énergétique ; ...

les Transports :

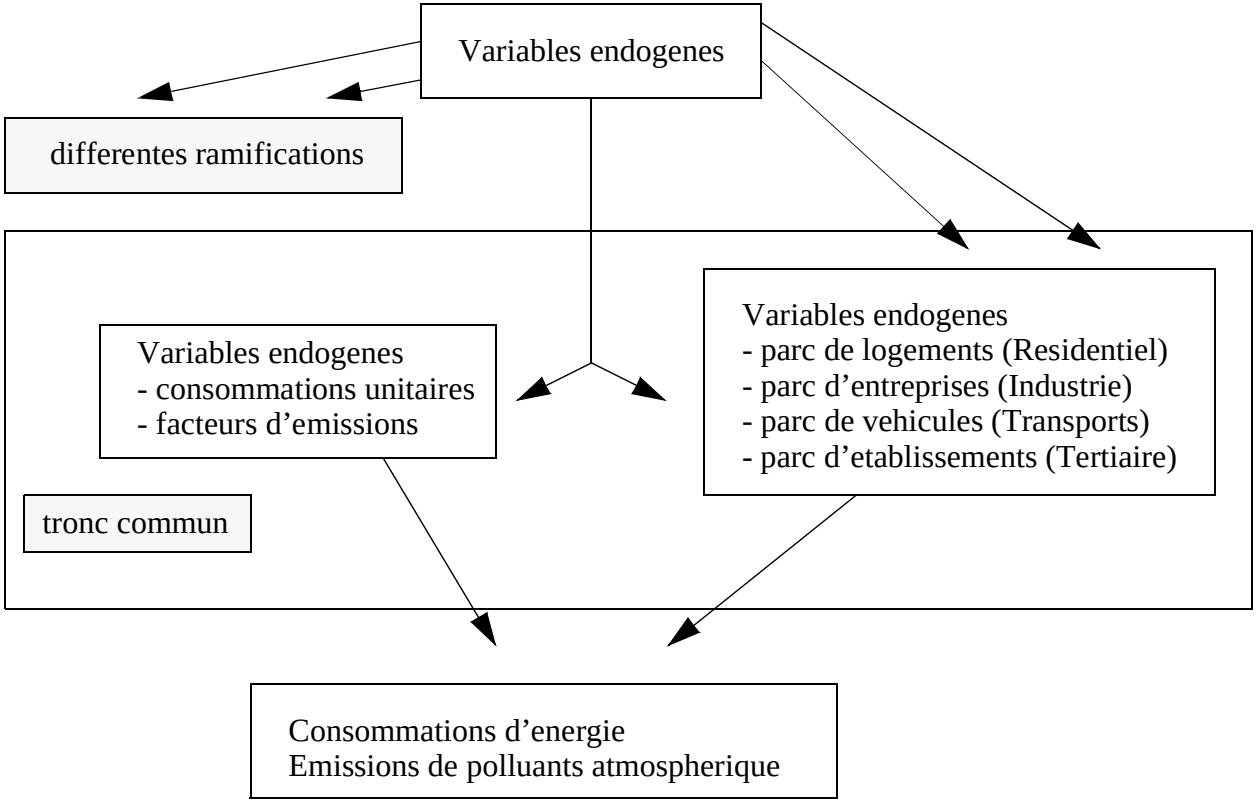
- la tarification des carburants ;
- la réglementation des vitesses ;
- le type de transport public urbain (bus, tramway, métro, ...) ;

Une analyse de ces informations spécifiques est nécessaire pour permettre :

- de les intégrer au cahier des charges élaboré à partir des variables endogènes ;
- de quantifier l'apport de ces variables dans l'ensemble du modèle de simulation énergétique.

La réalisation du modèle de simulation énergétique est la synthèse et l'aboutissement de la recherche et de l'analyse des différentes catégories de variables.

L'objet principal de la recherche réside dans la quantification de l'influence des variables exogènes sur l'ensemble des variables endogènes.



Le modèle de simulation est conçu pour être le plus adapté possible aux Municipalités retenues et

conserve des champs libres pour une possible transcription dans d'autres sites.

Il est réalisé de manière conviviale afin de ne pas nécessiter de formation spéciale pour son utilisation.

Le modèle est établi sur une base informatique Excel 5.0 sous l'environnement Windows. Chaque Ville dispose d'un modèle de simulation personnalisé mais transposable ailleurs.

Il sera géré par la suite par les services concernés de chacune des Villes avec un appui logistique de la part d'un consultant si la Municipalité le souhaite. Cette gestion implique :

- la mise à jour des données ;
- l'intégration de nouveaux paramètres affinant les résultats si cela est possible ;
- des tests sur des scénarios évolutifs de politique urbaine ou de politique plus précise comme celle des transports par exemple.

5 Actions actuelles

Dans le cadre d'études que nous menons actuellement (dans le programme APAS notamment) ou que nous avons pu réaliser auparavant avec certaines Municipalités, nous relevons l'ensemble des informations existantes auxquelles il est possible d'avoir accès. Il est intéressant de travailler avec des consultants de différents pays qui ont chacun une connaissance particulière des conditions relatives

aux systèmes urbains dans leur pays. Ces échanges nous font progresser dans l'élaboration du cahier des charges des variables endogènes et aussi des variables exogènes. Cet échange autorise aussi des confrontations entre Villes elles-mêmes afin qu'elles puissent faire part de leurs attentes et des freins qu'elles rencontrent dans la mise en oeuvre de leur politique énergétique globale.

Lors de ces études, outre les contacts directs avec les élus et les différents responsables de services, nous nous efforçons d'intégrer à la réflexion les décideurs locaux, les responsables de la gestion des principaux secteurs, les autorités décentralisées des différents ministères, les architectes, les équipementiers du bâtiment, afin que la définition d'un modèle de gestion des consommations d'énergie et des émissions de polluants atmosphériques intègre les attentes et les divers degrés de décision sur le territoire de la Ville. Ces contacts permettent aussi aux personnalités de se rencontrer et de confronter leurs priorités leurs objectifs afin d'essayer d'élaborer en commun une réflexion globale.

GREEN Etudes & Conseil, a company founded in 1993, is a consulting firm specialized in the energy and environment management. GREEN Etudes & Conseil also opened a new office in Besançon in 1994.

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Main businesses of GREEN Etudes & Conseil

Energy planning. Analysis and forecast of energy consumption, development of energy and environment strategies (local and international) : various studies for European and Arab countries : Guadeloupe department, the Municipality of Besançon (PERU (DGXVII), SAVE (DGXVII) APAS (DGXII)), the Municipality of Rochefort/ Mer (APAS), Morocco, Algeria, etc.

Coordination for various programs for the European Commission on decenrtalized cooper-

ation (ECOS (DGI), ECOS-PHARE (DGI), THERMIE (DGI), ASEAN 2010, etc.) with Rumania, Ukraine and China.

Energy consumption survey : Evaluation of the energy consumption and spending in the municipal services and buildings for the Ademe agency and the French Ministère de l'Intérieur ; energy consumption survey in the hotel/ restaurant industry.

Promotion programs for the publicizing of performing technologies in the energy and anti-pollution industry : comparative studies of energy technologies in the European textile industry (THERMIE) ; promotion of the European technologies in the Chinese coal industry (OPET) ; recognition study for the Chinese industrial needs etc.

Decision support studies for the implementation of computerized control panels for energy management, database conception, computerized modelling (software programming for the selection and evaluation of return on equity and capital invested in energy technology, for the simulation of energy consumption and polluants emissions, ...), feasibility studies : implementation of a control panel for tracking the prices of heating and water heating equipment for individual housing ; programming for the analysis and tracking of energy consumption and its associated polluants emissions to develop an environment and energy policy (various assessments and reports for the Municipalities of Nantes, Belfort, Besançon and Ile de France region).

Training : schools and universities, graduate schools and vocational training.

Complex Urban Areas and their Sustainable Development - Development of a model-based decision support tool and its application to Brussels

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Abstract

We propose a Spatial Decision Support System (DSS) designed for planners and policy makers which will help them develop effective policy interventions for more liveable and sustainable cities. The DSS will be based on novel high resolution urban simulation models augmented with tools capable of measuring and distinguishing sustainability levels as well as tools that support the decision

maker in progressing through the typical steps of the decision process. A multi-disciplinary team, consisting of professional end-users, urban consultants, modellers and computer scientists, will develop, in an iterative process, the proposed methodology and supporting planning instruments in the course of an application to the city of Brussels.

1. Introduction

Decision makers entrusted with the management of urban areas, or part of it, are to manage geographical systems in which a multitude of political, social and economic powers surface. They are to face consequences of phenomena which they do not control, often do not even know the existence of. Urban structures really evolve through the occurrence of instabilities in their dynamics, and the capacity of positive and negative feedback loops of interaction to amplify some initially small event, leading to the eventual re-organisation of the system as a whole. The logic of the spatial arrangement that emerges can not be seen before the event, but only afterwards, when the ripples of adaptation and response of the other urban actors have been played out. The location and timing of such instabilities will not be predictable on the basis of external, rational factors, such as patterns of accessibility, or technological parameters. Instead, particular, local circumstances, or chance will determine exactly where or when a disturbance begins. Since almost all cities exhibit this complexity, it is reasonable to assume that complexity is an essential key to their success (Jacobs, 1961). Recent work in the theory of dynamic and evolutionary systems provides support at the most fundamental level for the idea that complexity is an inherent, necessary characteristic of social systems, be it a society of primitive creatures or human beings (Langton, 1992; Wolfram, 1984; Prigogine, 1981). Effective

urban planning should not suffocate the urban dynamics, rather stimulate the creation or maintenance of a high level of diversity and complexity in the city. To that end, decision makers need to be equipped with tools that permit them to get insight in the mechanisms underlying the complex dynamics, tools that are helpful in the very early detection and anticipation of forces that endanger the valuable assets of the urban system, and tools that help them to keep the system on a sustainable path by means of directed interventions and legislation.

In this paper we will present a research programme aiming at the step by step development of a methodology and Decision Support System usable in the design and evaluation of alternative policies aimed at more sustainable and viable cities. The core of the DSS is a simulation shell that allows to create spatial interaction based dynamic models capable of representing urban dynamics at a high level of spatial detail. The models are based on Constrained Cellular Automata in which the use of each parcel (or cell) of land is determined by institutional and environmental factors as well as by the activities present in its local neighbourhood. Although cells only affect one another locally, a complex dynamic emerges that structures the urban area on a macroscopic level. Unlike applications of conventional Cellular Automata, however, we constrain the overall dynamics of the Cellular Automata model by means of a coupling with more traditional dynamic spatial interaction models, operating on a set of regions much larger than the individual cells, such as the ones developed by the Brussels School of Ilya Prigogine. The details of this simulation approach are the subject of the next section of this paper.

2. Hybrid simulation models of urban systems

In order to capture in a model in a sufficiently realistic manner the complex nature of urban systems, it is essential to identify the principle urban actors and to represent their spatial behaviour at a detailed geographical scale. In some sense, todayõs growing success of GIS and remote sensing techniques demonstrates the dedication of planners and geographers to spatial detail and formal methodologies to deal with it. But, ô*current GIS analysis is based on simple spatial geometric processing operations such as overlay comparison, proximity measures, and buffering. It does not provide optimisation, iterative equation solving and simulation capabilities necessary in planning*õ (Janowski and Richard, 1994, p.339). Yet, GIS contain information on which a new spatial interaction based simulation models can be build and run. We developed Constrained Cellular Automata models on top of GIS layers, and have shown that these are able to capture observed urban structure and growth.

A Cellular Automaton (CA) is made up of *cells* arranged in regular grid, 2-dimensional for most geographical problems. The cells in the grid are in one of *k* possible *cell-states.* Cells will change state according to (a) *transition rule(s),* which will define the new state of the cell as a function of its old state and the state of cells in its local neighbourhood. Time progresses discretely and all cells are updated to their new state simultaneously. The best known and most studied CA model is ôLifeõ (Gardner, 1970). It is a 2 (states), 8 (neighbours) CA which mimics to an extent a form of life on a grid. Cells are either dead or alive. They are born if there are sufficient life neighbours to act as parents, and die if there is overcrowding or a lack of company. It was Tobler (1979), who introduced

Life into geography and called it the ôGeographicalõ model. Yet, although Life-like models display a very complex behaviour, --with an evolution towards a constant state, or to a chaotic state, with all sorts of intermediate transients-- its definition is to simple a model to represent geographical problems realistically. A growing number of spatial scientists tries to add detail and constraints to Life --or similar models-- to turn it into an operational model for geographical applications (Batty and Xie, 1994; Roy and Snickars, 1993)

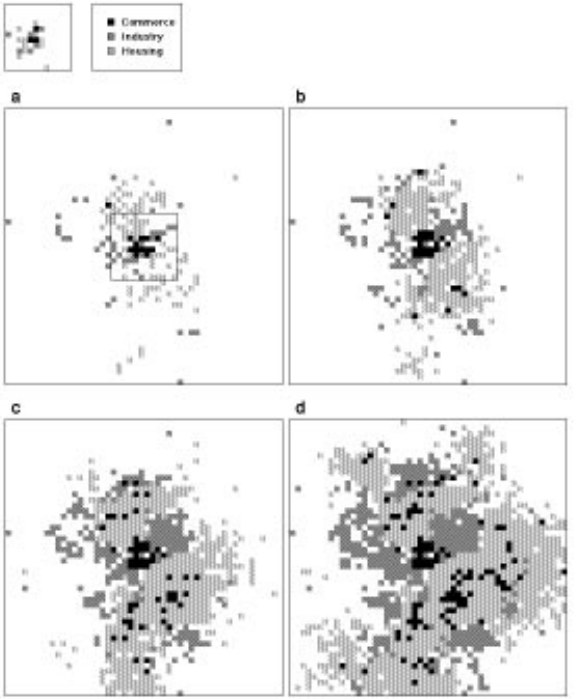
In our earlier work (White et al., 1993, 1994, 1995; Engelen et al. 1993, 1994, 1995) we have developed CA models with a high level of generic applicability:

- The cell states represent 7 to 12 land-use or land-cover categories.
- The neighbourhood is larger than for traditional CA and consists of 113 cells maximum;
- The transition functions are written as distance functions and represent the push and pull forces between pairs of land-uses.

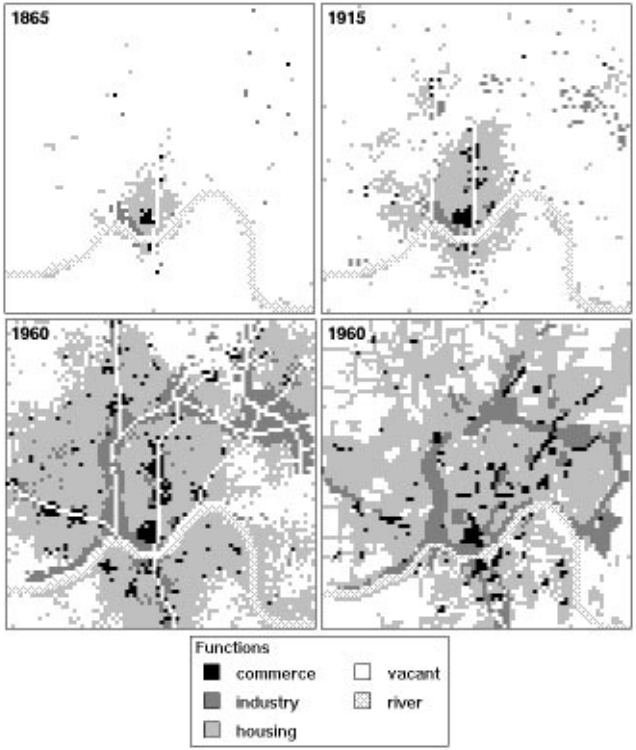
A number of practical exercises, both in intra-urban and inter-urban applications of the model lead us to a number of important conclusions:

We have run the models with and without noise introduced in the transition rules. In a first series of simulations, we have shown the importance of the stochastic perturbation introduced into the model and have generated artificial cities with structures resembling strongly those of existing cities (White and Engelen, 1993). To that end the fractal dimension of the urban clusters generated have been

compared with those of real cities (Frankhauser, 1991). One conclusion from the study is that CA modes are capable of generating realistic urban form at a macroscopic level despite the fact that their transition rules operate locally only. Another conclusion is that the inclusion of some degree of messiness in the model is required to develop realistic urban structures featuring observed levels of complexity (figure 1).

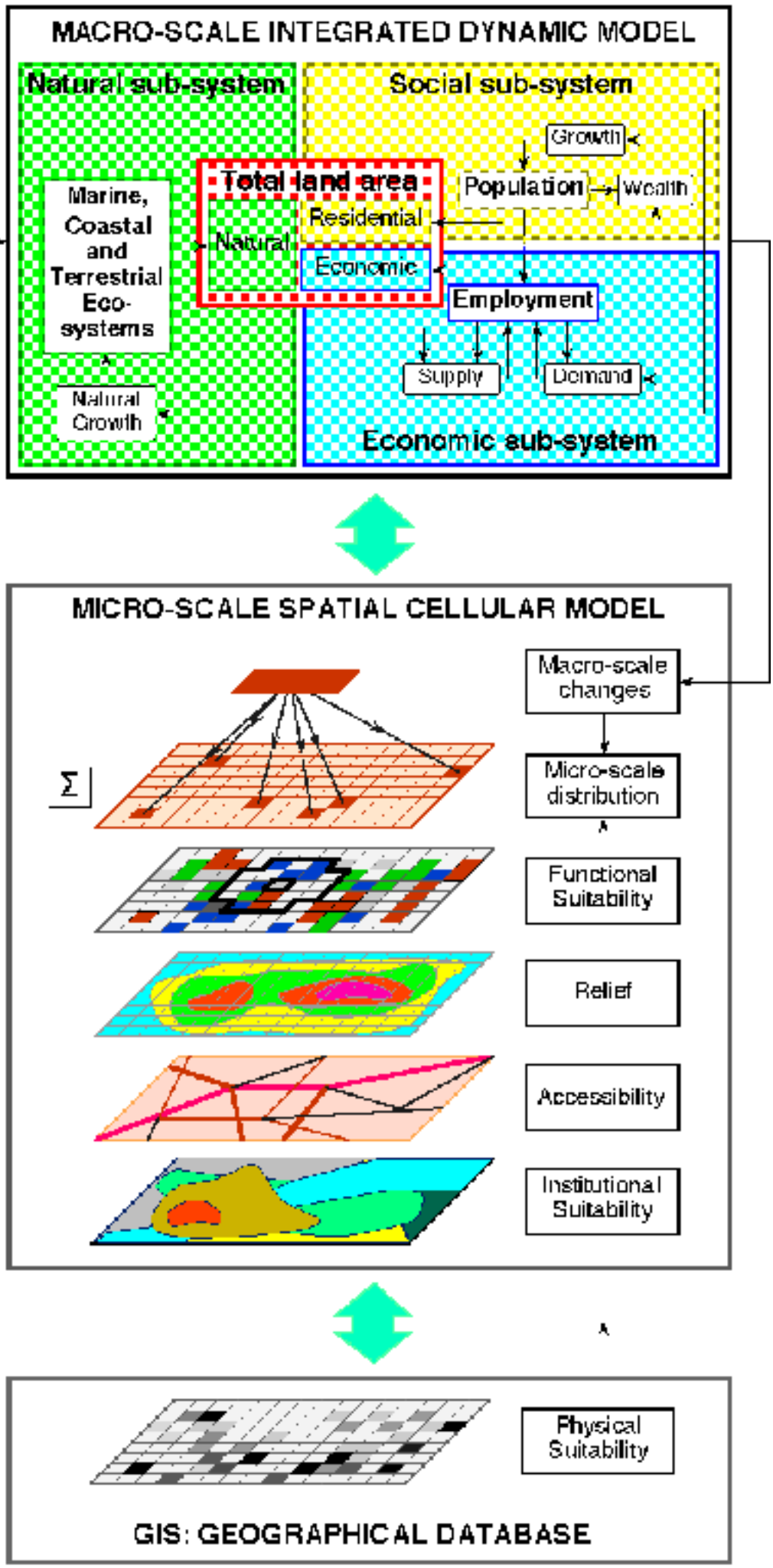

Commerce
Industry
Housing
a
b
c
d

We have run the models on fully homogeneous landscapes and on (geographical) realistic landscapes with idiosyncrasies introduced at the level of the individual cell. Idiosyncrasies are obtained from the GIS on which we develop our generic CA model and include among others: physical and environmental characteristics, historic elements, institutional constraints, and accessibility to the transportation networks. In the application of a simple model to Cincinnati, we could reconstruct, in a satisfactory manner, the historic development of the real city, which is strongly influenced by the cityõs specific location on a plateau strongly dissected by the Ohio river and its tributaries and the growth of the transportation system (White et al., 1995). The introduction of idiosyncrasies in the model is strongly stabilising the growth of the city, but adds detail to the simulations which has its importance in the application to real cases (figure 2).



Three stages in the simulation of grouth Cincinnati (the dates are approximate), and the real land-use in Cincinnati in 1960.
(after Passonneau and Wurman 1966)

We ran all of the models with a strong constraint on their overall dynamics. More precisely, we ôforcedõ the CA models by means of a more or less detailed macro model, imposing at each simulation time step the total number of cells in each state required in the cellular micro representation (figure 3). In the applications mentioned above, this macro model is simply a constant or variable growth coefficient. In the application of the model to a Caribbean Island, as part of a UNEP (United Nations Environment Programme) study of the effects of climatic change on the socio-economics of small islands and coastal states, the macro model is an integrated systems model, representing the dynamics of the island as the result of demographic and economic growth and influenced by climate change induced factors (Engelen et al., 1993, 1995a, 1995b). Both levels exchange relevant information in a bi-directional manner. The macro model represents the Island as a single geographical zone interacting with the world outside. It generates in each simulation step the new socio-economic activities and the demand for space to house them. The cellular micro model places the activities on a grid consisting of 4200 cells and returns the supply of suitable land and its cost. In an experiment (Engelen et al., 1995c), the Island is sub-divided into 4 macro regions, and the macro model forces the growth of the individual regions on the cellular level. We demonstrated that such representation --featuring a multi-regional model at the macro-level linked to a cellular model at the micro-level--, allows to study the growth of clusters of activity crossing regional borders. Hence, that urban dynamics no longer need to be defined in terms of discrete areas represented as interacting centroids, rather that constrained CA models can deal with space in a continuos manner and that urban morphology can be treated as a structuring element. We can now start to think of a new breed of models that will permit to grow urban clusters at the micro level, to detect them when they outgrow their local role and get regional significance, and to include them in a macro level representation


MACRO-SCALE INTEGRATED DYNAMIC MODEL
Natural sub-system
Social sub-system
Growth
Total land area
Population
Wealth
Residential
Marine, Coastal and Terrestrial Eco-systems
Natural
Economic
Employment
Supply
Demand
Natural Growth
Economic sub-system
MICRO-SCALE SPATIAL CELLULAR MODEL
Σ
Macro-scale changes
Micro-scale distribution
Functional Suitability
Relief
Accessibility
Institutional Suitability
Physical Suitability
GIS: GEOGRAPHICAL DATABASE

where they can further grow and structure due to longer range interactions.

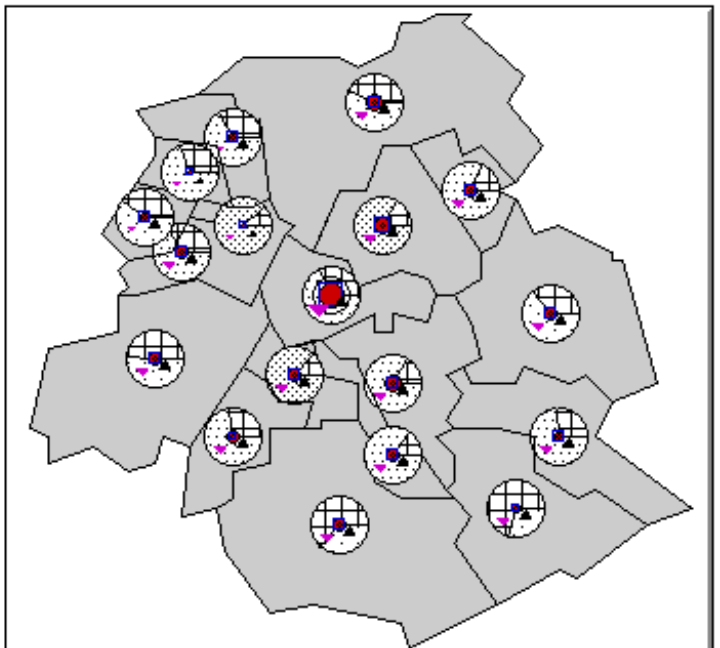
We can also force the Cellular Automata models by means of spatial interaction based dynamic models at the macro level (White and Engelen, 1994b). This is the solution which we propose in the context of this research programme. The spatial interaction model selected for this purpose is the Intra-Urban model which has been developed in the Brussels School and which has been adapted and refined over a long period of time (Allen and Sanglier, 1981; Allen et al., 1985, 1986; Pumain et al., 1989; Buchendorfer, 1995). This model describes urban dynamics in terms of a number of socio-economic actors in an urban area developed on some 40 zones. Typically 2 social groups are retained (blue-collar and white-collar residents) and 5 economic sectors (exporting tertiary, specialised tertiary, elementary tertiary, light industry and exporting industry). Each of the zones is described by means of the same set of non linear differential equations. Each equation captures the specific location criteria and functional needs of one actor. These include interactions internal to the zone, as well as interactions with the remainder of the urban area. The dynamics unfold as each of the urban actors tries to satisfy his specific needs and changes its location accordingly. In his effort to do so, he is attracted by the location benefits and idiosyncrasies of the individual zones, but constrained by the needs, relative strength and actual moves of the other actors. His perception of locational benefits is anyhow somewhat fuzzy as represented by a stochastic element in the attractivity functions. From this spatial interplay, spatial market structures and settlement patterns emerge that gradually organise space as the result of a particular history. Many simulations have shown that structurally very different cities could be generated from the same initial conditions. None of these is necessarily optimal or identical to another in terms of costs, utility or efficiency, rather that each is one of many

possible situations that could survive according to the urban logic (Allen, 1995).

In the past this model was calibrated to the point of representing the general characteristics of a Brussels-like city called Brussaville (figure 4). A history similar to the one for Brussels was simulated which showed how the heavy exporting industry concentrates on the canal running NE-SW through the centre of the city, how exporting tertiary activities concentrate on the axis running from the centre to the east, how the airport in the NE is attracting light industry and how Bleu and White collar residents live somewhat segregated in the city, attracted as they are to their job locations. The stability of this model to fluctuations was tested in a number of simulation exercises that involved more or less realistic policy interventions. Among the more realistic exercises we mention changes in the public or private transportation networks, the introduction of telecommunication systems and tele-working, and investments in retailing floor space. Each of these exercises have been discussed at length in other publications.

DYC Viewer V1.0

1995 by
Thomas Buchendorfer
CEAC/CMTA
Cranfield University



Legend

Number of workers

blue collar	white collar
1-100	1-100
-250	-250
-500	-500
500+	500+

network links

- city_highway
- major_road
- local_road
- train
- underground
- tram
- bus

Service employment

short range	long range
1-10	1-10
-25	-50
-50	-100
-100	-250
-250	-500
-500	500+
500+	

Base employment

industry	exp. tertiary
2-25	2-25
-100	-100
-500	-500
500+	500+

In the proposed research, this spatial interaction based model would represent the Brussels area, covering the agglomeration sensu stricto and a first ring of municipalities, thus permitting to study the interaction of Brussels with its periphery. The model would consist of some 50 zones, defined on the basis of census tracts. The variables are urban actors, social as well as economic groups, that play a relevant role in the development of Brussels and European cities in general. Their precise definition should result from the analysis carried out by the multi-disciplinary group, consisting of urban decision makers and planners, modellers, and urban consultants, in charge of the programme. This decision should be based on both an analysis and typology of typical urban problems, the measures and indicators of sustainability and the scope of policy interventions that one would want to test and evaluate.

At the micro level, a grid is laid out over the same area, consisting of some 40.000 cells with a resolution of possibly 200 meter on the side. The cell states will be the urban land-uses, which are represented in the macro level model, augmented with a number of specific characteristics only relevant at this level. The transportation systems, the physical, environmental and institutional characteristics of the region will be stored in the GIS of the system and will be considered in the model at both levels.

3. Decision Support ...

A Decision Support System can best be pictured as a computer-based problem-solving ôtool kitõ to be used in an interactive manner by managers to assist them in their decision making. It utilises

formal models and analytic techniques in combination with internal and external databases to solve semi-structured and unstructured problems such as those encountered in strategic planning in complex decision domains (El-Najdawi and Stylianou, 1993). DSS emphasise flexibility, effectiveness and adaptability, hence are at best systems with an open architecture to permit their updating and expansion as new knowledge and tools become available. The primary function of DSS systems is to improve the quality of the decision making process. It is inherently understood that if the process can be improved, higher quality decisions will be the end result. From the management sciences, DSS methodologies have adopted the view that ôdecision makingõ is a process consisting of various stages that are being stepped through linearly or cyclically. Generally three phases are defined in the decision making process (Janssen, 1992): the identification phase, the development phase and the selection phase.

From the fields of psychology and economics, the idea is adopted that decision making is a normative process: given a certain definition of optimality, decision rules are developed that result in an optimal solution for a stated problem. For the purpose of strategic management in highly dynamic complex systems such as cities, the search for and the design of an ôoptimalõ solution remains an utopia. Rather, adequate techniques are required that support and stimulate the decision maker in recognising actual problems and anticipating future ones. These should also allow him to formulate and test possible solutions to assure a ôsafeõ future for the system. For such exercises - and despite the fact that they are not typically used in DSS - simulation models are effective means (Boersma, 1989), because:

- they permit to represent complex situations that are beyond the reach of the operations

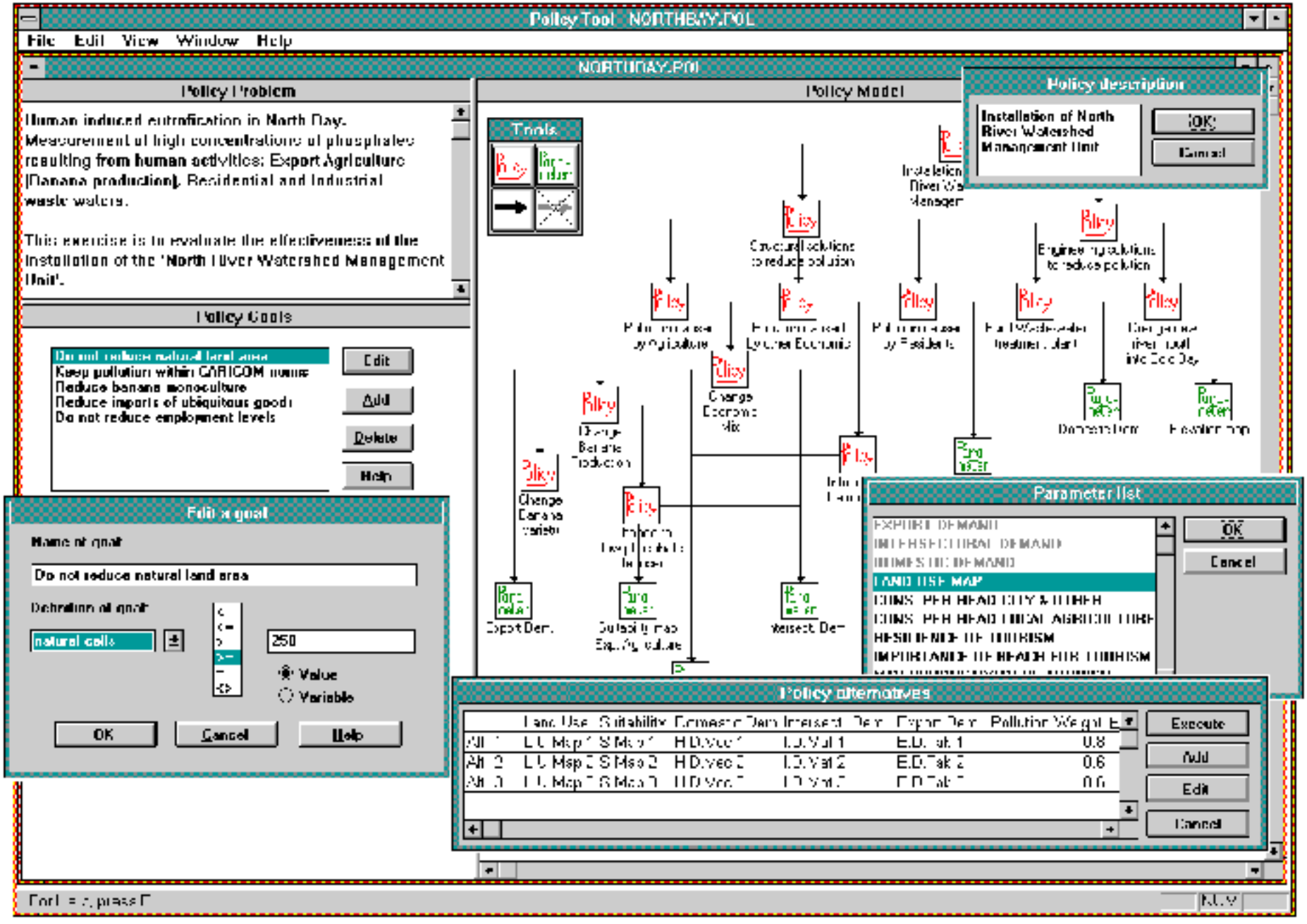
research and analytical methods typically used in DSS;

- they permit an intuitive, plastic representation of reality, thus providing a better insight in the actual decision domain and the particular decision situations;
- they permit to calculate alternative, comparable futures, thus constituting an instrument to investigate the likeliness of a desirable situation through experimentation.

But, simulation models remain poor decision tools, in the sense that they are not goal-directed. Rather, an initial condition, along with constraints on the model, is solved and propagated forwards in time. By means of ôWhat-ifõ analysis, the user is to change the initial state, or the constraints, till the model will produce a desired final result. It is by no means certain that this final result can or will ever be reached, nor is it clear why this is the case. The task of the user can be made somewhat easier by adding some decision instruments to the DSS that will assist in the selection of states that come as close as possible to the desired ones.

In the context of this research programme, we propose the further elaboration of a DSS which we began to develop (Engelen et al., 1993a, 1993b, 1995b; Schutzelaars et al., 1994). Ideally such a system will consist of the following computer instruments, all performing dedicated task in the same software environment and capable of exchanging relevant information with one another at run-time:

- An IDENTIFICATION tool supports the user in the identification of the planning problem.


Policy Tool - NORTHBAY.POL
File Edit View Window Help
NORTHBAY.POL
Policy Problem
Human induced eutrofication in North Bay.
Measurement of high concentrations of phosphates resulting from human activities: Export Agriculture (Banana production), Residential and Industrial waste waters.
This exercise is to evaluate the effectiveness of the installation of the 'North River Watershed Management Unit'.
Policy Goals
Do not reduce natural land area
Keep pollution within CARICOM norms
Reduce banana monoculture
Reduce imports of ubiquitous goods
Do not reduce employment levels
Edit
Add
Delete
Help
Edit a goal
Name of goal
Do not reduce natural land area
Definition of goal
natural soils
250
Value
Variable
OK
Cancel
Help
Policy Model
Tools
Policy description
Installation of North River Watershed Management Unit
OK
Cancel
Parameter list
EXPORT DEMAND
INTERSECTORAL DEMAND
DOMESTIC DEMAND
LAND USE MAP
COINS PER HEAD CITY & OTHER
COINS PER HEAD RURAL AGRICULTURE
RESIDENCE OF TOURISM
IMPORTANCE OF REGION FOR TOURISM
OK
Cancel
Policy alternatives
Land Use
Suitability
Domestic Dem
Intersect. Dem
Export Dem
Pollution Weight
Execute
Add
Edit
Cancel
For Help, press F1
NUM

It accepts a textual (figure 5, left and top) and a graphical description of the planning problem. For the graphical description the user will select or draw the policy model which he intends to apply in solving the problem (figure 5, right and top). The policy model links its graphical objects to the parameters and the state variables of the underlying simulation model(s). Different settings of parameters can be stored as policy alternatives (figure 5, right and bottom), each of which is run by means of the SIMULATOR tool. The simulation results are stored for subsequent analysis.

- A TARGET tool permits the user to define his policy goals --or targets-- expressed in terms of the model variables (or combinations thereof) and to set associated criteria or threshold values. The simulation results obtained when running the different policy alternatives are compared by means of the COMPARE tool or tested against the policy goals with the EVALUATE tool (figure 5, left).
- A SIMULATOR tool consists of a number of instruments built around the simulation model(s) that support the user in running and testing policy alternatives. It concerns tools for data entry, retrieval and display; for mapping; for text editing and graphical (map)editing; for

imposing shocks or stochastic perturbations onto the modelled system; ôwhat if?õ analysis, sensitivity analysis; and tools for setting the preferences with regards to the output and report generation. There is a policy-history manager which enables the user to store successive policy interventions as histories, in order to be re-played and modified at a later time, and thus permitting the policy analyst to ôfine-tuneõ policies in which he has a special interest. Several other support functions could be included, notably a hypertext-like explanatory guide to the simulation and decision models used, as well as context-sensitive help functions.

- A COMPARE tool consists of instruments to compare, visualise and report any two simulation states, or simulation experiments. From such comparison it is possible to detect the differences within and between simulation runs at the level of the individual cells, clusters of cells, and the system as a whole.
- An EVALUATE tool performs a multi-criteria analysis and ranks the policy alternatives (run with the SIMULATOR tool) as to their adequacy with the pre-defined targets (set by means of the TARGET tool). The tool allows to set the priorities of environmental, natural, economic and social criteria individually and interactively. Similarly it permits to set

priorities for zones within the region and set fault tolerances for each policy experiment. It displays the results graphically and generates an evaluation report.

- Finally, a MONITORING tool performs an ex-post evaluation with regards to the effectiveness of the implemented policies and generates feedback in terms of new targets, new policy options, revision of models, updates of data and knowledge bases as well as new research needs. While the other tools are used in the policy preparation phase, the MONITORING tool is focused on policy management. Its actual implementation is beyond the ambition of this specific research programme.

4. ... and Measuring Sustainability

It is increasingly realised that human induced socio-economic growth, propelled as it is by short term thinking and profit making, no longer is a kind of ô*development meeting the needs of the present generation without compromising the ability of future generations to meet their own*õ. It thus lacks the prerequisite for sustainable development as laid out in the Bruntland report (WCED, 1987). Intuitively this definition of sustainability makes a lot of sense, yet it is extremely difficult to operationalise it for inclusion in formal decision support methods. ô*It is intrinsically inexact. It is not something that can be measured out in coffee spoons. It is not something that you could be*

*numerically accurate about. It is, at best, a general guide to policies that have to do with investment, conservation, and resource use*õ (Solow, 1991). In any attempt to quantify or measure sustainability a number of key elements need to be taken into consideration:

- The element ôtimeõ; sustainable development is measured over time periods that span generations. Hence good indicators should have this temporal dimension, and models dealing with sustainability should be long term strategic models used in exploratory exercises.
- The element ôwell beingõ; sustainable development supposes a level of social and economic well being for all, now and in the future. Sustainability is different from conservation in that it allows some exploitation of resources and production of waste in order to achieve this lasting level of well being.

Economic sustainability concerns the diversity of activities present in the city, the skills and abilities of its inhabitants, and the mechanisms of innovation and change which allow these to modify themselves through time in response to changing circumstances. This is linked to cultural and social attitudes and perceptions, organisational and institutional characteristics and structures, which will influence innovation and technology transfer processes, and the capacity of the system to adopt and to learn new skills and techniques.

Social sustainability concerns perceptions of increasing social inequalities and unequal access to opportunities. It will therefore be linked to the evolution of social values and to the spatial evolution of the urban systems, through the degree of mismatch between employment opportunities and the skills of the inhabitants, the patterns of accessibility and of social deprivation.

- The element ôresource useõ and more specifically ônon-renewable resource useõ; systems are more sustainable if more is done with less resources. Indicators of *environmental sustainability* concern the long term viability of the many systems from which the city draws the multiple flows of matter and energy which it needs to maintain and renew itself. Some of these subsystems, such as sweet water aquifers, extend far beyond the limits of the city itself. The most important flows are those of food, clean water and of air, and the sustainable maintenance of these requires that land and soils should not be degraded by contamination, erosion or the long term effects of food production.
- The element of ôpollution and waste generationõ; in that a sustainable system will produce as little as possible trash and within levels that the system can absorb and putrefy naturally. Indicators will include waste generated per head and per job and the availability of institutional and technological means to avoid, recycle, purify and store it. Policies related to

accessibility and transportation need to be evaluated in terms of air and noise pollution.

- The element of ôadaptability and evolvabilityõ; in that urban systems should maintain high levels of diversity and complexity, keeping them from being driven irreversibly into one or another development scheme, since what seems sustainable today might not be so anymore in the future. Sustainability we take to mean the capacity of the system to continue to renew itself in an adaptive, co-evolutionary process with the meta-system in which it is embedded.
- The element of ôsystem spaceõ; emphasising the openness of urban areas, reflected in the many bi-directional linkages with the world outside, and the need for institutional arrangements that recognise this openness (Brehemy, 1992).

Operational sustainability indicators for use in the evaluation procedures of the decision making process will therefore measure, for the urban area as a whole, for its detailed spatial subdivisions, but also for the meta-system of which it is part the levels and trends of:

- densities, mixes and congestion (social groups, jobs, activities, traffic congestion, over-concentration, ghetto formation).
- flows of people and goods (levels of necessity and efficiency)

- levels of resource use (in terms of: land, base products, water and energy)
- levels of economic well being (in terms of: economic output, per capita income, specialisation, technological innovation, know how)
- levels of social well being (in terms of: employment; home-work distance and travel; social position and status; nearness, quality and quantity of leisure areas and public services)
- levels of waste generation and environmental degradation (air, water, noise and visual pollution, solid waste, natural and open land lost or dissected, hard surfaced areas, erosion and flooding incidence)

But, we have began this paper with the statement that urban systems are very complex spatial systems. Perturbations and fluctuations will rarely hit the city as a whole, rather at very precise and detailed locations. For example: traffic jams are caused at specific road intersections, large scale gentrification might be initiated by one or two individuals, firm x will open its office in location y. Hence, sustainability needs not only be studied at the level of the city as a whole, rather a detailed analysis is required to pick up signals that might lead to a qualitative shift in its overall operation. Our cellular representation and modelling of the city has a number of qualities that permit such approach. We have implemented a number of decision tools, that permit to ômeasureõ sustainability at the level of individual cells and clusters thereof (Engelen et al., 1994). We will describe two of them very

briefly here.

The Transition-Potential Indicator.

Transition rules determine the state changes of the cells in Cellular Automata models. Their computation will result in a potential for transition for each cell, from the state it is in, to any other state. In our models, this transition potential is a composite measure which takes into account a number of locational criteria including the physical and environmental quality, the accessibility to transportation systems and the nearness of other urban functions that are essential for the success of the specific state. Hence, mapping of the transition potentials will display the degree of desirability of each cell for each state, or urban function. Not all cells with a high transition potential for a specific state will effectively change into that state. Relative economic bargaining power as well as institutional constraints, resulting from policy interventions, intervene in this process. The maps allow the decision maker to see where speculation and competition for land are highest in his city. If he wants to defend economically weak urban functions, such as housing, against stronger ones, such as office activities, than the maps will help him in trying out interventions that are adequate over longer periods of time.

The Uncertainty Indicator.

The behaviour of socio-economic systems remains largely unpredictable due to their inherent complexity. For their long term modelling this is an essential consideration, and decision makers have to realise that forecasts can only be approximate: they are indications of possible trends rather than

definite statements about the future of the system. Hence, model results should be presented with due attention for this level of uncertainty. To that end we have implemented a tool which will run a simulation not just ones, rather a given number of times with stochasticity introduced at the level of one or more of the model parameters. The result of the simulations is presented in terms of probability maps, one for each land use, displaying for each cell the number of runs that it was occupied by that land use. Thus the decision maker gets an indication of the likeliness that a cell will be taken in by one or another activity. He can thus focus his attention on areas or activities that have a high probability of being endangered and he can prioritise his actions.

5. Application to the case of Brussels

Brussels is a city with a degree of complexity to make it into a challenging case for developing the models and tools described. Brussels has some 1,5 million inhabitants and has witnessed since the late sixties a strong delocalization of its population to the periphery. This, in combination with an increased and dispersed employment, causes serious traffic problems during the morning rush hour. It is a rather classical case of a city loosing its residential attractivity. Recently, a strong rise of the housing rents, linked to its new function as European capital, has accelerated this phenomenon. The result is a city hampered in its development as it faces important investment obligations while its main source of income --the residents income taxes-- decreases. Important problems of air pollution caused by road traffic, of water pollution caused by households and industrial activities, and of noise nuisance add up to the basic socio-economic, spatial and organisational problems. Concerned by such pessimistic diagnosis, the Government of the Brussels Region, one of the three regions of the new

federal State of Belgium, has conceived a regional development plan. Thus, the need for policy intervention and new planning instruments to support it, has been understood and expressed.

Other reasons to choose Brussels as a case is the availability of a usable prototype of a mathematical model (see section 2), a large number of studies and data related to land-use and traffic (STRATEC, 1988, 1992, 1993, 1994), good time series on its evolution and the existence of an institutional structure permitting efficient policy intervention. The readiness for action is real now that the cityõs autonomy has largely increased with its new status in the federal state: independent housing policies, land-use regulations, new environment management policies, transport policies, employment creation programmes, and effective means to implement this.

With focus on the case of Brussels, the research is to evolve through the following steps:

1. the constitution of a *User Grou*p consisting of urban managers, planners and policy makers from European cities including Brussels. They are potential end-users of the methodology and instruments developed. They provide their input as domain experts and express their needs and desires in terms of new decision instruments. They assist in the development of the methodology and models and evaluate the decision support tools developed;
2. the concise *review of problems* existing in European cities, and the analysis of existing,

intended or experimental policies to remedy these problems;

3. the definition, selection and implementation of a set of relevant *indicators* usable in determining the sustainability of urban activities;
4. the development, in line with the findings from activities 2 and 3, a mathematical simulation model capable of realistically representing urban systems and with an aim to use it for designing policies aimed at sustainable development;
5. the encapsulation of the model, augmented with decision methods and tools, in a decision support environment. The latter should be as generic as possible in order to be made applicable to most (European) urban areas in subsequent development stages;
6. the requirements analysis and development plan for application of the methodology and support system to other (European) cities.

6. Conclusions

We have outlined the contents of a research programme that would result in a prototype of a model-based spatial decision support system (DSS) usable in the design and evaluation of sustainable urban

policies. An application to the city of Brussels will serve as a case to develop the methodology as well as the particular tools that are required. Brussels is chosen for the test application because of the size of the city, its level of complexity, the availability of earlier work as well as the needs, expressed by policy makers, for decision instruments of the kind proposed. The case study should demonstrate the strength of the approach, but also lead to suggestions for improving the methodology and tools developed, and to the definition of precise terms of reference for the advanced application of the ultimate, and generic, framework to Brussels and other European cities.

The research concerns an iterative development and implementation process in which the end-users of the product are actively participating from the very beginning. A process also that can benefit from a great deal of usable material readily available. This is specifically the case for the simulation models that are to be used and the decision support shell in which they are to be embedded. It concerns instruments that can handle the intrinsic complexity of cities realistically at a level of geographical detail which is novel. These models can benefit from existing rich census datasets as well as unique data-sets resulting from surveys and studies carried out in the past.

The approach permits the straightforward integration of detailed physical, environmental, and institutional constraints, as well as the inclusion of the effects of the transportation and communication infrastructure. It thus permits a very detailed representation of evolving spatial systems, and allows the examination of issues related to morphological change which are lost in more traditional spatial models dealing with interacting regions in terms of centroids representing homogeneous areas. Thus it is very well suited for the study of local and global factors influencing urban growth.

The high level of spatial detail retained in the dynamic model provides a good basis for working with the complex nature and information rich character of urban areas. Based on the growing evidence that complexity is a prerequisite for the survival and success of natural as well as man-made systems, it seems essential that measures of sustainability should be able to capture this complexity in an operational sense. Hence, a special effort will be made to develop and implement such measures.

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Figure Captions

Figure 1. 5 stages in the development of a cellular city: initial state (upper left) and iterations 10 (a), 20 (b), 30 (c) and 40 (d).

Figure 2. 3 stages in the simulation of the growth of Cincinnati (the dates are approximate), and the real land-use in Cincinnati in 1960 (after Passonneau and Wurman, 1966) (botom left)

Figure 3. The two-level Constrained Cellular Automata model of the Caribbean Island.

Figure 4. The user interface of the Brussaville model (after Buchendorfer, 1995).

Figure 5. View of a combined IDENTIFICATION - TARGET - EVALUATION tool, applied in a policy exercise with the Island model.

VIRTUAL REALITY TO DETECT CITIZEN REACTION TO TOWN PLANNING

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ABSTRACT

This paper deals with the design of a hardware-software tool supporting town-planning designer and sociologist for the evaluation of emotional impact of the inhabitant with respect to a real (built or already utilised) or potential (in the design phase) environment. The presented tool is based on Virtual Reality technologies and exploits different components capable of allowing a direct, realistic sense of

presence of the user inside the simulated scenario. The general idea is presented. A detailed analysis of the interaction devices is given with a particular emphasis on force feedback interfaces.

1. INTRODUCTION

The town-planner should propose design solutions that can satisfy the largest class of users/town-subjects. The dimensions of the present metropolitan areas do not allow a direct, effective contact between the designer and future users.

In this framework, the figure of a go-between able to interpret, by means of statistical and sociological studies, the needs and expectations of the users/town-subjects becomes essential.

However, statistical and sociological tools do not allow the expert to evaluate the effects of interventions on limited areas (e.g. constructions of new buildings such as commercial/administrative centres, or realisation of parking areas, parks, etc.) neither to monitor the attitude and the utilisation by which the potential users will exploit them. In fact, the user frequently utilises such spaces according to a different modality with respect to those developed by the designer; in the town-planning terminology, two words - *potential design* and *effective design* have been coined in order to denote the difference between the functionality foreseen at the design phase with respect to that concretely realised by the utilisation performed by the user/inhabitant.

At the same time it is very important to completely realise the new users attitudes towards the existing structures or spaces, in order to adapt them to the new needs.

In recent years the concept of Virtual Environments has attracted a lot of potential applications, most of them dedicated also to the architectural field. The power of a Virtual Environment primarily resides in the “immersion” of the user inside the simulated scenario: with respect to scientific visualisation tools or CAD representations of urban - civic environments, VE representations allow a higher degree of interaction with the graphical environment. Several interaction modalities have been considered; all human senses have been exploited in order to design and realise adequate man-machine interface systems for replications sensory information on the represented environment on the user.

2. THE APPROACH BASED ON VE TECHNOLOGIES

The aim of the approach we intend to pursue is to realise a fully immersive Virtual Reality system capable to allow - *in loco* - objective judgement of the relationship that is growing between people and spaces, of the psychological attitude and on how a user enjoys a particular habitat which has been just designed or built.

Today the interest of the architect and of the city planner for software, computer graphics, scientific visualisation of data and non interactive simulation is certainly growing.

However such tools are mainly used to show the plan to outsiders. However they can not offer to the designer any information related to the evaluation of the correspondence of the plan to the users

needs.

The proposed experience has not to be just visual but has to involve other senses (haptic, acoustic, tactile, thermal) in order to have a virtually complete experience such as to realise a fully emotional reaction for the representative sample of users. The approach we intend to follow is based on the construction of a Virtual Environments system by which it will be possible to evaluate the adequacy of an existing place to the real needs of the inhabitants and to monitor their new expectations. Furthermore, in a verification phase of a new plan, it will be possible to evaluate the correspondence of the virtually "real space" with the aims of the designer.
Such a tool will be utilised with a sample of users/ inhabitants who will be immersed into a virtual environment reproducing the area subjected to the study.

The user will be able to interact with the immersive environment in real time.

The user will display her/his preferences, spontaneously or driven by appropriate stimuli (such as visual, acoustic, tactile; direct or indirect). These choices, appropriately interpreted, could be subjected to sociological and statistic analysis in order to reveal the real explicit and implicit expectations and needs of the people and, in general, how she/he approaches the plan.

The user will be faced with the effect of the choices made, simulated on the area subjected to the study; such effects will be local or mediated in the surrounding areas.

By using *ad hoc* simulation models and by considering the surrounding areas with respect to the one under study, a more careful evaluation of the environmental impact of the plan can be performed:

not only from an aesthetic point of view but also by considering the effect on traffic saturation, acoustic pollution, etc. (ref. EC 337/85) that cause environmental damages and drastically reduce the quality of life for the inhabitants

3. VE SYSTEM HARDWARE AND SOFTWARE

The aim for evaluating the user's emotional reaction to the virtual environment in now a realistic possibility.

In fact, although commercial virtual reality products are often not capable to completely and realistically involve the user, recent advances in VE technology allow to foresee a realistic immersion (and interaction) for the next few years.

The components of a VE system can be outlined as:

1. "representation component", dealing with the graphical presentation of the simulated scenario. Usually 3D graphical representations are utilised and the user can "navigate" inside the 3D environment by moving his/her point of view according to the movements of his/her head. The representation of the 3D environment is given on Head Mounted Display (HMD), located directly in front of the user's eyes; at present the graphical representation obtained

from HMD is not completely satisfactory due to technological problems in terms of frequency of frame representation, visual resolution, distortions of the image. High performance HMDs derive from military applications and their cost is unaffordable. In the presented approach, the immersion of the user is a room where computer generated images are projected (for example by projector or retroprojector) on maxiscreens, is foreseen as more suitable. In this way the user completely exploits his/her natural head movements and it is possible to overcome the above-mentioned technological problems by obtaining a natural visual immersion. From the point of view of graphical image generators, today there are manufacturers (in particular Silicon Graphics Inc., Mountain View, CA) producing a workstation with accelerated graphical boards that are capable of generating realistic scenarios in real-time. S.G.I. Workstations like *Onyx/Reality Engine(* are able to draw 1.6 millions of flat shaded triangles per second and 0.9 millions texture triangles per second, allowing to develop, by also using a graphic library like GL or a toolkit such as Performer, applications in which the user can explore and interact in real time with the virtual environment.

2. “behavioural component”, consisting in the modelling modules capable of generating the behaviour of virtual entities. At present existing commercial VE systems do not comprehend such modules. As an example, the interaction between virtual objects and virtual body parts is not modelled at all and these complex behaviours are only simulated with simple software tricks. In the work we intend to carry out, modelling modules such as collision detection among virtual entities as well as dynamic behaviour of virtual objects will be addressed. In this way a higher realism can be achieved.
3. “interaction component”, that comprehends all the interface systems capable to elicit sensory sensations to the user. In this component of a VE system we can include auditory, force, tactile feedback systems (this group of interface system can be usually categorised as “afferent interfaces”) also “efferent interfaces”, devoted to monitor and record the necessary movements of the user’s body (such as hands and head), can be considered as belonging to the interaction component. In fact, sight is one of the most important senses, but in order to obtain a complete emotional involvement by the user it is necessary to wrap her/him in a wider set of stimuli. We will have to add an acoustic system, driven by software being able to

generate coherent sounds with the simulated environment.

Today, by using computers, it is possible to generate sounds giving the impression to the user of being located in a particular position in the 3D space and to generate a whole range of acoustic effects capable to increase the realistic sensation of the virtual presence.

Other senses, such as the tactile sense, can be stimulated by means of special kinds of actuated gloves. When an effective VE system implements all the three components, the sense of presence of the user inside the simulated environment can vary according to different degrees: from the possibility to "move" inside the synthetic space by exploiting only efferent interfaces and high rendering graphical representations, to the effective capability to physically control the virtual entities (to grasp virtual objects, explore them and vary their relative spatial position) by implementing different kinds of afferent interfaces such as force and tactile feedback systems.

For architectural and urbanistic purposes, the user, immersed in a realistic simulation of the "potential-space" (the architect design) will be able to interact with the surrounding immersive environments, also by modifying them, without any interruption in the perception of the virtual space she/he is exploring.

It is possible to develop new kinds of interfaces devoted to increase the naturalness of the deambulation and the user's interaction in/with the virtual environment (for example to allow the user to move himself in the room where virtual images are displayed).

Such a high degree of realism that the user will feel in the virtual environment makes it possible to

examine the emotions displayed and the sensations felt by the user, by considering them like those related to the real scenario.

4. FORCE FEEDBACK INTERFACES

In the VE system devoted to evaluate the user's reaction to the design of new architectural places, the possibility for the user to physically interact with the graphically represented entities can represent an innovative characteristic with respect to existing architectural CAD representations or commercial VE applications.

For demonstrating the capabilities of force feedback systems, in the following two systems developed at the PERCRO laboratory of the Scuola Superiore S. Anna in the framework of the ESPRIT n. 5363 GLAD-IN-ART project, will be presented.

A first system is a mechanical exoskeleton for the human arm capable of generating forces at the level of the arm and external forces acting against the hand. The arm exoskeleton consists of a mechanical structure wrapping up the whole human arm and composed of links connected through 7 degrees of freedom (DOF) located in correspondence of the human arm joints. The open kinematic chain representing such a structure can be described as: the DOF of the exoskeleton follows the configuration of the arm joints: there are 2 DOF at the shoulder (flexion-extension and adduction-abduction movements); 1 DOF in correspondence of the arm (arm rotation); 1 DOF at the elbow (flexion-extension); 1 DOF in correspondence of the forearm (prono-supination movement); 2 DOF

at the wrist level (flexion-extension and adduction-abduction). The structure follows the movements performed by the human arm although limited constraints due to the mechanical limits in some joints (e.g. shoulder joints) do not allow to span the complete workspace of the arm. However very good mobility is allowed around an initial reference position assumed as significant for manipulative operations (arm vertical, forearm horizontally flexed, intermediate position between pronation and supination).

Each joint of the arm exoskeleton is actuated by means of DC servomotors located on the structure; the motion of each joint is obtained through a tension tendon-based transmission system. Joint rotation sensors have been integrated for each joint. The arrangement of the actuators and sensors allows the system to be completely portable and this fact can generate a complete portability of the system during operation, i.e. the user, wearing the arm exoskeleton, can freely move in the real control space.

Experimental tests have been successfully performed by controlling the interaction of a virtual arm against virtual surfaces (vertical, horizontal, oblique as well as spherical surfaces). Contact forces are replicated by the arm exoskeleton at the level of the hand, where the structure is connected through a plate at the dorsal part of the metacarpus. This plate has been integrated on a glove that allows an easy wearing operation.

Forces at the level of the fingers, especially those forces arising during the control of grasping and manipulative operations, are replicated by a hand force feedback (HFF) system consisting of a parallel configuration of finger exoskeletons. Each finger exoskeleton consists of four links connected by

revolute joints disposed as the joints of each finger.

For each joint of the finger exoskeleton, the joint axis has been designed in order to approximate the instantaneous position of the flexion-extension axis during operation. Due to technological and compactness problems only the 3 DOF representing the flexion-extension movements ot the fingers are actuated, while all joints integrate rotation sensors (adduction-abduction movements at the metacarpophalangeal joint included).

For each finger, forces at the level of each phalanx are obtained according to the simplified configuration; the resulting force, mimicking the grasping contact force in the virtual environment, is applied at the centre of each phalanx with the direction such as to constrain the closure motions exerted by the user's fingers. From the mechanical point of view, these forces at the level of each phalanx are obtained through a complex tension tendon-based transmission system driven by DC servomotors located at the level of the back of the hand.

Also for the HFF system, experimental tests have been performed by considering grasping operations of virtual objects possessing a simplified geometry (e.g. cubes, spheres, polyhedra). The forces experienced by the user are such as to allow him to recognise the incipient contact with the virtual object. A video of the experiments developed by exploiting an ad hoc collision detection procedure for real time operation will be presented.

5. MONITORING OF AN EXISTING SPACE

The VE system we intend to propose will be used also to verify the functionality of an existing place in consideration of the changes and the new growing needs of the users/inhabitants.
If we now pay attention to the particulars of the verification process of an existing place we can identify the following phases:

1. Monitoring the evolution of inhabitants' needs by testing a chosen sample of users in the virtual environment, reproducing the existing place.
2. The user is able to interact with the environment and to modify it, spontaneously or driven by appropriate multimedia stimuli, on the basis of an array of predefined choices. The software will simulate the effects of the performed choices in the workspace and in the adjacent involved areas.
3. The user will face, directly in her/his workspace, the effects of her/his actions; furthermore she/he will recognise the repercussions of her/his actions, not only in the limited area of the workspace but also in the whole urban scenario. For example we can consider the effect on the air, acoustic and thermal pollution caused by a variation of the state of the road condition.

4. The user will be able to modify again the scenario, thus balancing her/his different expectation and needs.
5. The designer creates a plan that ideally satisfies the eventual new needs showed during the above mentioned activities.
6. The functionality of the plan is tested by a representative chosen sample of users/inhabitants by using the already described system, capable of giving rise to a sufficient realistic effect.
7. The executed choose* will be analysed in order to evaluate the correspondence of the plan to the real needs of the users/inhabitants and/or designer's purposes. The evaluation of eventual produced changes, will be done by a new iteration of the above mentioned points.

If we now pay attention to the correspondence between a potential plan and a real plan, we can identify the following phases:

1. The functionality of the plan is tested by a representative chosen sample of users/inhabitants, by using the already described system, capable of giving rise to a sufficient realistic effect.
2. The executed choose* will be analysed in order to evaluate the correspondence of the plan to

the real needs of the users/inhabitants and/or designer's purposes. The evaluation of eventual produced changes, will be done by a new iteration of the above mentioned points.

6. CONCLUSIONS

The aim of such a system is to pre-evaluate the impact on users/inhabitants both from an aesthetic/ visual impact point of view and to understand the use the inhabitants will actually perform of the effective built plan.

This tool is made for evaluating the user's attitude towards the examined space and his/her consequent emotional reactions.

The factors that can be quantified are:

- Behavioural reaction: monitoring the gestural expressiveness, choosing its own path.
- The impact of the chosen user of the scenario, will be evaluated considering the exterior attitude, by using sensorised survey about: gestural expressiveness, facial expression, muscular contraction, other parameters indicating any emotional stress (heartbeat, perspiration), other physiological data, path planning analysis during the exploration of

virtual environment. In the same way we can imagine to evaluate an emotional state through the analysis of the reaction to appropriate stimuli and of the performed choices in relation to specific inputs.

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Un modele pour simuler l'impact d'un projet d'amenagement sur la dynamique urbaine

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INTRODUCTION

La ville est un tout organisé. La répartition des activités, des habitants, et des catégories sociales dépendent de facteurs déterminants de nature différente: géographiques, démo-économiques et sociaux. Ils se combinent en proportions variables et produisent l’entité urbaine.

Actuellement, certaines villes sont en crise, les manifestations en sont nombreuses : urbanisation anarchique, pollution, ségrégation, contribuent de façon complexe à ce dysfonctionnement. Pour lutter contre ces phénomènes, les pays industrialisés ont modifié leurs politiques urbaines et pris un certain nombre de mesures. D'abord confronté à une forte demande de logements et donc tourné vers une politique quantitative, l'orientation de l'aménagement est devenue, depuis les années 80, plus qualitative. Cette exigence de qualité a des conséquences sur les méthodes d'approche des problèmes urbains, et notamment, la recherche d'un développement urbain durable, d'une ville « durable » (ou sustenable city) [1].

Cette notion, qui tend à être de plus en plus utilisée, s'applique à une politique et à une stratégie visant à assurer la continuité dans le temps du développement économique et social, dans le respect de l'environnement, et sans compromettre les ressources naturelles indispensables à l'activité humaine. On définit en outre le développement durable comme un développement apte à « répondre aux besoins du présent sans compromettre la possibilité de répondre aux besoins des générations à venir » [2].

L'organisation spatiale et le fonctionnement des zones métropolitaines est le résultat d'un processus socio-économique complexe, auquel participe un grand nombre d'agents sociaux et de

1. Extrait du volume II du programme communautaire de politique et d'action pour l'environnement et le développement durable et respectueux de l'environnement, mars 1992.
2. Rapport de la commission mondiale sur l'environnement et le développement durable, dit "Rapport Brundtland".

décideurs. La conception d'une «ville durable» doit donc intégrer la multiplicité des besoins de la population et tenir compte de la complexité des interactions entre les agents sociaux et les décideurs, et ce, à tous les niveaux d'échelle. Dans cette optique, il apparaît nécessaire de transformer les pratiques, de formaliser de nouvelles approches capables de comprendre la complexité qui sous-tend l'évolution des espaces urbains, et d'évaluer les impacts potentiels des projets d'aménagement.

Afin de contribuer à développer les options technologiques pour la réalisation d'une ville durable, l'objectif de notre projet de recherche est de développer un outil de compréhension des dynamiques urbaines. Notre but est de simuler et visualiser des scénarios d'évolutions urbaines, afin d'aider les décideurs à apprécier l'impact d'un projet d'aménagement sur l'organisation spatiale de la zone en question et le fonctionnement urbain et régional.

Dans un premier temps, nous mettrons en évidence la complexité de la morphogénèse des villes et le rôle primordial des espaces périurbains dans la morphologie actuelle des tissus urbains. Nous montrerons la nécessité d'identifier les différents acteurs et leurs interactions à des niveaux d'échelle différents.

Dans un second temps, nous présenterons les principes et les concepts sur lesquels se fonde notre recherche, ainsi que les outils disponibles adaptés à la résolution de notre problématique. Ceci nous permettra d'élaborer l'architecture de notre modèle. Notre troisième partie, plus technique, sera consacrée à la formalisation du modèle.

1. Les tissus urbains : une morphogenèse et un fonctionnement complexes

La morphologie et le fonctionnement des entités urbaines sont interdépendants et s'influencent mutuellement pour concourir au développement urbain. Afin de mieux comprendre ces interactions nous allons commencer par analyser le rôle des différents facteurs qui contribuent à l'évolution des entités urbaines en examinant tout d'abord l'influence du site, puis les processus socio-économiques et enfin le rôle des acteurs.

1.1. Le rôle du site et le cadre socio-économique

A l'échelle locale, le cadre naturel n'est pas sans influencer l'organisation de l'espace urbain. Le site, configuration du lieu où s'établit la ville, peut en effet imposer des contraintes, qui entraînent par exemple un surcoût de construction, ou au contraire faciliter l'implantation humaine.

A l'échelle régionale et nationale, l'insertion d'une ville dans l'espace national ou international surtout par rapport aux axes de transport revêt une importance certaine dans son évolution. De plus, la position dans le réseau des villes joue beaucoup dans la concurrence qu'elles se livrent pour attirer les entreprises et capter les innovations.

La dimension historique est également un aspect non négligeable. En effet, le tissu urbain actuel est la résultante de plusieurs siècles (même de millénaires) de développement, et conserve des traces liées aux conceptions architecturales de ces époques. La morphologie urbaine fait ainsi référence au

concept de "mémoire" de l’espace.

L’augmentation considérable du taux d’urbanisation au cours des trente dernières années s'est accompagnée d'une forte consommation de l'espace. On s'aperçoit que les préférences des agents pour certains sites ont contribués à ce phénomène. En effet, pour celui qui a la possibilité de choisir sa résidence ou pour l’entreprise qui cherche un emplacement, des critères particuliers liés au site et à la situation (qualité paysagère, accessibilité...) jouent un rôle primordial. L'incohérence visible de l'urbanisation a fortement accentué l'importance sociale des problèmes urbains et a obligé les responsables des politiques urbaines s’intéresser davantage au comportement des acteurs.

1.2. Les acteurs urbains

1.2.1. Les domaines d'intervention

- Un aménagement réfléchi des réseaux de transport

L’accessibilité de l’espace est une condition élémentaire du fonctionnement d’un système de peuplement. L’aménagement de ces réseaux a donc joué un rôle important dans le processus d’urbanisation. Dans un premier temps, le développement des villes était conditionné par la structure des réseaux de transport en commun (métro, tramways) ce qui s'est manifesté par une croissance tentaculaire le long de ces axes. Depuis la motorisation, les politiques d'aménagement ont longtemps favorisé le développement du réseau routier au détriment des transports en commun. Ainsi la desserte de l'espace est devenue beaucoup plus homogène et la croissance urbaine a perdu son caractère

purement axial ce qui a contribué à l'éclatement de l'espace urbanisé. Suite aux impacts négatifs de la motorisation (pollution, saturation du réseau routier) on observe récemment un intérêt croissant pour la création ou la restauration de réseaux de transport en commun, organisés en fonction de la demande des utilisateurs.

- L'importance de l' urbanisme

Sur la base d'une vision essentiellement urbanistique de la ville, les décideurs conçoivent des plans d'aménagement urbain et des politiques de gestion des infrastructures et équipements existants. Pendant la forte poussée urbaine des années 1960-70, le fonctionnalisme était le concept dominant de l'urbanisme. Il favorisait la motorisation et la création de nouvelles entités spatiales, parfois assez éloignées des centres existants et constitués de grands immeubles locatifs. L'architecture monotone de ces quartiers, l'absence de lieux de rencontre et d'infrastructures attractives ont souvent empêché une identification de la population avec leur environnement résidentiel. Cette situation n'a pas facilité l'intégration des nouveaux-venus, d'autant plus que ceux-ci ne travaillent que rarement dans leur commune résidentielle. Ainsi le phénomène de ségrégation sociale a été renforcé et on a observé une dégradation rapide de ces quartiers.

Depuis les années quatre-vingt, les politiques urbaines ont changé d'orientation et favorisent la qualité des aménagements plutôt que le nombre de logement construits. Maintes tentatives ont également eu pour objectif de limiter l'éclatement urbain.

- La compétition entre communes périurbaines

Actuellement, la périurbanisation concerne un espace de plus en plus vaste et un nombre croissant de communes. On constate que les communes périurbaines ne réalisent qu'assez tard qu'elles forment un tout fonctionnel avec la ville-centre. Elles établissent dans un premier temps leur propre stratégie pour attirer des activités, soit délocalisées du centre-ville, soit accompagnant le développement urbain. Une compétition entre communes s'instaure et prive ainsi la ville-centre de ressources, bien qu'elle soit obligée d'assurer un nombre de services croissants. Souvent, ce n'est que lorsque l'étalement de la zone urbanisée dépasse la proche banlieue que les communes acceptent en général d'entrer dans une structure de concertation. Mais alors la croissance périurbaine atteint déjà la prochaine auréole de lieux centraux qui, par leur taille, sont plus autonomes que les communes de la proche banlieue. Ainsi la compétition entre communes s'amplifie.

1.2.2. Les stratégies des agents sociaux et économiques

- Les stratégies résidentielles

Depuis les analyses de l'École de Chicago de nombreuses études, notamment sociologiques, ont mis en évidence l'importance des stratégies résidentielles dans le phénomène d'éclatement des villes et de ségrégation sociale des quartiers. La population cherche à habiter dans des quartiers qui réunissent le maximum d'avantages en regard de ses revenus et de ses propres aspirations, qui sont multiples et parfois contradictoires. Plusieurs analyses (Friedrichs 1983, Prognos 1977) ont montré que ce sont notamment les jeunes couples avec enfants qui considèrent les zones périurbaines comme avantageuses : plus d'espaces verts, moins de nuisances dues au bruit et à la pollution, prix avantageux

du terrain qui permet l'accès à la propriété immobilière. Ce comportement crée une forte demande de terrains à bâtir dans les communes périurbaines. Comme ces nouveaux quartiers sont surtout des lotissements pavillonnaires, la consommation d'espace est d'autant plus forte. Ces observations ont conduit certains auteurs à supposer que les noyaux urbains allaient disparaître complètement (Berry 1976, Vining 1977). Cependant, comme l'a fait remarquer Hoyt (1964), le même groupe d'agents réclame une bonne accessibilité des centres villes. En effet, les centres restent attrayants par leur ambiance urbaine (Hall 1991), par leur services culturels et commerciaux et concentrent ainsi un certain nombre d'emplois. En outre, d'autres classes sociales préfèrent loger au centre-ville, par exemple les couples sans enfants ou les personnes âgées. Il s'agit donc d'une migration sélective vers les zones périurbaines qui renforce la ségrégation sociale. Celle-ci n'est d'ailleurs pas nécessairement perçue comme un phénomène négatif : dès qu'une classe sociale est majoritaire dans un quartier, elle tente de préserver cette homogénéité.

- • Les stratégies économiques

L'importance croissante de la desserte routière au détriment du chemin de fer et des voies navigables permet aux entreprises de choisir assez librement leur emplacement. De ce fait, certains critères avantageux tels que la disponibilité et le prix du terrain, une meilleure accessibilité et les avantages fiscaux accordées par les communes incitent les entreprises et les commerces (grandes surfaces) à s'implanter en périphérie des villes.

I.3. L'échec des politiques urbaines d'aménagement

L'analyse du comportement des différents acteurs montre une diversité considérable de leurs objectifs. Chaque groupe d'acteurs évalue une mesure d'aménagement en fonction de ses propres besoins, dans le but d'obtenir ou de conserver une situation favorable. Par exemple, les propriétaires de maisons situées en bordure d'une zone bâtie, à proximité d'un espace vert, essaieront d'empêcher la réalisation d'un lotissement ou la construction d'une route dans leur voisinage. Cet exemple montre qu'il existe des forces centrifuges qui tendent à empêcher une densification de l'espace urbain et donc à repousser l'urbanisation vers les zones rurales. Les politiques d'aménagement n'ont pas réussi à maîtriser l'étalement des zones périurbaines. Ce dysfonctionnement a contribué à la perte d'identité considérable de beaucoup de communes périurbaines, dont la fonction se borne trop souvent à celle de villes-dortoirs.

Cette évolution aurait nécessité l'élaboration précoce de schémas directeurs au niveau régional, qui définissent les fonctions de certains espaces selon leur vocation naturelle, voire leur importance pour un fonctionnement de l'ensemble de la zone en question. Cependant la relance démographique et économique espérée par les communes périphériques a freiné la réalisation de ces plans ou du moins entraîné leur modification. Ceci se manifeste notamment par le manque de coordination des opérations d'aménagement entre des communes voisines, par exemple lors de l'implantation de zones commerciales, industrielles ou même résidentielles, dont l'étendue paraît souvent démesurée par rapport à la taille de l'ancien bourg. Ceci provoque une délocalisation des activités commerciales des anciens centres, dont souffrent encore plus les communes périurbaines que les centres villes.

Si la marge de manœuvre de l'aménageur paraît réduite, le succès qu'a connu récemment la mise en place de systèmes pertinents de transport en commun montre que la politique de transport semble être un des rares moyens efficaces pour canaliser l'urbanisation.

1.4. La dynamique urbaine, un processus d'auto-organisation

Les projets d'aménagement ne dépendent pas uniquement de la seule volonté des décideurs, mais peuvent être contestés par certains groupes d'agents. Il arrive parfois que les agents revendiquent une opération d'aménagement non conforme à l'orientation du schéma directeur : la population résidentielle d'un lotissement peut, par exemple, exiger la construction du contournement routier ou l'amélioration de l'infrastructure de services de leur quartier .

En outre, la compétition entre communes se manifeste éventuellement par des projets contradictoires avec les intérêts d'autres communes ou de l'ensemble de la zone métropolitaine : un village en marge de la zone urbanisée peut élaborer un plan d'occupation du sol qui sacrifie une zone de loisir importante sur le plan régional. Ceci peut provoquer la contestation de la population des communes voisines, qui se retrouvent dans ce cas en concordance avec la vision de l'aménagement régional.

Il existe ainsi une rétroaction sur le processus d'urbanisation qui tend à influencer le développement futur de certaines zones. L'influence directe de la politique d'aménagement est alors amoindrie. L'évolution des espaces urbains apparaît comme le résultat de l'interaction entre les stratégies des groupes d'agents et les directives des responsables de l'aménagement. Dans une perspective

systémique, ceci doit être interprété comme processus d'auto-organisation

Des études récentes des tissus urbains, réalisées à partir d'une nouvelle méthode d'analyse basée sur la géométrie fractale, ont confirmé que la dynamique urbaine doit être considérée comme un processus d'auto-organisation (Frankhauser 1994) L'analyse fractale permet de mesurer, à partir de la représentation cartographique d'un tissu urbain, la variation de la part de la surface bâtie en fonction de la distance à un endroit choisi, par exemple le centre du noyau urbain. La représentation graphique des résultats met en évidence une diminution régulière de la densité du bâti ou la présence de ruptures dans l'organisation spatiale du tissu. Dans beaucoup de cas, les résultats obtenus montrent que la variation de la densité est la même dans les petites villes que dans les grandes agglomérations. On trouve ainsi, à différentes échelles, le même principe d'organisation spatiale.

En comparant les tissus d'une même agglomération à plusieurs dates, on constate que le noyau urbain tend à conserver son organisation spatiale. En revanche, les courbes d'analyse de la périphérie deviennent régulières ce qui montre une structuration croissante des villes périurbaines. Par ailleurs, on constate une augmentation de la prégnance de l'agglomération principale sur les zones périurbaines qui ont tendance à former un agrégat commun avec le centre (François, Frankhauser, Pumain 1995). Cependant l'organisation spatiale de cet agrégat est loin d'être homogène. Au contraire, les résultats traduisent un allongement surproportionnel des bordures des agglomérations caractérisées par une fragmentation croissante du bâti. On n'observe en réalité pas de densification au centre de la zone urbanisée : la ville croît uniquement dans sa périphérie. Ainsi de nombreux espaces vides persistent à l'intérieur des agglomérations et l'étendu de ces espaces vides augmente de façon régulière vers la périphérie.

Le fait d'observer dans de nombreux cas certaines régularités dans les tissus urbains, aussi bien dans leur organisation spatiale que dans leur évolution, paraît surprenant vu la diversité de leur aspect. L'interprétation systémique d'un tel phénomène indique l'existence de certains processus qui font qui mettent en évidence des structures sous-jacentes selon un principe morphogénétique qui se manifeste de façon comparable dans beaucoup de villes. Ce processus ne peut résulter que des interactions socio-économiques que nous avons précédemment définies.

2. Architecture conceptuelle et outils choisis pour traiter une problématique pour la ville durable

L'analyse morphologique des tissus bâtis, ainsi que l'identification du processus d'urbanisation ont montré que, sous un angle d'approche systémique, la croissance urbaine doit être interprétée comme un processus d'auto-organisation résultant de l'interaction socio-économique de différents groupes d'acteurs. Nous proposons donc de modéliser le comportement des agents sociaux et de simuler les transformations d'un espace urbain, en faisant varier l'impact des interactions socio-économiques existant entre les groupes d'agents

2.1. Concepts fondamentaux du modèle

Pour analyser de façon correcte les transformations de l'espace urbain, notre modèle doit présenter certaines caractéristiques essentielles. La première réside dans la faculté d'appréhender la dynamique urbaine, de permettre l'étude des processus de différenciation spatiale et d'être pertinent par rapport

aux échelles d'action des phénomènes étudiés. La deuxième est l'interaction des différents acteurs socio-économiques et, liée à cela, le choix d'un type de modélisation qui prenne en compte les processus qualitatifs déterminant les décisions des acteurs. Enfin, troisième condition, le modèle doit être en mesure d'évoluer, d'adapter ses règles de fonctionnement, relativement aux changements qui affectent le système urbain étudié.

2.1.1. Dynamique, différenciation spatiale et pertinence des niveaux d'analyse

L'analyse dynamique d'un espace correspond à l'étude du fonctionnement de celui-ci à travers le temps. Ce fonctionnement évolue en général de façon bien déterminée, mais certains événements imprévisibles peuvent survenir, qui entraînent des conséquences disproportionnées sur le développement futur de l'espace. L'étude de la morphogenèse d'une ville doit donc inclure la modélisation de ces discontinuités irréversibles qui marquent son évolution. A ce propos, il importe de noter que la notion d'évolution dépasse celle de développement. Alors que l'idée de développement, et donc de croissance, suppose une stabilité des formes spatiales, celle d'évolution admet des changements structurels.

Un espace urbain est le siège d'un ensemble d'actions, de relations extrêmement nombreuses et variées. Celles-ci jouent sur des échelles spatio-temporelles multiples et interdépendantes. De ce fait, une ville peut être assimilée à un système complexe, c'est-à-dire présentant plusieurs niveaux d'organisation qui interagissent entre eux. La différenciation spatiale naît alors de l'impact du fonctionnement global d'un territoire sur un espace local présentant certaines spécificités. Autrement dit, il s'agit pour nous d'étudier un territoire infra-régional (une ville et son agglomération) sur lequel

s’exercent aussi des influences extérieures régionales, nationales, voire internationales.

A l’échelle locale, il semble plus efficace de modéliser le comportement de groupes d’agents, plutôt que celui de chaque agent pris individuellement : riverains de la route, entrepreneurs intéressés par une meilleure desserte, etc. Ceci implique de considérer les phénomènes collectifs propres à cette échelle d’agrégation, à savoir les rapports entre groupes sociaux. A un niveau plus global, il apparaît intéressant de prendre en compte les effets de compétition entre différentes localités voisines. En effet, un tel phénomène compétitif peut largement influencer la structuration de l’espace. Ainsi un aménagement quelconque dans une commune peut affecter également l’attractivité d’une zone commerciale ou résidentielle dans une commune proche. Rappelons ici le rôle prépondérant de l’agglomération principale dans le processus d’urbanisation et le phénomène de concurrence des lieux centraux de la périphérie.

Afin de mettre en évidence les phénomènes de différenciation spatiale d’un espace urbain, nous devons intégrer la réalité morphologique de l’espace, ce que nous permet notamment la prise en compte des distances et des contiguïtés entre les lieux considérés.

2.1.2. Processus de décision et communication

Supposons qu’un projet d’aménagement ait été proposé, par exemple la construction d’une route. Chaque acteur (ou groupe d’acteurs) de l’espace concerné dispose d’une certaine masse d’informations, souvent incomplète, sur le projet. Il va alors se forger une opinion à son sujet, sur la base :

1– des informations obtenues par le décideur, par exemple sur le tracé de la route, sa fonction (desserte, transit) et sa fréquentation ;

2– d'informations complémentaires diffusées par la presse ou certains groupes d'acteurs, par exemple des groupes de pression écologiques ou industriels ;

3– de l'opinion d'autres agents ou groupes d'acteurs exprimée en public :

4– de ses propres aspirations : dans quelle mesure le projet répond-il à ses désirs. Une route de desserte peut ainsi lui paraître bien plus souhaitable qu'une voie de transit ;

5– de ses expériences préalables tirées principalement de la connaissance d'autres projets comparables. Il peut par exemple avoir une idée de la fiabilité des informations délivrées à propos de l'impact éventuel de la route (fréquentation, bruit).

Les trois premiers facteurs de décision correspondent à un traitement de l'information obtenue par des sources extérieures, tandis que les autres sont issus des réflexions propres à l'agent. A partir de ces éléments, il va évaluer le projet en pondérant les facteurs 1, 2 et 3 au moyen des facteurs 4 et 5, puis définir ensuite son attitude par rapport au projet. Il s'agit en fait d'un processus de formation d'une opinion.

L'opinion ainsi forgée par l'agent constitue une base de réflexion en vue du choix d'une stratégie d'action qui soit la plus efficace possible, en fonction de ses propres aspirations. Il va dès lors imaginer différents comportements possibles, par exemple :

- s’engager dans un groupe de pression (pour ou contre le projet ou vers sa modification),
- se résigner à la situation et réagir en changeant de lieu de résidence.

La manifestation des différentes opinions individuelles va alimenter une discussion publique sur le projet. A partir de là, le décideur peut entrer en lice et décide d’agir sur les facteurs 1, 2 ou 3. L’évaluation du poids de chacun d’eux va inspirer à l’aménageur sa future stratégie, soit par exemple :

– faire parvenir aux agents des informations complémentaires,

– proposer des mesures d’accompagnement (parois anti-bruit),

– modifier son projet (proposition d’un nouveau tracé de la route).

Suite à cela, une nouvelle boucle de formation d’opinion s’ouvre et l’agent modifie ou pas son avis sur la question. Plusieurs boucles de formation d’opinion peuvent se succéder avant que la décision définitive ne soit prise.

2.1.3.Mémoire et apprentissage du modèle

Imaginons que le projet de construction d’une route présenté ci-avant soit effectivement réalisé. Dans un premier temps, on observe une réaction directe de certains acteurs en rapport avec cette nouvelle situation. Ainsi il est possible que l'amélioration de la desserte d'une zone industrielle devienne un argument décisif pour l'implantation d'une nouvelle entreprise.

Dans un deuxième temps, le résultat de ces actions peut provoquer une transformation de l'espace et ainsi influencer le processus d'urbanisation. Par exemple, la densification progressive du tissu bâti peut provoquer une attitude hostile de la population résidentielle envers la création d'une nouvelle zone d'activité. La perception de l'espace vécu par la population a donc changé et influence différemment son comportement. Ceci peut également se traduire par un changement des indicateurs économiques : la gestion rigoureuse de l'espace peut entraîner un manque de terrains à bâtir et provoquer une augmentation des prix du foncier non bâti ; la dégradation d'un quartier peut faire baisser les prix des terrains et encourager la spéculation foncière.

Ceci montre qu'une décision d'aménagement peut être à l'origine d'une bifurcation dans la trajectoire (le comportement) d'un système spatial : ce n'est pas seulement l'impact direct de la décision qui transforme le paysage urbain ; la réponse à moyen terme des acteurs influence aussi le développement futur de l'espace.

Notre projet de modélisation prévoit de prendre en compte ces effets de transformation du système urbain suite à des opérations d'aménagement, aussi bien au niveau des stratégies des groupes d'agents, qu'au niveau de l'espace en lui-même. Ceci est possible par l'introduction de la notion d'apprentissage du système : les règles qui président au fonctionnement du modèle évoluent en fonction des changements qui affectent le système urbain. Précisons ici que la faculté l'apprentissage suppose une mémoire du système.

2.2. Architecture générale du modèle

Notre objectif étant de réaliser un modèle opérationnel, son architecture générale doit être conçue de façon à ce qu'un décideur puisse l'utiliser pour étudier l'impact d'un projet d'aménagement

Pour cela, l'utilisateur peut proposer un projet d'aménagement soit sous la forme d'une représentation cartographique soit d'indications chiffrées. Deux options sont prévues :

– la simulation du débat avant la prise de décision. Elle tiendra compte des réactions des différents groupes d'agents socio-économiques et leurs opinions seront portées à la connaissance du décideur. Celui-ci pourra intervenir, modifier sa proposition et observer à nouveau les réactions des agents. En fonction des résultats, il pourra ensuite prendre sa décision définitive.

– la simulation à moyen terme. Le décideur pourra observer l'évolution du système urbain en fonction de la décision précédente. La simulation prend en compte les transformations de l'espace et les réactions des acteurs.

Afin d'observer l'impact d'une décision, l'aménageur aura à sa disposition :

• une représentation cartographique de l'espace affichée à l'écran, qui se transforme en fonction des décisions prises par les acteurs, et contient :

– des informations sur l'occupation du sol,

– des informations sur les réseaux de transport (par exemple leur saturation),

– des informations sur les contraintes naturelles (relief, hydrographie…),

– d'autres indications diverses (pollution).

• un environnement informatique convivial, qui comporte :

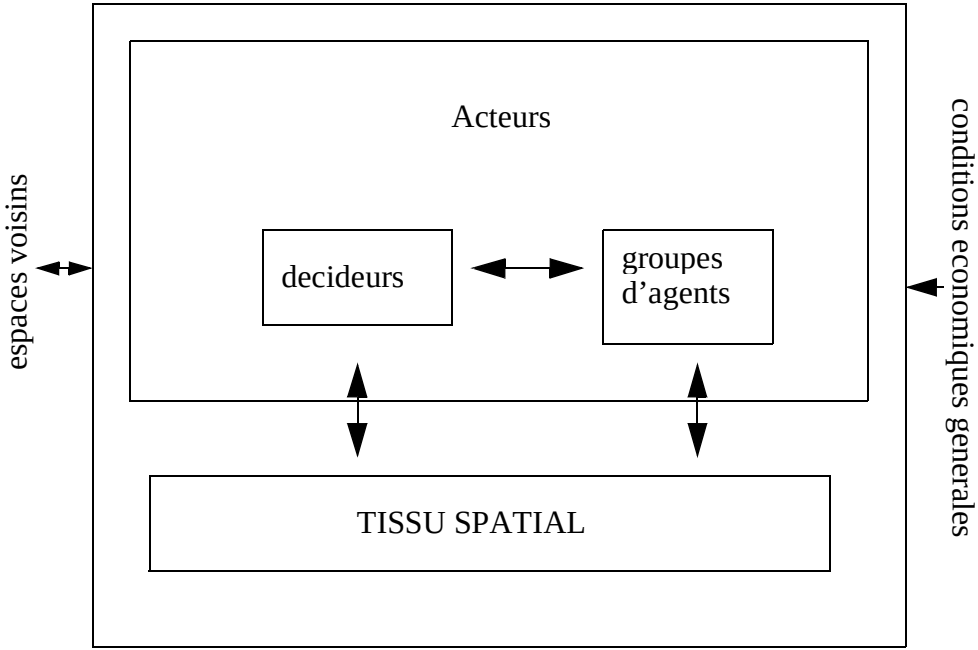
– un menu permettant de choisir les options prévues,

– une fenêtre dans laquelle sont affichées les informations non spatialisées soit sur le système urbain, soit sur le comportement des acteurs, soit sur des indicateurs économiques, environnementaux, etc.

• la possibilité d'introduire des variables externes.

La représentation cartographique de l'espace sera limitée à la zone dans laquelle on désire étudier l'impact d'une mesure d'aménagement. Cependant la simulation tiendra également compte :– de l'influence des espaces avoisinants, en particulier de l'intérêt que représente pour eux l'aménagement de la zone en question (implantation d'une plate-forme logistique, d'un supermarché…),

– de la situation démographique et socio-économique générale (l'implantation d'entreprises dans une zone industrielle sera moins probable en période de crise économique).



Le modèle s'articulera autour de deux pôles, d'une part une représentation cartographique de l'espace qui se transforme en fonction des décisions prises par les acteurs, et d'autre part une modélisation de la stratégie des acteurs qui évolue aussi en liaison avec les modifications de leur espace vécu (cf. figure 1).

2.3. Les différents outils de modélisation disponibles, adaptés à notre objectif

Nous avons évalué l'apport de différents outils de modélisation par rapport à notre projet (cf. figure 2).La figure 2 indique, pour chaque type de modèles, les propriétés et les fonctionnalités principales qu'ils sont susceptibles de présenter. Les utilisations envisageables des différents outils correspondent en réalité aux potentialités qu'il serait intéressant de développer dans le cadre de notre problématique.

3. Formalisation du modèle

La présentation des différents outils de modélisation disponibles, adaptés à notre problématique, nous a permis de choisir quels outils de formalisation seront utilisés et de concevoir le modèle. Nous prévoyons de modéliser le tissu spatial grâce à un automate cellulaire, cependant, contrairement aux concepts classiques, nous concevons la dynamique du modèle de la façon suivante :

– les règles dynamiques ne sont pas uniquement basées sur l'interaction entre les cellules ;

– on introduit des modules qui prennent en compte l'interaction entre l'espace et les stratégies des acteurs socio-économiques (cf. figure 3) ;

– toutes ces interactions se manifestent à des échelles spatiales et temporelles différentes et créent ainsi des phénomènes d'auto-organisation qui changent les règles au cours du fonctionnement du modèle ;

– les règles dynamiques sont basées en partie sur la logique floue et en partie sur les stratégies d'optimisation.

Sur une base commune de modélisation de la dynamique spatiale, nous comptons asseoir le modélisation de deux processus socio-économiques :

– la modélisation du comportement des agents dans la phase d'élaboration du projet,

– la modélisation des comportements et des évolutions qui en résultent dans la phase postérieure à la réalisation du projet.

Nous les présentons ici dans cet ordre, qui est chronologique. Cependant, compte-tenu de la difficulté de chaque approche, et de son intérêt pratique, nous commencerons le travail de recherche par le second aspect, celui des évolutions postérieures au projet. Ce n'est qu'après avoir dominé cette question que nous aborderons celle plus délicate de la modélisation de la phase d'élaboration.

3.1. Modélisation de la dynamique spatiale

Dans les modèles traditionnels, l'espace n'apparaît que de façon indirecte sous forme de fonctions d'interaction décroissantes au fur et à mesure que la distance s'accroît. Contrairement à ces approches, nous proposons de choisir une méthode de formalisation basée sur une représentation cartographique numérisée (raster) de l'espace modélisé qui permet de visualiser les transformations progressives de l'espace considéré. Un tel objectif s'inscrit, au niveau conceptuel, dans la logique de formation d'un tissu spatial ("pattern formation"). En outre il paraît important de tenir compte des résultats obtenus

par les analyses fractales qui ont mis en évidence certains caractéristiques particulières de la morphogénèse urbaine.

L'outil qui paraît le mieux adapté à une telle description de la dynamique spatiale est l'automate cellulaire , déjà utilisé dans plusieurs disciplines avec succès. M.Phipps (1989) a proposé une application des automates cellulaires en géographie notamment, Récemment R. White et G. Engelen (1993 et 1994), ainsi que M. Batty et Y.Xie (1994), s'en sont servis pour modéliser la dynamique urbaine.

• La représentation de l'espace

Il est prévu d'implanter directement une représentation cartographique numérisée de l'espace. Les unités spatiales sont perçues comme des unités fonctionnelles (zone résidentielle, zone industrielle, route, etc.). Chacune de ces unités est perçue comme un objet propre. Cet objet est formé d'un ensemble de cellules (pixels) de taille fixe, définie par la résolution cartographique, présentant le même état à un instant donné, à savoir celui de l'objet . (Cf. figure 3)[1].

En outre, une unité fonctionnelle peut être subdivisée en fonction de nouveaux critères, qui apparaissent par exemple à l'occasion d'un projet d'aménagement. En effet, dans un même quartier, les riverains potentiels du trajet prévu pour une route percevront ce projet différemment des agents, dont la résidence est plus éloignée. Or la notion de proximité est parfois difficile à délimiter

1. Par exemple en utilisant une représentation au 1:50~000 et une résolution de 75 dpi, un pixel représenterait un carré dont la longueur serait environ 17 m

précisément.

Nous proposons donc de modéliser la notion de proximité en utilisant un gradient spatial défini en fonction d'attributs qualitatifs tels que : très concerné, moins concerné, etc. Ils seront formalisés au moyen de la logique floue (Zadeh 1992).

• Les vecteurs d'attributs

Afin de caractériser les différentes unité fonctionnelles, il est prévu d'introduire des vecteurs d'attributs formés de composants, qui incluent chacun une information sur l'espace en question. Un vecteur est propre à l'ensemble des pixels qui constituent un objet.[1]

Certains composants seront caractérisés par des attributs flous, notamment ceux qui décrivent la perception de l'espace par les agents, par exemple la qualité du site (site agréable) ou l'accessibilité (bonne ou mauvaise). L'accessibilité pourrait par exemple être mesurée par le temps nécessaire pour effectuer certains déplacements. D'autres attributs seront chiffrés (prix du terrain).Le type d'information donné par les attributs peut varier selon le type d'utilisation de sol : pour une zone industrielle la qualité paysagère est moins importante que pour une zone résidentielle.

• La notion de distance

1. Ceci montre l'avantage de cette formalisation : il n'est pas nécessaire de doter chaque pixel de toutes les informations, il suffit d'établir un lien entre l'objet spatial et le vecteur d'attribut ce qui allège considérablement la gestion des données.

Dans les automates cellulaires traditionnels l'interaction spatiale, qui gouverne la dynamique du système, se borne au voisinage immédiat. Les approches récentes comme celles de R.White et G.Engelen (1993, 1994) introduisent des fonctions d'interaction entre cellules éloignées. Une approche semblable, basée sur la logique multi-agent a également permis de modéliser des interactions de portées et de formes différentes.

Mais ces règles sont parfois trop précises par rapport à la réalité des agents[1], qui perçoivent les distances plutôt de façon floue et estiment une route être "trop proche" ou "trop loin" ou "dans un mauvais état"[2].

Nous proposons donc de formaliser la notion de distance en utilisant aussi des attributs flous.

• Les transformations de la morphologie spatiale

Dans les automates cellulaires, les fonctions d'interaction spatiale servent à définir des règles de transformation des attributs de certaines cellules. Le modèle cellulaire se borne alors à une vision descriptive de la dynamique spatiale ; les règles d'interaction ne considèrent que de façon globale le comportement des agents sociaux, par exemple en supposant un effet répulsif entre une zone industrielle et une zone résidentielle si celles-ci sont proches, ou bien un impact positif si la distance entre les zones dépasse une certaine limite.

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1. Ceci rend une calibration des fonctions d'interaction spatiales difficile
2. L'introduction d'un bruit, proposé par certains auteurs ne paraît pas adapté, puisqu'il ne s'agit pas d'un phénomène statistique, ou d'une information incomplète, mais d'un phénomène de perception.

Contrairement à cette vision, nous projetons d'utiliser l'automate cellulaire uniquement comme un support spatial et de modéliser l'évolution de l'espace en simulant le comportement de différents types d'acteurs. La dynamique spatiale apparaîtra alors comme la conséquence des décisions prises par les acteurs.

Le comportement des agents est susceptible de varier au cours du temps. Ceci peut être une conséquence directe des transformations de l'espace en question, ou le résultat d'expériences acquises au cours du processus de formation d'opinion (voir plus loin). Nous supposons donc que les règles dynamiques du système peuvent changer au cours du temps, contrairement à la logique traditionnelle des automates cellulaires.

Il est prévu de visualiser sur écran les impacts spatiaux de ces décisions et donc de visualiser la transformation graduelle de l'espace.

Il est admis que certains types de règles d'interaction spatiale génèrent, dans les automates cellulaires, des tissus de morphologie fractale[1]. Comme nous l'avons montré, la morphologie des tissus urbains et leur évolution peuvent être caractérisées par leur comportement fractal. Afin d'obtenir des résultats qui sont en concordance avec ces observations il est prévu :

– d'analyser les tissus simulés selon ces critères ;

– d'étudier quels types d'interactions entre acteurs se traduisent par des règles dynamiques qui

1. R.White et G.Engelen ainsi que Batty ont recouru à cette observation lors de la conception du modèle.

générent des tissus dont la morphologie correspond à celle des villes réelles.

3.2. Modélisation du comportement des agents

Afin d'expliquer les principes que nous avons adoptés pour formaliser le comportement des acteurs (cf. figure 4), nous allons reprendre à titre d'exemple certaines étapes du processus d'urbanisation tel que nous l'avons décrit plus haut. Nous commençons par la première phase du modèle qui simule la réaction des acteurs par rapport à la proposition d'un projet d'aménagement.

3.2.1. Modélisation du comportement des agents dans la phase d'élaboration du projet

• Critères de regroupement des agents

Les agents seront regroupés en fonction de critères spatiaux et socio-économiques.

Un critère spatial possible pourrait être le degré avec lequel les agents sont concernés par le projet d'aménagement en question, autrement dit d'après une notion de proximité éventuellement floue comme définie ci-avant.

Un critère socio-économique pourrait être l'appartenance à une classe sociale, à un groupe d'acteurs économiques (entrepreneurs…) ou à un groupe de pression politique

• La formation d’opinion

Un projet d’aménagement est jugé par les acteurs selon :

- leurs propres aspirations,

- leurs expériences antérieures (mémoire),

- les informations disponibles sur le projet.

Sur la base de ces trois facteurs, l’acteur va concrétiser ses besoins par rapport au projet en question. Nous donnons quelques exemples d’arguments qu’un résident pourrait évoquer lors d’un projet d’aménagement d’une nouvelle route :

– je ne voudrais pas être dérangé par le bruit d’une route proche de mon appartement ; en revanche, je désire une amélioration de la desserte routière de mon quartier puisque la voie actuelle est mal tracée, étroite et en mauvais état.

– la nouvelle route va améliorer l’accessibilité de la zone d’activité plus loin, ce qui risque d’augmenter la circulation ; cependant j’aimerais bien profiter de l'installation d’un supermarché dans cette zone.

Nous constatons d’abord que les attributs utilisés ("proche", "améliorer", etc.) ne sont en général pas des critères quantitatifs précis.

Afin d’introduire les attributs qualitatifs nous proposons une formalisation au moyen de la logique

floue.

En outre, les raisonnements de l'acteur montrent des "ambiguïtés", ce qui l'oblige à réfléchir sur l'importance attribuée aux différents arguments afin de trouver une attitude qui lui semble la plus avantageuse et donc la mieux acceptable.

Une telle procédure d'évaluation peut être considérée comme un problème d'optimisation multicritère : pour chaque objectif (accessibilité, nuisance, etc.), on introduit une fonction d'objectifs (ou fonction économique) basée sur des attributs éventuellement flous (bonne accessibilité si la route est proche).

Il existe une multitude de méthodes qui permettent de résoudre des problèmes d'optimisation. Nous présentons une approche particulière, les algorithmes d'évolution, dont certains aspects paraissent également intéressants au niveau conceptuel.

Ces algorithmes explorent l'espace multidimensionnel de la fonction d'objectifs par étapes et s'approchent graduellement des solutions optimales. A chacune de ces étapes, on obtient une information sur les valeurs de la fonction économique multidimensionnelle à un certain nombre d'endroits de l'espace. Parmi ces solutions, seules quelques unes sont sélectionnées pour constituer le point de départ de la prochaine étape, les autres sont rejetées.

Cette méthode a été utilisée avec beaucoup de succès lors de problèmes d'optimisation de paramètres. Cependant, certains auteurs ont récemment proposé d'interpréter cet algorithme comme séquence de processus de décision. Dans ce cas, on interprète l'ensemble des points considérés à

chaque étape comme les scénarios retenus par l'agent qui, au cours de sa réflexion, s'approche graduellement des solutions optimales (Fonseca, Fleming 1995).

Afin de modéliser les processus de formation d'opinion, les algorithmes d'évolution semblent donc une approche intéressante, non seulement comme technique d'optimisation, mais aussi également comme réflexion conceptuelle sur les processus de décision.

La construction de la fonction multicritère des objectifs a aussi retenu notre attention. Il existe plusieurs façons de concevoir une telle fonction :

- soit en définissant a priori les poids de chacun des différents objectifs. Dans ce cas, il s'agit de trouver les solutions qui répondent au mieux aux différents besoins : une route paraît désirable, à condition qu'elle se situe à une certaine distance d'un lieu d'habitation. En fait, cette méthode permet de retenir les solutions qui correspondent aux valeurs minimales (ou maximales) de la fonction d'objectif multicritère.

- soit d'introduire la notion d'optimum de Pareto. Ce principe sous-tend que le choix d'une situation plus avantageuse par rapport à des objectifs se fait toujours au détriment d'autres objectifs (si le desserte est bonne, la circulation augmentera). L'utilisation d'algorithmes évolutionnistes permet de trouver dans ce cas l'ensemble des solutions possibles qui répondent au critère de l'optimum de Pareto sans qu'il soit nécessaire de définir a priori les poids préférentiels.

Les solutions optimales déterminent le degré d'acceptation du projet : plus ces solutions sont éloignées des attributs du projet d'aménagement, plus l'opposition sera forte. Il paraît donc important

de définir une mesure qui intègre à la fois le désir représenté par la solution optimale et les conséquences du projet, telles qu'elles sont perçues par l'acteur.[1]

Ce degré d'acceptation pourrait être caractérisé par une valeur floue se situant entre l'acceptation totale et le refus total.

• L'interaction entre les acteurs

Nous supposons qu'à un certain moment les groupes d'acteurs rendent publique leur opinion. Ainsi, pour chaque groupe d'acteurs, les résultats du processus d'évaluation devrait être mis à disposition du décideur, c'est-à-dire de l'utilisateur du logiciel de simulation.

Il peut arriver que la proclamation d'une opinion par un groupe d'acteurs soit accompagnée de revendications si la solution optimale qu'il préconise est plus ou moins incompatible avec le projet proposé (par exemple demande d'un projet alternatif, demande de mesures d'accompagnement). Ceci montre l'intérêt d'introduire une mesure pour décrire le degré d'acceptation qui définisse la disposition d'un groupe d'agents de passer à l'action. On peut imaginer d'implanter selon des règles floues certains types de revendications en fonction du projet et du degré d'acceptation de celui-ci.

Dans cette optique, la construction d'une fonction multicritère, basée sur un optimum parétien, paraît intéressante. Elle pourrait servir à déterminer au moment où les opinions des acteurs sont rendues publiques l'ensemble des solutions parétiennes, c'est-à-dire des solutions qui répondent au

1. Cette perception dépend de l'information actuelle et éventuellement d'expériences préalables.

mieux aux besoins de l'ensemble des acteurs. A cet égard, on constituerait une fonction des objectifs qui regroupe l'attitude des différents types d'acteurs. Ainsi le décideur disposerait d'une information globale sur le degré d'acceptation du projet.

En fonction de ces informations nous rappelons que l'utilisateur pourrait intervenir dans le processus de formation d'opinion en :

1– proposant des mesures d'accompagnement,

2– modifiant le projet ou proposant d'autres alternatives,

3– décidant la réalisation immédiate du projet,

4– renonçant au projet.

Cependant il serait aussi possible que le décideur attende de voir la façon dont évolue la formation d'opinion suite à l'échange d'informations entre les différents groupes d'acteurs. Une telle possibilité sera également prévue.

Les options 1 et 2 relancent un processus de formation d'opinion.[1] Cependant chaque échange d'informations peut influencer les jugements des agents puisqu'ils parviennent, d'une part à recueillir de nouvelles informations sur le projet même, et d'autre part à accumuler des connaissances sur les

1. On peut prévoir dès début de proposer plusieurs alternatives. Ceci nécessite de distinguer les opinions selon la variante.

opinions des autres groupes.

Ceci peut provoquer:

- une modification des opinions dans un groupe (par exemple une meilleure acceptation du projet),

- un changement de l'effectif des groupes. On peut imaginer une plus grande solidarité d'intérêts des habitants de la zone concernée.

Suite aux informations obtenues, le jugement des groupes d'acteurs sur certains aspect du projet d'aménagement changera éventuellement : la proximité de la route paraît peut-être moins nuisible ou, au contraire, plus contraignante qu'avant.

Il ne s'agit donc pas d'un changement des aspirations des acteurs, mais du poids qu'ils attribuent à différents arguments. Il s'agit ainsi d'un phénomène d'apprentissage qui est susceptible de modifier le processus d'évaluation lors d'une nouvelle boucle de formation d'opinion. En effet, cette rétroaction signifie pour la modélisation une modification des fonctions d'objectifs : une solution peut apparaître plus ou moins optimale qu'avant. L'interaction entre les acteurs influence donc le comportement dynamique du système, ce qui doit être considéré comme un processus d'auto-organisation.

Nous rappelons que les objectifs sont définis selon des attributs flous. Le processus d'auto-organisation peut se manifester par un rapprochement des opinions voisines, ou bien un éloignement d'opinions proches au départ en fonction des informations obtenues par les différents acteurs.[1] Les

propositions de l'aménageur peuvent ainsi provoquer des bifurcations dans le système.

Si les fonctions d'objectifs peuvent être influencées par l'échange d'informations, il est également envisageable que le processus de la formation d'opinion, c'est-à-dire la façon dont l'acteur s'approche, par sa réflexion, des solutions optimales, change. L'analogie entre les algorithmes d'évolution et les processus de décision discutés plus haut incite à étudier dans quelle mesure cette approche permet d'intégrer les aspects stratégiques de la formation d'opinion dans le processus d'optimisation.

Pour les processus d'auto-organisation, l'échelle temporelle joue un rôle prééminent : quand certains groupes réagissent plus vite que d'autres, le comportement du système peut être différent que lorsque tous les groupes agissent en même temps. De même, le moment où l'aménageur décide d'intervenir peut s'avérer crucial dans la formation d'opinion.

Il est donc important d'introduire une échelle temporelle.

Jusqu'ici nous avons considéré les groupes d'acteurs comme homogènes dans leur comportement. Or ceci n'est pas nécessairement le cas. En particulier, quand il existe plusieurs solutions pratiquement équivalentes au niveau de leur optimum, il semble utile d'introduire des probabilités qui caractérisent le poids statistique de ces solutions. Cette approche paraît d'autant plus importante qu'il est éventuellement possible de mesurer la fréquence de certaines opinions par des sondages. Ceci peut représenter une base de données qui servira à calibrer le modèle.

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1. Ceci peut être introduit par des possibilités conditionnelles

Cette approche implique d'introduire également des probabilités pour évaluer les niveaux d'acceptation de chaque groupe d'acteurs.[1]

3.2.2. Modélisation du comportement des agents et des évolutions qui en résultent dans la phase postérieure à la réalisation du projet

Dès qu'une décision est prise, l'utilisateur a la possibilité de simuler l'évolution à moyen terme. Le comportement des acteurs est d'abord réactif, basé sur un fait accompli. Il ne s'agit donc pas d'un processus de formation d'opinion et sa formalisation en est de ce fait différente. Puis la transformation progressive de l'espace provoque un comportement rétroactif des agents.

• Une mesure d'attractivité

Pendant la période succédant à la réalisation du projet, la dynamique spatiale se manifeste surtout par une compétition entre plusieurs unités spatiales. L'information disponible sur ces unités est codée dans les vecteurs d'attributs de chaque zone que nous avons introduit plus haut. Dans leur ensemble, ces attributs peuvent servir à caractériser l'attractivité des unités pour les différents groupes d'acteurs. Ainsi, pour un individu qui cherche un terrain à bâtir, l'attractivité d'une zone est le résultat d'une comparaison entre les attributs, qui sont eux-mêmes pondérés par l'importance que l'acteur leur attribue. Cette pondération peut être floue. Ainsi un acteur pourrait dire : « le fait que le paysage soit beau (attribut flou), me paraît important (évaluation floue) », ou : « le prix du terrain me paraît très

1. Nous précisons qu'il s'agit donc d'une description probabiliste d'états flous. Ces deux logiques ne doivent pas être confondues.

élevé ».

Nous proposons de définir à partir de ces attributs pondérés une mesure d'attractivité en utilisant la formalisation de la logique floue[1].

• Le processus d'urbanisation à moyen terme

L'attractivité des zones pour les différents types de demandeurs servira de base pour définir une probabilité d'occupation du sol L'occupation du sol est donc appréhendée comme une séquence stochastique d'événements.[2]

Les processus de décision apparaissent dans cette phase d'évolution moins nets que pendant la formation d'opinion. Ceci reflète le fait que la dynamique du système n'est pas le résultat d'une confrontation d'idées, mais basée sur la perception d'attributs spatiaux et de facteurs économiques.

• La rétroaction du processus d'urbanisation sur le vecteur d'attributs

Le processus d'urbanisation peut modifier les composantes du vecteur d'attributs des diverses unités fonctionnelles :

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1. Cette attractivité peut être interprétée comme un potentiel
2. Nous rappelons que la description de l'espace est réalisé à l'échelle des quartiers qui sont perçus comme objets homogènes. L'impact spatial de ces décisions est donc considérée à cette échelle. Ainsi on indiquera pour une zone plutôt le degré d'occupation du sol. Il ne semble en effet pas réaliste de les décisions au niveau parcellaires.

– soit par les décisions d’aménagement,

– soit par le comportement des différents groupes d’agents.

Ainsi une forte activité de construction ou la nuisance sonore provoquées par le nouvel axe routier, dont la construction était le résultat de la décision prise lors de la phase précédente de la simulation, peuvent dévaloriser l’image de marque d’un quartier.

Cette rétroaction du processus d’occupation du sol sur les attributs spatiaux représente un phénomène important dans la conception du modèle. En effet, grâce à cette méthode, le système peut contrôler lui-même au cours du processus d’urbanisation le degré d’occupation du sol, le changement du paysage, etc., et modifier, en fonction de ces transformations de l’espace, les attributs spatiaux des unités fonctionnelles concernées.

• La rétroaction des modifications du vecteur d'attributs sur le comportement des agents

Il est possible que ces modifications affectent la qualité de vie dans le quartier telle qu’elle est perçue par les différents groupes d’acteurs :

– une dégradation de l’image de marque peut provoquer une baisse de la demande ;

– du côté de l’offre, une telle baisse peut être la cause d’une chute des prix de terrain ;

– la baisse des prix peut relancer une demande, dont le caractère est cependant différent : par exemple on pourrait observer l’apparition de logements locatifs bas de gamme.

Ces exemples mettent en lumière le rôle que jouent d'autres groupes d'acteurs dans la boucle rétroactive. Ceci concerne en particulier la population résidentielle : celle-ci dispose d'une partie de l'information contenue dans le vecteur d'attributs. Cette information évolue et la population en subit les conséquences, qui affectent éventuellement la qualité de vie dans le quartier. D'autres groupes d'agents vont également réagir, par exemple le groupe des propriétaires de terrain : leur comportement sera considéré en fonction de la demande .Leur comportement de terrain peut être modélisé selon une approche économique traditionnelle, basée sur la notion d'offre et de demande. En revanche, le comportement de la population résidentielle est différent. Il s'agit ici non plus d'une décision investigative, comme dans le cas des demandeurs de terrain, mais d'un processus de formation d'opinion. Une telle situation rappelle celle observée lors de la proposition du projet d'aménagement.

Il semble donc exister des seuils limites d'acceptation de certains attributs, liés à la perception de l'espace et au fonctionnement du système urbain. Ces seuils seront introduits dans le modèle. Le franchissement, au cours de la simulation, induira une modification du comportement des résidents. Celui-ci sera formalisé de façon comparable au processus de formation d'opinion à l'exception des conditions initiales (espace considéré et comportement des agents) qui seront modifiées.

L'impact des décisions d'aménagement peut se manifester sous différentes formes. Par exemple, s'il y a une dégradation de l'image de marque du quartier, la population résidentielle se considère comme victime d'une évolution qu'elle n'a pas désirée et qui lui a été imposée par des forces extérieures. Il peut également apparaître de nouvelles demandes sociales : création d'équipements publics (écoles, terrains de sport…), solutionnement des problèmes de saturation des réseaux de transport, etc.

L'utilisateur du logiciel sera informé d'une telle demande et aura la possibilité de réagir en proposant de nouvelles mesures. Ceci aboutira à une nouvelle boucle de simulation.

3.3. La réalisation du projet

La complexité du modèle exige une réalisation par étapes. C'est pourquoi son implantation sera effectuée selon une logique modulaire, ce qui permettra d'ajouter progressivement les différentes parties qui le composent, afin d'en étudier avec précision le comportement. Pour valider le modèle, nous l'appliquerons à un exemple réel.

3.3.1. Premières réalisations et test sur un cas pertinent

Les travaux effectués jusqu'ici portent sur la conception même du modèle, telle qu'il a été présenté ci-avant. Un automate cellulaire a été implanté de façon assez ouverte, ce qui offre la possibilité d'étudier différents types d'interaction spatiales et d'implanter des modules simulant le comportement des agents.

Pour réaliser et tester le modèle, nous avons choisi d'étudier dans un premier temps un espace assez limité. Il s'agit d'analyser l'impact, en terme de dynamique urbaine, de la construction de l'autoroute A 39, actuellement en construction entre Dole et Bourg-en-Bresse. Nous nous attacherons plus particulièrement à l'agglomération de Lons-le-Saunier, chef-lieu du département du Jura.

L'intérêt principal de ce secteur réside dans le fait que l'agglomération n'est actuellement située à proximité d'aucune infrastructure autoroutière. Ceci constitue un avantage indéniable pour étudier les

effets qui en découleront, d'autant plus que nous devrons distinguer l'évolution qui résulte de la tendance générale des villes moyennes françaises de celle qui est spécifiquement due à la nouvelle autoroute.

Pour effectuer les simulations, nous avons retenu un nombre restreint de types d'occupation du sol :

– les espaces à vocation logistique (diffuseurs, entrepôts…),

– les zones résidentielles,

– les espaces voués aux entreprises (ZAE, zones industrielles, zones artisanales…),

– les espaces libres,

– les espaces non disponibles en raison de contraintes naturelles (relief, hydrographie), d'une vocation particulière (réserve naturelle) ou d'un type d'exploitation agricole (viticulture).

Les réflexions sur le comportement des acteurs ont surtout porté sur l'impact à moyen terme du diffuseur le plus proche de Lons-le-Saunier, Beaurepaire-en-Bresse. En effet, une autoroute a un impact sur le milieu socio-économique essentiellement par l'intermédiaire des diffuseurs. Dans cette optique, une étude comparative est en cours sur les motifs d'implantation d'entreprises dans plusieurs zones d'activité de Besançon. Elle est basée sur des enquêtes auprès de différents acteurs concernés (chambres de commerce, mairies, entreprises concernées).

3.3.2. Deuxième étape : étude approfondie des facteurs socio-économiques

L'élaboration de notre modèle nécessite une connaissance approfondie des facteurs qui influent sur la morphogénèse et le fonctionnement urbains. Pour cela, nous envisageons d'analyser :

– les phénomènes déjà existants, mais non encore décrits et expliqués suffisamment (interaction urbanisme-infrastructure-population) : développer des études de simulation puis des modèles en intégrant des dimensions spatiales ;

– les phénomènes connexes (environnement) : intégrer des modèles de simulation développés dans le cadre d'autres études CEE, à savoir notamment les modèles traitant de la pollution atmosphérique, du bruit...

Nous nous appuierons sur des études déjà réalisées en ce domaine, ainsi que sur des enquêtes complémentaires à mener.

Les informations démo-économiques recueillies seront ensuite analysées selon des méthodes statistiques. Elles serviront de base à l'interprétation des processus socio-économiques en jeu, et en particulier à l'étude du comportement des différents types d'agents sociaux. Nous nous attacherons à :

– obtenir une meilleure compréhension de nos observations,

– identifier les impacts directs et indirects d'une opération d'aménagement et rechercher les différents paramètres intervenants,

– évaluer l’interpénétration des phénomènes.

Ceci permettra d’aboutir à une formalisation des interactions sociales, économiques et spatiales qui entrent directement dans la conception de notre modèle de simulation.

En outre, des analyses sur la morphogenèse urbaine seront réalisées, en intégrant de nouveaux outils d’analyse spatiale ce qui permettra de mieux comprendre la morphogenèse urbaine et de calibrer certains paramètres du modèle. Des mesures fractales pourront par exemple servir à comparer la morphologie des tissus simulés à celle des tissus réels.

3.3.3. Application du modèle à un espace opérationnel, l'Est de l'agglomération lyonnaise

Dès que le Rhône a pu être franchi par un ouvrage, Lyon s’est développée vers l’Est où s’étend une vaste plaine. Ces dernières décennies, ce secteur a connu une consommation de l’espace conséquente avec notamment l’implantation ou la délocalisation de grands équipements (aéroport, Eurexpo, gare TGV...), la construction de plusieurs infrastructures (autoroutes, nouvelle gare TGV), l’installation des grands ensembles d’habitat, d’une ville nouvelle et de grandes zones d’activités.

Dans les prochaines années, ce territoire sera concerné par deux nouveaux barreaux autoroutiers nationaux Nord-Sud, par la nouvelle ligne TGV Lyon-Turin (Est-Ouest). Une étude est également en cours sur l'installation d'une nouvelle ligne ferrée de marchandises Nord-Sud avec création de plates-formes logistiques.

Ces nouvelles infrastructures, essentiellement routières, vont entraîner de fortes pressions de la part des acteurs, notamment économiques et politiques, pour offrir des terrains à l'urbanisation, au-delà certainement des besoins réels. Un mitage excessif et un gaspillage de l'espace sont à craindre, ainsi que des pertes financières pour les différents acteurs, dont la Collectivité.

Dans ce contexte géographique, institutionnel et économique, il apparaît souhaitable de réaliser des scénarios d'évolution des secteurs concernés, afin d'aider les élus dans leurs décisions. Ces scénarios prendraient en compte les aspirations et contraintes des différents acteurs, et tenteraient d'apporter une meilleure réponse quant à la consommation de l'espace et sa gestion, en particulier grâce au réinvestissement des espaces urbanisés délaissés et par un meilleur choix de localisation des terrains à urbaniser.

Notre projet s'inscrit parfaitement dans une telle problématique. En effet, l'application du modèle de simulation de l'impact d'un projet d'aménagement sur la dynamique urbaine, présenté précédemment, serait très intéressante pour deux raisons principales. La première est que ces travaux permettront de clarifier le concept de la "ville vivable de demain". La deuxième est que nous pourrions ainsi modéliser les problèmes spécifiques d'une grande métropole et modéliser des projets d'aménagement "grandeur nature".

En outre, sur le plan national, l'agglomération lyonnaise est à la pointe de la réflexion sur l'aménagement du territoire. La présence du CERTU à Lyon, ainsi que ses relations avec les collectivités locales et les organismes de planification, nous renforce dans le choix de l'Est de l'agglomération lyonnaise comme champ d'application de notre modèle.

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PROTO-URBAN CONDITIONS AND URBAN CHANGE

Raoul Bunschoten
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SUTURING THE FIELD

'Beyond the revolution' indicates a field that has emerged in Europe containing a former wound, the Iron Curtain. CHORA is one of many institutions emerging that tend this 'woundscape' and create sutures around it. It does so as. A new research institute for architecture and urbanism, based in London CHORA[1] is a peripatetic agency working with a toolbox of comparative models weaving

1. CHORA, institute of architecture and urbanism, registered as a charity under English law, based in a small factory in London, 24A Bartholomew Villas, NW5 2LY; Collaborators with CHORA on this material are: Takuro Hoshino, Peter Hasdell, Alain Chiardia, Neave Brown, Robert Mull, Ilva Kvist, Joost Grootens, Khalid Mehmood, Filipe Decorte, and CHORA wishes to thank Vyacheslav Glazychev, Elena Kolpinsky and Vladimir Lalyakin, all from the AUE in Moscow.

different urban sites on both sides of the former divide and current edge of EC Europe. The main concern is the study of *proto-urban conditions*[1], - the way in which they engender urban change and the management of this change. The following text briefly expands on these concerns and places them in the context of the changing urban context in Europe after 1989. CHORA has conducted research and developed projects in Linz, Austria, in co-operation with the city of Linz; Helsinki, Finland, in co-operation with the University of Arts and Design and the city of Helsinki; in Alexandrov, Russia, in co-operation with the city of Alexandrov, members of the Architectural Association in London and the Academy of the Urban Environment (the AUE, headed by Vyacheslav Glazychev) in Moscow[2]. The case study in Zagreb has been initiated by the city of Zagreb Bureau for Urban Planning and the Berlage Institute in Amsterdam[3]. A related project in Vladimir, with a grant of the European Community, is being conducted by the Academy of the Urban Environment, city of Vladimir and local residents.

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1. A term coined by CHORA, after a first test run in Diploma Unit 2 of the Architectural Association
2. Funding of this project has been made possible. This project has been supported by the Stimuleringsfonds voor Architectuur and the Stichting Fonds voor Beeldende Kunsten, Vormgeving en Bouwkunst, both in the Netherlands
3. Raoul Bunschoten is currently guest professor at the Berlage Institute in Amsterdam and was involved in the Zagreb project as such.

PROTO-URBAN CONDITIONS

In Eastern Europe changes have occured that were inimaginable several years ago. After the initial euphoria a more complex side of the story is unfolding. The disappearance of repressive political systems and the partial destruction by war have created strong desires based on feelings of denial, neglect, resentment and outright hatred. The attempted phasing our of a whole period of history creates equally strong myths related to older and easily manipulable periods. Territory becomes again a primal means of selfexpression and the object of great disputes. Architecture and cities are main icons for this expression. They are destroyed and rebuilt for similar objective applied by opposite sides. A restless urbanism emerges which is fluid, anarchic and thirsty. Thirsty for models, techniques, opportunities and of course a new culture of urban action. The restless energy that accompanies these developments has tremendous potential. What is this emerging urbanism and how can its potential be articulated and managed?

Enourmous migratory movements of Russians from the former Soviet republics towards cities in Russia forms one example, the tribal warfare, large population movements and radical ‘ethnic cleaning’ in the former Yugoslavia another. For these proto-urban conditions. The collective emotions related to these phenomena involved are intense and on a collective scale radical and momentous. A new boundary has emerged. The success of the development of urban environments in central and eastern Europe will strongly influence stability in Western and Central Europe. Consequently the EC is taking a keen interest in these developments by supporting innovative experiments in planning and development. This concern for internal stability, combined with the

desire of several ‘fringe’ states to join the EC and the lure of this expansion for, the EC makes the study of urban development in places like Zagreb, Alexandrov and Vladimir a ‘domestic’ affair. These cities are models for the effects of proto-urban conditions. Zagreb is capital city of a new state currently still at war but with high hopes to become an EU member. Small Russian cities would seem to be of no interest from the perspective of Europe, but a change in urban culture in thousands of small towns will create democratic voting patterns in Russia and thus affect the political balance in Europe as a whole.

All cities are dynamic. But the understanding of the dynamic nature of cities does not necessarily prepare us for emergent phenomena such as

1. sudden loss of collective memory, the structures of civic society or of the physical environment caused by political revolutions or violent conflagrations
2. the (re)creation of new local or national identities
3. radically new economic spaces linked to information environments
4. wandering populations and ‘soft’ social structures that evolve gradually out of this population flux.

Assumption of the conditions underlying unpredictable changes will help us to describe their mechanisms. These are seemingly submerged and yet have radical effect. Proto-urban conditions are

like emotions in human beings, subliminal conditions strongly affecting physical states and behaviour. Proto-urban conditions form a metaphoric emotive space of the city, this space is in need of appropriate forms of expression. Contemporary planning discipline lacks the forms. To touch this space there needs to be an expansion or revision of the current architectural and urban planning discipline. For example a more culturally oriented form of planning should also use poetic modes of expression in order to mimetically come closer to the assumed nature of proto-urban conditions and understand better the value of their related phenomena. This revised discipline has to be exact in its technique and in its site-related fieldwork, mapping and other forms of representation of urban environments undergoing radical change but profound in its reading of vectors of desire, modelling of values and use of their power of transformation.

AXIOMATIC SETS AND PROTOTOYPES

Certain urban problems are derived from a malfunction of the exchange between the 'open' dynamic city and the 'submerged' proto-urban conditions. These are constantly changing our environment towards new forms of urbanity. In order to employ these conditions and influence this urbanity, it is necessary to formulate methods that make them 'visible' and operational. CHORA is experimenting with techniques of simulation that affect proto-urban conditions rather than detect them. These experiments have so far involved inductive methods and prototype development with the use of an axiomatic set of four urban processes - erasure, origination, transformation and migration - forming operational 'fields'[1]. Each field contains one process in various forms. The intention of this exercise is to make easier to read the 'handwriting' of any assumed proto-urban condition in each field

separately. The totality of fields simulates the given environment. In praxis the axiomatic set of fields assumes the characteristics of a specific urban environment. In the case studies conducted by CHORA the axiomatic set has increasingly become related to geographic situations. In several projects the set begins to demonstrate structures for Cultural Planning by becoming a form of 'embedded narrative'.

FOLDS

Such geographic situations become real or fictitious sources for either the axiomatic processes or related 'embedded' narratives. Called urban 'folds' they should contain sufficient 'representative' elements to become a proto-type for strategic planning. 'Folds' are urban features that have the potential to grow under the influence of proto-urban conditions. In order to become operational they require identification of: a) the proto-urban conditions in question, b) local authorities[1]. That anchor these within existing institutions or places; actors, or participants with stated desires; and agents to develop the potential of growth in relation to the desire of actors.

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1. In a dynamic environment it is less important to locate processes belonging to single agents or single forms then to allocate layers of processes or sets of forms belonging to a certain kind. The aim is to allocate different frames of analysis to the urban environment under study. Any kind of regulation or proposed implementation may than be directed at such layers or sets. The powerlessness often experienced by architects and planners in such environments can be juxtaposed by acting as 'match-makers' between aspects of different frames.
1. *The practise of everyday life*, by Michel de Certeau, University of California Press, London 1988

Helsinki, gateway

Helsinki lies in a peripheral fold of the European community. This area is becoming part of a new region that includes St. Petersburg and Tallinn, with a strong influx of people and trade form both places. It is very conscious of being the 'edge' of Europe and dreams of being some kind of gateway, with both resisting and regulating functions.

The University of Art and Design (UIAH) in Helsinki staged recently a conference on GATEWAY II: Managing Urban Change[1]. The conference sketched out conditions of strategic and cultural planning and linked these issues to the specific concept of 'gateway'. This concept brought together global and regional change with urban and local environment. The location of the UIAH itself was seen as a generative instrument for a refocussing of Helsinki towards St. Petersburg and the Gulf of Finland region. CHORA participated in these events and proposed four geographically based scenarios that would exist autonomously or interactively:

- A holding and preservation scenario based on the adjacency of the near-mythic site of medieval Helsinki, combined with the existing birdsanctuary for migrating birds and a delicate lake landscape. Ecology is becoming a collective concern, a new 'common good', both concrete and near-spiritual, linking place, collective memory and nature on a global

1. The initiator and organisor was Ian Verwijnen. The conference was held on 15 and 16 September 1995

scale, a place of ‘common good’.

- The creation of new public spaces: physical and visual urban space as cultural instrument of change, an expression of a public gameboard for different attractors.
- Urban trading floors as engines of change: economical spaces that are ahead of economic developments and create a real gateway situation in terms of an intensification of flows and networks, regulated trade with Russia is an imperative and an information environment enables active global exchange given appropriate deregulations, byproducts can seriously (re)generate urban sites, as well as damage them if ill-chosen.
- Democratic reform: regulation of political stability and migration by investing in the institutional development of municipal policy departments that are aimed at direct-democracy projects and other structures that create civic action and cohesion, this is a necessity for the EC as a whole, aimed at places like Alexandrov and the Gonchary (see later in this article) of which there are plenty in Russia. Finland has real concerns for its security (warned by the spectre of a Zhirinovsky scenario) and the urban culture of Russia relates strongly to who will govern Russia in the near future. The newly emerging cultural planning

discipline will have to be embedded in new types of institutions that can offer the appropriate cultural context.

Zagreb, shifting identities

A vignette[1]: in 1617 a man is born in Zagreb, Yuri Krizhanich. He studied theology in Zagreb, then in Vienna, Bologna and Rome. In 1647 he visited Muscovy (now Russia) and became adviser to Tsar Alexis, assisting in the creation of the first schools and academies. After suspicions of spying he was sent into exile of Siberia where he wrote his 'Political Considerations', in which he tried to define the historical role of the new Muscovy. It is a progamme for change based on a thorough reading of the life in Muscovy (it was the time of the first 'factory peasants'). As proto-Pan-Slav he called on Muscovy to rescue and unite all the stateless peoples - the Croats, Serbs, Bulgars, Czechs and Poles - and restore them to their national honour. The Slavs, Krizhanich argued, 'were the young people of the future'. [2]

Zagreb lies also in a peripheral fold of the EC but the other side of the boundary: Croatia hopes to enter the EC within the next few years. The forceful clarification of its boundaries (apart from the Eastern Slavonia territory, at the time of writing) with as 'by-product' the exodus of almost all Croatian-Serbs (according to one Croatian urban planner, a serious problem is now that Croatia has

1. This episode is taken from The making of modern Russia, by Lionel Kochnan and Richard Abraham, Penguin Books, England 1986

'too many towns') is clearly meant to prepare Croatia for EC membership and bulwark or gateway status.

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2. Further vignettes: 2. The Croatian state existed in various forms during the middle ages, but in 1527 Croatian noblemen elected the Habsburgs as rulers. This situation reained until January 1918 when the State of Slovenians, Croats and Serbs was founded, the later Kingdom of Yugoslavia
3. On the day of the Invasion of the German army into the Soviet Union, 22 June 1941, the Central Committee of the Communist Party of Yugoslavia met and began preparatory discussions about armed resistance. Then the Soviet Union was model and object of veneration and when Moscow gave the sign the prolonged and very tough struggle ensued which resulted in Tito and his partisands gaining power in Yugoslavia after the capitulation of the German army and those that sided with it. From a period of monarchy Yugoslavia turned into a communist state.
4. On 25 June 1991 Croatia was proclaimed as a sovereign and independent state. On May 22 1992 Croatia was accepted as a member of the UN. President Tudjman was its president. With speed the new state created its own administrative structure, sought international recognition and cultural and economic ties, and pursued all things that a nation state does. Many aspects in the cultural and economic sphere could be changed relatively fast, other conditions like the legal system and land-ownership follow more slowly.
5. Soon after its proclamation of independence war rages in parts of Croatian territory between the new Croatian forces and attacking forces of the former Yugoslav army, joined by Croatian Serbs. The conflict concerns especially territories where Croatian Serbs live. Fighting, ethnic cleansing and scorched earth substitute for planning measures and cohabitation.
6. By the time of writing the Croatian army has almost completed its retaking of the western Slavonia and Krajina regions, accompanied by a mass exodus of Croatian Serbs. A new and nearly homogenous state is ready to be taken seriously by the EU

War and reconstruction

Division, war and destruction have changed the former Yugoslavia. States have formed themselves and nationalities are brutally carving out territory. Croatia is one of the nation-states emerging in this, with raw edges, scorched earth, parts of its territory inhabited by seceding groups of people and an involvement in the war on territory of another new nation-state. Towns and villages have been destroyed. Institutions are torn apart, old wounds opened. Unter the umbrella of *European* several attempts were made in war-torn areas. It was emphasized that any reconstruction must not only take into account what existed before the 'imposition of the fifty years of the îrevolutionary" rule'[1] but also needed to work with slow time-scales and scenarios on the basis of 'diagnostic maps'[2] which take account of 'those structures which have been created 'in an unplanned manner' as the time went by[3]. This in order not go for a wholesale refection of conditions of a certain period and engage in a more subtle form of destruction but use the catastrophe to an advantage and give form to uncharted but significant entities. Zagreb, old and new capital of Croatia was physically not touched much by the war but is now struggling to construct a new normality, to reconcile forty years of second city status (the 'denied city') in a communist state with new ambitions as capital and plan for a dynamic future aimed at assimilation with western Europe. A 'search for identity of a Croatian metropolis' is intoduced by Slavko Dakic, Director of the Bureau for Development Planning and Environmental

1. Part of Article 2, idem
2. Language of Patterns, Theses on soft method and organisation of reconstruction by Mladen Kreblin, From *_European Croatia*, Croatia,1994
3. idem

Protection in Zagreb, who states that their hope is to achieve an exemplary status for Zagreb towards Europe by pursuing dynamic systems of planning that achieve sustainable development. This term refers to the reconciliation of development and environmental issues, of the quality of life of one generation and the processes that ensure the preservation of the global environment.[1]

Soft Structures, turbo environments and sustainability

European workshops in war-damaged areas of Croatia have raised the issue of unchartered but significant 'structures created îin an unplanned manner"'. How to diagnose these 'soft' structures and how to employ them? Slavko Dakic hopes to achieve an exemplary status for Zagreb towards Europe by pursuing dynamic systems of planning in Zagreb that achieve 'sustainable' development[2]. This implies a delicately balanced dynamic environment which has much in common with other micro-urban regions in other cities in Europe. But Zagreb is a 'turbo-environment'[3]: it is the capital of a state at war and part of a struggle in which nationalities and religious entities are pitted against one another,

1. 'Metropolitan Identity of Zagreb' and introduction, by Slavko Dakic, Zagreb/Govor o Gradu, Bureau for Development Planning and Environmental Protection in Zagreb, Zagreb 1995
2. idem
3. Turbo-environments are environments that are propelled into new states of existence hardly imaginable a short while ago. They may appear in primal and raw form pushed by forces, political, economic, of near-demonic nature that come free in a society that is being pulled apart by geopolitical developments. In other places there may be mere turbulence and only a desire to not drown but com to grÌps with the erratic movements and wandering population sections and to gain some kind of control or guiding function. This is the case in Zagreb.

while it is the capital of a state in the midst of a struggle in which nationalities and religious entities are creating forced segregation that is in contradiction to the dynamic heterogeneity of modern urban metropolises while it is entering a new economic sphere of influence which has its own highly competitive dynamics. The sustainability that is needed is one linkes the regulation of the raw forces of such a volatile environment to the maintenance of a structure of change that resists homogeneity and that creates the basis for urban environments that are not defined by national boundaries and interests.

The 'Frames of the metropolis' workshop concentrated on planning strategies for a central zone in Zagreb. This zone, a large and very sensitve 'fold' in Zagreb's urban fabric has great potential. The issues emerging can be grouped into four categorical frames derived from the axiomatic sets described above, similar to those developed by CHORA for the project *Linzer Entfaltungen* [1] in Linz, and *Gateway* in Helsinki . These groups are autonomously defined but have to interact:

- A preservation scenario based on the adjacency of the older part of Zagreb, and an concern for ecology. Ecology is becoming a collective concern, both concrete and near-spiritual, a linking place for collecitve memory and nature on a global scale, a new 'common good'.
- The creation of new public space as cultural instrument of change to promote the status of

1.See *Linzer Entfaltungen*, 'Artifice', London, October 1995, and 'Archis', Amsterdam, February 1996, also in preparation in book form, Vienna, 1996

Zagreb as capital city and as central European metropolis in line with Helsinki, Berlin, Vienna, Bratislava and Athens.

- Urban trading floors as engines of change that are ahead of economic developments and create a real gateway situation in terms of on intensification of flows and networks. Regulated trade with surrounding neighbours is an imperative in addition to an information environment that enables active global exchange.
- Mobility and democratic reform: the regulation of the mobility of refugees and other displaced populations and the of the mobility of the inhabitants of a city stretched over a vast territory are necessary ingredients for the development of an urban environment and of political stability and democratic reform. The modes for this range from innovative use of the inner-city railway line through the site under study to EC investments in municipal policy and the institutional development of strategic and cultural planning proto-types that create civic action and cohesion.

Unfolding

Strategic and cultural planning involve scenarios that link economic and demographic changes to factors such as identity, culture, history and collective memory. These factors are often expressed with narrative or other means that do not easily mix with more seemingly exact methods. In a volatile environment moving towards a fully-fledged democracy large-scale urban transformations cannot be implemented without forms of planning and management of the subsequent changes that resemble 'game' structures. These consist of new institutional structures that include radically different partners, actors and agents. These structures have a temporal development consisting of negotiated planning built in. This allows for an 'unfolding' of planning scenarios that are able to react to changing interests and situations. This is an essential requirement in the context of Eastern Europe where societies are in an unpredictable flux and where any fixed strategies will be outdated immediately.

Alexandrov: agitating models

'There are two Russian nations: the immense provincial-village heartland, and an entirely disparate minority in the capital, alien to it in thought and Westernised in culture.' Solzhentisyn suggests that the impulse (to envolve to full nationhood) must come from the local productive economy and from locally elected government. He wants a moral revolution, one of self-limitation, and the central government is poorly suited to creating it.'[1]

Similar to other regional cities in Russia, Alexandrov was planned in various stages by state policy

and was run by central state bureaucracies combined with a local party apparatus. Alexandrov and its surroundings have the makings of a micro-region but will eventually be drawn into the immediate influence spheres of both Moscow and Vladimir. Alexandrov's industry has recently undergone a change from a state controlled defence industry to an industry struggling for something to do but being virtually at a stand-still. This change has caused a catastrophic disruption in the fabric of the city and its structures, leaving in its wake a period of transition in which the former functions of the city require redefinition. Currently Alexandrov attempts to fill this void by posing itself as a magnet or attractor for new high technology industries and for cultural acitivities. This it must effect in competition with the region as a whole and other neighbouring cities and against terrifying odds of a collapsed national infrastructure and widespread corruption and highway crime. Alexandrov enters into an increasingly global condition which is inherently dynamic and subject to complex changes in economic, political and social changes often outside the city's immediate regulatory capacity. The effects of this global relation are made manifest on a local level in Alexandrov in ways which follow complex behaviour patterns, especially visible in boundary conditions. These boundary conditions demonstrate self-regulatory behaviour or reveal characteristics that point at the emergence of new identities. This self-behaviour forms a kind of 'awareness' or 'consciousness' of an environment. This crystallizes in an emergence of cultural forms of expression. It is here that identities variant with existing ones, or identities which are only in the process of becoming are sketched out. A technology of simulation and interaction should therefore describe and enter this non-linear self-regulatory behaviour but also

1. From *Mother Russia'a prophet returns*, a review the Independent of 21 September 1995 by Geoffrey Hosking of the book *The Russian Question at the End of the Twentieth Century*, Harvill Press

simulate and propose the formation of a strategic ‘Public Space’.

Common to the thousands of other cities in central and northern part of Russia, the city of Alexandrov is undergoing a transformation of its social environment where the preceding structure no longer is the significant factor for determining their future. As a model case study Alexandrov can contribute to the gradual redevelopment of Russian cities and deserves a longer period of study. Observation is an interactive mechanism which has already had an effect in the instruction and confidence-bolstering of the chief architect[1] and his team, and other participants.

CHORA’s work in Alexandrov is the result of an earlier co-operation between Raoul Bunschoten and Vyacheslav Glazychev. The ‘Skin of the Earth’[2] was exhibited during the events that led towards the final break-up of Soviet Union, a process it modelled. The relationship was revived when Raoul Bunschoten and Robert Mull, then both as unit masters of the Architectural Association in London, held a joint workshop in the Moscow Institute of Architecture in 1993. By then Glazychev had founded the AUE and was conducting fieldwork and urban planning projects in smaller towns in Russia. The founding of CHORA made it possible to initiate a collaboration with the AUE.

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1. Alexandr Vasenkov (chief architect of Alexandrov)
2. ’The Skin of the Earth, a dissolution in fifteen parts’, an architectural project conceived for and exhibited in the Main exhibition hall of the Union of Architects of the Soviet Union. Main collaborators were Alain Chiardia, currently involved in CHORA as trustee, and Kristin Kotov, assisted by a team of young architects. For publication see A+U no. 263, Sept. 1992, or B, no. 49, published in Denmark in 1992

Proto-types, urban devices and form

To start a 'public space' of a strategic planning process proto-types and techniques of unfolding and embedding are needed. Proto-types are vectors of desire, they create the necessity to bring various parties together and to decide on an urban device which, when linked to the prototype, will smoothly map and implement its processes on to more complex situations. A device is an organisational structure but becomes visible in the urban fabric as form. CHORA has experimented with this set of urban tools in *Linzer Entfaltungen* and it is preparing their use in Alexandrov. A first field session was conducted by CHORA and members of the Architectural Association in co-operation with the city of Alexandrov. This produced data for three model planning projects to be developed in a second session in 1996. The three models are based on a second axiomatic set of themes: *urban icon formation*, *resonance* and *micro-models*. The models establish three frames within which relatively simple sets of rules for interaction can be set. The value of such models lies in the provisional prediction on new emergent forms, but also in the possible provision of additional or alternative situations to a planned change and to provide guidelines to the implementation of some of these extra situations.

Action & Simulation

Town planning and urban culture are political concerns and as the conditions that generate urban change in Eastern Europe are to a large extent new and very difficult to understand. There is a need for a new boldness of research, experimental techniques of modelling, a revised terminology and new methods of intervention and action. There is an urgent need for exemplary studies. The aims of these

studies can roughly be divided in three categories:

- to aid local populations in their quests for direct action, direct democracy, self-determination and self-organisation,
- to contribute directly to the decision making process of authorities with the help of demonstrations and simulations, and to train authorities in the possibilities of the first aim,
- to create model cases and prototypes for other Eastern European cities and towns, and for the urban planning discipline.

Gonchary (Vladimir),

Simulation is the implementation of an alternative reality as action into an actual environment. In Vladimir, Vyacheslav Glazychev and the AUE have, with the Vladimir city planning authorities, conducted a series of workshops that focused on the neighbourhood Gonchary. The workshop examined the general situation of neglect, decline and lack of urban structure in a typical inner city low intensity area, between the famous cathedral of the eleventh century, the old main entrance gate (the Golden Gate) to the city and busy train lines along the river. Gonchary has an older population which is divided between those who want to leave and those who want to improve their surroundings. There are no municipal facilities, industry or newcomers.

Glazychev sets up a task force of experts from Vladimir and Moscow, with visiting specialists from Britain, Switzerland and Germany having no certainty whatsoever that he could draw in the population. He succeded by arousing curiosity: people to come in slowly, almost one by one, and he quickly make them appropriate the particular parts of the project by proposing and than taking care of problems or initiatives. A slow and fragile process in an environment where there is an enourmous lethargy and a few decision making skills, a legacy of life under a system that discouraged them from taking individual actions. At the end of the workshop a Territorial Development Corporation was agreed upon, local committees were activated, Gonchary became an official model for the other neighbourhoods in Vladimir, the city of Vladimir officially committed itself to various projects, and the AUE was commissioned to further guide and advise for the city and the neighbourhood.

The AUE is undertaking four actions. Each of these actions construct an aspect of simulation and action, each is a part of a demonstrative and possible reality:

- The AUE as a *migrating body* (invited form the outside by local authorities or groups) has a form of institutional legitimacy.
- The AUE acts as an *agent* in drawing our hidden social structures, their dreams and desires. Using these networks of connections it finds out things that are unknown to the legitimate authorities. The agents action of ‘weaving’ connects two disparate realms (ephemeral or ‘soft’ entities and institutional bodies) and can turn a void into a mediating space.

- The AUE acts as *masque,* as a catalyst of a narrative space. It becomes a vehicle of emotive expression within a newly initiated cultural context. Its creation of maps and historical research bringing ephemeral or forgotten conditions up to the surface as for potential cultural assets. It triggers memories and dreams, and stimulates the realisation of a small cultural centre.
- The actions of the AUE catalyse but also simulate the construction of a neighbourhood as a *symbolic home*. This becomes a positive attractor in the city as a whole; a model that borrows from other or older traditions.

Very consciously Glazychev hopes to create a quasi-autonomous organism while simultaneously creating an education for local authorities and a potential threshold space for involvement of these authorities in locally initiated affairs.

MARKET SOLUTIONS FOR SUSTAINABLE CITIES

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Abstract

Sustainable development has become a globally accepted policy objective. It is however, increasingly recognized that the implementation of sustainability strategies has to take place at a decentralized level. This has also provoked the idea of urban sustainability.

The notion of sustainable city is indeed nowadays gaining increasing importance and policy interest. However, it falls short in providing a basis for effective urban policy, unless two conditions

are fulfilled.

- the specification of manageable urban sustainability indicators and related critical threshold values.
- -the identification of an evaluation mechanism as a basis for urban policies which can boost public support.

In principle, several policy orientations can be imagined for ensuring a sustainable urban development. They may range from command and control policies to market-based policies. In practice, urban policies seem to be instigated by the confidence in environmental standards as an effective policy vehicle. But the question on economic efficiency is hardly taken care of.

The paper aims to offer a refreshing contribution by making a plea for market solutions for urban sustainability problems. Particular attention is given to the potential contribution of tradeable permits for various polluting activities (air pollution, water pollution, congestion, energy consumption etcetera). The idea is that such market strategies may favour efficiency, equity and environmental quality in the city. An overview of various possibilities is given, followed by policy guidelines and conclusions.

The paper argues that Pareto-optimal solutions may be achieved by getting all actors in the urban space involved in sustainability strategies through the possibility of using the price mechanism for tradeable permits for polluting acitivities, taking for granted that - based on measurable environmental

quality indicators - it is possible to identify critical threshold values for urban environmental quality.

In the paper, a wide range of market solutions for tradeable permits is given and critically reviewed. The paper concludes with various policy guidelines.

1. Introduction

It is increasingly recognized that modern cities - or urban regions - are dynamic and self-organizing artifacts; they are the result of creative design, architectural implementation, land use policy and management of human resources within a cohesive framework imposed by their cultural and political history. Modern cities have become multi-faceted economic, social, cultural and environmental systems making up an organic assembly of multiple interacting subsystems. At the same time, cities have to struggle for survival and continuity, a task sometimes denoted by the concept of urban sustainability. As a result, cities exhibit complex evolutionary patterns in which growth and decline are in turn present. Thus the life cycle of cities seems to demonstrate a stimulus-response dynamics which is omnipresent in business life. Therefore, it makes sense to interpret urban dynamics in terms of a Schumpeterian search for new strategies that ensure continuity in changing - and often competitive - conditions. Clearly, seen from this perspective, innovative behaviour in the city is a sine qua non, in order to (i) remain at least at a competitive edge or (ii) to curb a process of urban decline. Deliberate innovative strategies to rejuvenate city life are necessary as the challenges and problems facing cities are numerous, complex and difficult to manage. Examples are: the governance of balanced human co-existence in the city (e.g., a multi-cultural community, social exclusion, high

unemployment rates); the management of urban capacity and density problems (e.g., urban environmental sustainability, urban traffic); or the policy response to globalisation processes impacting on the urban territory (e.g., urban network design, urban in-migration)(cf. Newman and Thornley 1994).

It has become customary to speak of the 'urban crisis' or the 'urban malaise' in order to denote the problematic position of modern cities which are paralysed by the burden of managing the urban space with its multiplicity of conflicts. We observe crisis syndromes originating from alienation problems, urban financial crises and high criminality rates (cf. Businaro 1994).

In light of the great many challenges (threats and opportunities) of the modern city, there is also a tendency to emphasize the new role of the city as the creator of a portfolio of locational opportunities (e.g., the agora city, the 'glocal' city, the resourceful city etc.). The main question is of course whether sufficient and effective governance strategies - in both the public and the private sector - can be developed that guarantee sustainable urban development (see also Camagni et al. 1995). In this context, it ought to be recognized that a proper organisation and use of the urban space should exploit the fact that the city is a privileged spatial - economic actor as a result of scale and urbanisation advantages. A city is in principle able to produce positive externalities which favour innovative behaviour (see Davelaar, 1991), in particular if multifunctionality, openness and spatial interaction are present. Thus the functional network character of the city is decisive for its innovative potential.

It is therefore also clear that in a dynamic competitive environment the absorption and generation of new technology in an urban economy is of paramount importance for the future role of that city.

Economic development is a sine qua non for a strong economic position of the city, but at the same time a strict environmental policy is needed to prevent that the basis for sustainability is eroded: non-sustainable urban growth implies by necessity that the whole urban economy will witness a process of socio-economic (and environmental) decay in the long run. Consequently, the urban carrying capacity has to be respected in urban development strategies, with sufficient attention for a balanced choice out of the portfolio of innovative capabilities of the city (and of the firms located in that city). In this context, a dedicated policy focused on urban sustainability is needed. Thus far, the results of urban environmental policies have not been overwhelmingly impressive, despite strict regulatory systems. This paper will explore the potential of more market based policy strategies and will argue that tradeable permits may be new promising instruments to ensure urban sustainability.

2. Environmental Policy and Space Conflicts

As mentioned above, in recent years the attention for urban areas in the sustainable development debate has grown rapidly (see Nijkamp and Perrels 1994). Many international organisations published policy documents with recommendations on strategies to reach urban sustainable development. A huge number of these reports strongly advocate a compact city solution to the urban sustainability problem (CEC 1990; Elkin et al 1991). Consequently, many urban governments advocate nowadays the compact city solution in their strategic urban plans. A compact city is a city which has a high density and a concentration of socio-economic functions in order to reduce energy use environmental decay and urban sprawl.

There are indeed many advantages involved in high urban density living (see Haughton and Hunter 1994). High density living is more efficient than low density living in terms of lower rates of domestic consumption of energy for heating, electricity and water. Scale economies can result in lower infrastructure costs, and critical mass thresholds are more likely to be reached to justify the provision of energy efficient modes of public transport (underground metros, trams, etc.). In addition, higher density urban development is regarded to economize on street lighting and to reduce transport needs, particulary where cities are arranged in such a way that people can readily walk or cycle to their work and services, such as schools and shops. A further positive feature concerns the range of functions which well-designed neighbourhoods can support with high concentration of population, in terms of healthcare, schools, shops and so on. Newman and Kenworthy (1989) have even found a strong correlation between the density of the urban area and the energy use in it. The higher the density of the city the less energy is used. Some other authors however argue that, although there is a strong correlation, also many other factors are involved like the size and the urban form (Breheny 1990).

The advantages of concentrating urban functions in a compact city may be summarised as follows (Rosdorff et al 1994):

1. positive environmental effects for the region; by concentrating the functions in the city, the entire area affected by the pollution or environmental decay is smaller;
2. a reduction of environmental stress per activity due to scale economies as a result of improved efficiency.

However, the compact city has also a big disadvantage. By concentrating the functions of the city, also the spatial concentration of environmental pollution is higher: because environmental stress is more concentrated, the environmental problems are more severe as well. This influences the quality of life of people in the compact city. This situation is also called the *paradox of the compact city* (Breheny 1990). We may thus argue that the paradox of the compact city is an allocation problem of environmental assets (clean air, clean water, etc.) to space and time (Rosdorff et al 1994). In the compact city the environmental assets are overused in order to reduce the use of environmental assets outside this area.

In light of the tension between economic efficiency, social equity and environmental sustainability in a compact city model, it is clear that many policy initiatives have been launched which were seeking for an improvement of urban quality of life through more strict regulation (e.g. environmental standards etc.)

In many countries (including the Netherlands), the government works predominantly with norms for environmental pollution (e.g. for noise dBA, for air pollution $\mu g/m^3$). In terms of strict efficiency, local standards would appear preferable to the adoption of nation-wide emission standards. The latter do not guarantee that the marginal costs of environmental improvement will be equalized across urban areas and, in consequence, the uniform standard will be too generous for some cities and too severe for others (Button and Pearce 1989).

With the present legislation a company is not allowed to produce pollution exceeding the norm. The norms however, are more or less equal for an industrial area and for a natural park. This means

that sometimes it is not possible to locate the industrial companies close together, because the norm of the area is exceeded. The result is that in some areas the development is halted, because it is not possible to locate there, whereas in 'clean' areas the development has started to grow. A new industrial company is not allowed to locate near an existing industrial area and as a result the pollution gets more dispersed. Given the present legislation in many countries it is thus difficult to reach a compact city.

An other disadvantage of the present legislation is that there are no incentives for companies to reduce their pollution level below the norm, even if the company is able to do this at low costs. Consequently, it seems meaningful to look for a policy which is more flexible and offers companies more incentives to reduce their pollution. Flexibility is then needed to concentrate the pollution problems and efficiency is needed to reduce these environmental problems at the lowest costs possible. In the USA several initiatives have started to find a solution to these problems, mainly based on market principles with a particular emphasis on the idea of emission trading. This system will concisely be described in the next section.

3. The System of Marketable Emissions Permits[1]

At present emission trading is a system which is only used on limited scale in the United States. It is a relatively new instrument in environmental policy. In a marketable emission permit system the

1. The term Marketable-Emission-Permit-System is sometimes also denoted as Tradeable-Emission-Permit-System or in short Permit-System

government (or an environmental authority) allocates or sells emission permits to companies, which can trade their emissions afterwards. Some companies will be able to reduce their emissions (or the impact of the emissions) at relatively low costs (low marginal abatement costs). They can then trade the emission permits which they do not use, to companies which are not able to reduce their emissions due to relatively high marginal abatement costs. In a perfect market the emission permits will be traded until the marginal abatement costs of the companies are equal to the price of the emission permits. This means that the reduction of the emissions are allocated between the emittents in such a way that the reduction is realised at the lowest costs (Montgomery 1972). Clearly, this outcome is only reached in a perfect market. The requirements for a competitive tradeable permit market are (Hahn 1984):

1. the existence of a large number of potential traders;
2. an 'arm length' (non-dependent) relationship among polluters in their product markets to prevent subversion of permit trading through product market threats;
3. sufficient differences in abatement costs among the potential traders to make trading worthwhile.

There are two forms of permit markets. In the Ambient Permit System (APS)[1] the permits do not concern a source emission, but refer to the impact of these emissions at the level of pollution at a particular point (a receptor point). Environmental quality norms are made for each receptor point and

competitive bidding for these permits per receptor points would then generate an equilibrium solution that satisfies the conditions for the minimization of total abatement costs (Montgomery 1972). A main advantage of this system is the simplicity of the system for the environmental authority. In particular, officials need no information or whatsoever regarding abatement costs; they simply issue the prescribed number of permits at each receptor point, and competitive bidding takes care of matters from there. But a great disadvantage is that it is extremely cumbersome for polluters. The polluters have to make a portfolio of permits from each of the receptor points that is effected by their emissions. When there is a large number of receptor points, each with its specific environmental norm, a huge number of markets will exist. The transaction costs for polluters may then be high (Baumol and Oates 1988). A second disadvantage of the APS is that the receptor points tend to become institutionalized. They all have their specific markets and the displacement of a receptor point to adapt it to a new pattern of pollution would create dislocations. The APS form of the permit market is thus not without serious problems (Baumol and Oates 1988).

The second form of permit markets is the Emission Permit System (EPS).[1] The EPS can simplify life significantly for polluters. Instead of assembling the necessary portfolio of permits from different receptor markets, each source would find itself assigned to a single zone within which emissions entitlements would exchange one-for-one, but no transfers are permitted between the zones. However,

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1. Also called the Ambient Differentiated Permit (ADP)

1. This is also called the Emission Discharge Permit (EDP)

the EPS cannot, in general, achieve the least-cost solution, and it places high demands on an administering agency that aims to approximate this solution. Since polluters with somewhat varying dispersion coefficients are aggregated into the same zone, one for one trades of pollution entitlements will ignore the differences in the concentrations contributed by their respective emissions. In short, the price of emissions for each polluter will not correspond accurately to the shadow price of the binding pollution constraint (Tietenberg 1980).

For the initial allocation the environmental authority needs to know the abatement cost functions of the polluters in order to achieve the least cost solution (Baumol and Oates 1988). Secondly, even if the control authority would have this extraordinary large amount of information, it would have only one distribution of permits which would be consistent with the least cost solution (as opposed to the infinite number of initial APS allocations which are consistent with the least cost solution). Even in the rather unlikely case that the control authority is able to discover this single initial EPS allocation, it would have no flexibility in trying to distribute the costs fairly (Tietenberg 1980).

Both systems are based upon source zones. The number of source zones and their size is a variable which can be manipulated by the control authority when the system is designed. Since the administrative complexity of the system rises with the number of zones, it is tempting to use very large zones (hence only a few of them) to characterize a particular geographic area. This temptation would have to be resisted however, since an increase in the size of the zone will introduce the possibility that 'hot spots' or high pollution levels will occur within the zone, since one-for-one transfers within the zone may result in clustering of emitters. On the other hand, in the EPS smaller zones reduce the transferability of permits, a prime source of cost reductions (Tietenberg 1980).

4. The Offset and Bubble Policy

As shown above, both the APS and EPS forms of marketable permit systems are then subject to some serious problems. In short, APS is cumbersome for polluters, whereas EPS is cumbersome to the environmental agency. Therefore, marketable permits schemes are rarely, if ever, introduced in their textbook form, and consequently a number of hybrid systems has emerged. One of these hybrid systems is the pollution offset-system (PO).

The emission offset policy was originally designed as a means for allowing economic growth in non-attainment areas while insuring no further degradation of their air quality. In this approach, permits are defined in terms of emissions (e.g. the permit allows the discharge of X ton of the pollutant, say, per month). However, sources are not allowed to trade permits on a one-to-one basis. More specifically, transfers of permits under the PO scheme are subject to the restriction that the transfer does not result in a violation of the environmental quality standard at any receptor point. The new source must for instance always use the 'lowest achievable emission rate'-technology.

The advantages of this hybrid system are significant. The PO system shares with the APS the important property that mutually beneficial trades among sources can lead to the least cost solution, a result which is independent of the initial allocation of the permits. The PO scheme makes modest information demands on the environmental authority. Officials need to know the dispersion characteristics of emissions within the zone, but need not have no information on source abatement costs. The authority does not have to solve the cost minimization problem to determine the initial allocation of permits; any allocation will do.

Unlike the APS the PO system does not require sources to trade in a multitude of separate permit markets. Instead, a firm purchases emission permits directly from other sources. The PO scheme thus promises substantial savings in transaction costs to sources relative to APS. In addition, it is not subject (as is APS) to the requirement that a fixed and 'institutionalized' set of receptor points be established (Baumol and Oates 1988).

An other related concept which has emerged is the *bubble concept*. The bubble concept specifically allows emitters to propose modifications in their emission standards, based on the substitution of a more stringent degree of control to an another source of the same pollutant. The attention is not focused on one source only but on a group of sources. The pollution by the group of sources - rather than a single source - should not exceed the total norm. In the bubble concept a bubble is put over the group of sources and within the bubble the companies are free in how far they want to realize the norm for the bubble. These substitutions can, under certain circumstances, take place between plants or even between firms.[1] This design feature carries the bubble policy a long way toward a fully transferable permit system. The aim, of course, is to allow a firm to meet its emission reduction goal as flexible and cheaply as possible while insuring that the air quality is not degraded by the substitution (Tietenberg 1980).

The main difference between the bubble and the offset policy is that the latter allows the transfer of emission reductions from existing sources to new sources, as long as there is a net improvement in

1. The possibility of compensating sources within the own company is also a form of a bubble and is often called *netting*

the environmental quality, whereas the bubble policy allows transfers only among existing emitters and does not ask for a net improvement of environmental quality.

The key difference between the existing system (with the bubble concept and the pollution offset system) and a system with full transferability lies in the fact, that in the latter the control authority allows all sources to participate in the trades and allows all emission reductions to be traded in a regulated market. In contrast, the bubble and offset policies have restrictions on which emission reductions can be traded (e.g. only those additional reductions above the standard in the offset policy) and on which sources can participate in trades (e.g., only existing sources in areas demonstrating attainment in the bubble policy) (Tietenberg 1980).

It is interesting that in the existing policy there is also a possibility to *bank the credit*. With the possibility to trade the emission rights, a market is created. Because supply and demand are not always equal, there is need for a possibility to store the emission reduction credits for later use. A banking system has to be created to store the emission reduction credits. In order to apply for a reduction credit at a bank or in order to trade, there are some constraints (EPA 1980):

1. a reduction of the emission can only be used as a credit and banked when the reduction is exceeding the norm for reduction;
2. the reduction should be permanent. This means that the reduction should not be temporary, intermittent, or short-lived (e.g. emissions reductions from carpooling are frequently only

temporary);

3. the reduction must be real. This means that *actual* emissions should be reduced. Methods to measure the reduction should be the same as the measures used before the reduction;
4. the reduction should be enforceable. This means that the emission is more than a promise of reduction. It must be an action and a commitment that is legally binding and enforceable in the courts and by the regulatory agency. Then the company has the opportunity to use the credit later and to sell it to an other company or to use the credit later when the firm wants to expand in a non-attainment area. The credit can thus be used to 'bubble' or to 'offset' later.

5. The Policy of Marketable Emissions and UrbanSustainable Development

It is now an interesting question whether policy of marketable emissions is consistent with the concept of urban sustainable development. Sustainable development is a development in which the critical environmental quality level should be sustained through modified economic growth (OECD 1990). The policy of marketable emissions sets standards for the environmental quality in a specific area, and these standards may be high when the interest in urban environmental quality is high. It is

thus in principle possible to reach urban sustainable development with modified economic growth through the policy of marketable permits.

An important advantage of the marketable emissions concept is that we only have to know until which point we want to pollute or use scarce natural resources. We simply set standards at these points without the difficult task of valuing the environment. With other policies (like the "polluter pays" policy) we have to know the value in order to calculate the tax for the firm. Thus the simplicity of the policy of marketable emissions makes it an attractive policy (Howe 1994).

Furthermore, it is noteworthy that sustainable development is an integrative process. The policy of marketable emissions tries to integrate environmental concerns into the economic system: the environment is seen as a scarce resource.

In Section 2 the compact city was mentioned as a solution to the problem of urban sustainable development. Theoretically a policy of tradeable emissions leads to a state where the environmental goals are reached at the lowest costs (see Montgomery 1972; Baumol and Oates 1988). So that the system of tradeable emissions is efficient in reducing the urban environmental problems. Clearly this policy is not the only policy that achieves environmental goals at lowest costs. The system of effluent fees also has this advantage. But a major advantage of marketable permits over effluent fees is that permits promise to reduce the uncertainty and adjustment costs involved in attaining legally required levels of environmental quality. The environmental authority is normally never entirely certain of the response of polluters to a particular level of an effluent charge. The fee may have to be raised and then altered again to generate an iterative path converging toward the target level of emissions[1]. In

contrast, under a permit scheme, the environmental authority directly sets the total quantity of emissions at the allowable standard; there is, in principle, no problem in achieving the target (Baumol and Oates 1988).

Next a tradeable emission policy is flexible, as it allows the environmental agency to set different standards for different geographical locations. In this way it is possible to have areas with higher attention to the natural environment, and other areas with higher attention to economic growth. With the system of emission trading it is also possible for a firm to expand or relocate to areas where this was previously not possible with the present legislation. The system has the possibility for financial substitution of the emission reduction. With the possibility to buy, sell or bank the emission reduction credits there are many incentives for firms to reduce their emissions. Like all policies the concept of marketable emissions embodies also a couple of disadvantages. First, by storing the emission reduction credits at a bank a right to pollute is created. The idea that someone (a company) can earn a right to pollute and therefore can get a right to hurt third parties with their pollution is somewhat counter-intuitive. But there is an important distinction between the "emission reductions" (the *physical* reduction of emissions by a source) and Emission Reduction Credits (the *commodity* that is to be banked). The simple fact that a source reduces its emissions by 100 tons, does not necessarily mean that either itself or another source that purchases these credits has the right to pollute an additional 100 tons. The use of Emission Reduction Credits is subject to the rules governing the particular permit context (e.g., offsets or bubble applications) to which it is applied. In order to avoid

1. This is also the case with, for instance, an inflation. Under a system of permits, market forces automatically accommodate themselves to inflation and growth with no increase in pollution

confusion between the physical pollution units and the intangible commodity which is banked and ultimately used, the former ones are termed emission reduction and the latter are termed Emission Reduction Credits. Credits will entitle sources to meet certain requirements for either obtaining new source permits or for meeting emissions limits at existing sources. The use of ERCs must meet sufficiency and equivalent tests. Credits do not automatically entitle sources to increase their pollution; nor are these credits absolute entitlements or property rights of interminable duration.

A second disadvantage of the marketable emission system is that it is not entirely fair to newcomers in an area who have to pay for permits, while the already existing companies do not have to pay for it. This is only the case when the initial distribution is done by grandfathering. Grandfathering means that the sources which are in the area, are given the permits at the initial distribution (usually on the basis of historical emissions). Trades between the holders will result in an equilibrium solution that satisfies the conditions for the minimization of total abatement costs. An other system that could be applied, is that the permits are sold at the initial distribution. Auctioning the permits results in an efficient initial allocation of the permits. In this latter system, the costs for the initial allocation may be high for the sources in the area; therefore, grandfathering has the advantage that it is much more politically feasible. In all cases where they work with tradeable emission permits, the initial distribution was done through grandfathering. Another possibility is that the authority reserves a share of permits for possible newcomers in the area. This is done in a Swedish study, in which 80% of the permits are distributed through grandfathering and 20% are sold. The permits that are distributed through grandfathering have to pay a yearly tax over the permits they own. But this system of paying taxes eventually is the same as when the permits would be sold initially (MEZ 1992).

A final usually mentioned disadvantage against the bubble policy is the danger of filling up the norms. Within the bubble companies are free to choose how they realize the norms. Consequently, the norms are totally used up, because a reduction credit may be sold or used to fill up the norms. But it is questionable whether this is really a disadvantage of the system. The norms are related to the number of permits that exist in an area. When the norms are set high enough and are adjusted in the future, the problem of filling up the norm is not necessarily a problem. As was mentioned above, in order to offset, the total environmental quality must be improved. It is thus not entirely true that the emission reduction credits may be used to fill up the norm.

6. Urban Sustainability and Emission Trading of Air Pollution

6.1. Introduction

The possibility to implement a system of tradeable emissions for different environmental problems in the urban area would administratively be easier, if all types of pollutants could be handled within the context of one general market. The problem of this approach is however, that the final amount of each pollutant is determined by the emitters; the control authority will then lose the capability to control each pollutant (Tietenberg 1980). Therefore, it is better to use separate markets for separate pollutants, provided the number of different markets is not too high. With many different markets, the administration costs will be high and subsequently also the transaction costs for the polluters.

Therefore, it seems more plausible to distinguish different markets for different pollutants in the urban area. The first step in designing a permit system is to define a basis for what will be traded. Theoretically, there are three ways to control environmental problems;

1. a control of the input that causes the pollution;
2. a control of the emissions of the pollution;
3. a control of the impact of the pollution on the environment.

We have to keep in mind the following criteria for the base of the permit (MEZ 1992);

1. the system should not be too difficult to implement; important aspects are the information required and the costs of control.
2. the policy instrument must be effective, which means for the permit that there must be a direct relation with the goal of reducing the pollution.
3. the system must have the possibility to control different pollutants within the same market; which means that the number of different markets should be low.
4. the system should be dynamically efficient, which means that developments of new technologies to reduce the pollution are to be stimulated through the use of the permit.

We will illustrate the above observations by taking a closer look at urban air pollution. From the viewpoint of minimizing administration costs and transaction costs, it would be desirable that all different air pollutants were traded in the same market. Macintosh (1973) suggests choosing the weights for determining the equivalency between different pollutants on the basis of their historical contribution to pollution in the local area. The permits in his study cover particles, sulphur oxides and carbon monoxide. He uses the emission of the different air pollutants as the base for the permit. The disadvantage is that the weights that have to be chosen are difficult to establish, and may change over time. A control on each pollutant will be lost, since substitution between the pollutants is possible. A second disadvantage is that some air pollutants have a more local character than others. This could cause certain hot spots in some areas.

It may also be interesting to take a look at the sources of pollution. We can see from Table 1 that most air pollutants are in one way or another related to the use of fossil fuels for energy. A trading system based on the use of fossil fuels might therefore, also reduce the concentration of different air pollutants. When the fossil fuels are completely combusted, there is a direct relation with the emission of CO_2 in the air. With an incomplete combustion the emission of CO_2 is less, but the emission of CO and VOC's is higher.

An advantage in using fossil fuels as a base for the urban permit system is that the system is far easier to control than a system in which the emission of pollution is controlled, since registration of the emission from all sources is a difficult task. The big advantage in choosing carbon based fuels as a base is that data on production, import and consumption of carbon based fuels are usually available from the energy company or the gas company (MEZ 1992). A second advantage of using fossil fuels

as the base is that we do not have to use different markets for all air pollutants. There is also a rather straight forward connection with the quantity of air pollution, while the system is rather flexible.

Table 1. Sources of the air pollutants

Air pollutants	**Source**
Carbon dioxide	Combustion of fossil fuels
Nitrogen oxide	Transport sector, industrial sector, energy sector
Carbon monoxide	Incomplete combustion of fossil fuels
Volatile organic compounds (VOC)	Incomplete combustion of fossil fuels
Particulate matter	Sources include fine asbestos and other particles stemming from wear and tear of tires and brakes as well as matter resulting from engine, especially diesel engine, combustion

Sulphur dioxide	Coal fired electricity generation, and for a small part the transport sector (5%)

The second step in designing an urban permit market is to distribute the permits to the actors in the market. In the energy market, we can basically identify three groups of consumers:

1. the transport sector;
2. the industrial sector;
3. the residential and commercial sector

A trading system with one market for the different consumers of energy is difficult to design, since the difference in consumption of energy is significant. In the residential sector the number of participants is large, but the amount they use is relatively low. In the industrial sector the number of consumers is relatively low, but the consumption on the other hand is high. A trading system in which all actors participate is thus cumbersome, because of the different sizes of the permits. For the practicability of the system of tradeable emissions, the costs of control and the required information should must not be too high, as otherwise the administration and transaction costs will be too high. Therefore it seems better to use separate markets for different consumers of energy.

6.2.The industrial sector

One of the main energy consumers in the urban area is the industrial sector. The share of the total amount of energy consumed by industries in OECD countries, is about one third (OECD 1993). This share has declined in the past 25 years (from 40.1% in 1970 to 32.1 % in 1991). This is partly due to a more efficient energy use, but also because of a structural shift in the economic base of most industrialised countries to a more service-oriented economy. The environmental problems directly caused by energy use of the industry are the depletion of the energy resources and the air pollution. The share of the different emissions of gases is shown in Table 2 (IEA 1991).

Table 2.
Share of the industrial sector in emission of gasses

Carbon di-oxide	34.1 %
Nitrogen di-oxide	22 %
Carbon monoxide	1 %

Sulphur dioxide	65.3 %

A permit system for the energy use by the industrial sector will reduce the amount of emissions of gases that are released by the combustion of fossil fuels. The costs of control are relatively low, since most data on the use of gas and the use of fossil fuels are available (MEZ 1992). Thus certain number of 'fossil fuel use permits' can be identified to meet air quality standards. These may be distributed through grandfathering or may be sold.

As earlier, a distribution through grandfathering is politically more feasible. After the initial distribution, the participants in the market can sell, buy, rent or lease the permits. When a company is able to increase its efficiency in energy use, it needs less permits and the company can sell the permits.

A system in which the fossil fuel permits are traded without any restrictions may result in an increase of pollution in local areas. Therefore, some trading rules should be used to prevent adverse air quality impacts. With the help of zones in which different air quality standards are chosen, the environmental authority can control the air pollution in the urban area. By setting different standards for different areas, the diffusion of pollution may be reduced, and a more compact city solution to the problem of urban sustainable development can be implemented. In non-attainment areas the trades might be limited in order to meet the air quality standards for a local area. This might could be done

through an offset and a bubble policy, as was explained above.

The result of such a trading system is that - because of the restriction of the energy use - the industrial sector gets incentives to use the fossil fuels more efficiently and/or that it seeks for cleaner ways to produce energy (e.g., through the use of renewable energy). A company will reduce the use of fossil fuels when the marginal costs of the reduction is lower than the price of a permit on the market.

6.3.Commercial / residential sector

The residential and the commercial sector use energy mainly for space heating, water heating, lighting, and more specifically in the residential sector for refrigeration and cooking. The residential sector used in 1991 about 18.8 % (in OECD countries) of the total energy demand (IEA 1994). More than half of the energy is used for space heating.

The number of consumers is large and the amount of energy use per consumer is relatively low. When the distribution is done through grandfathering, the actors in the market need to trade in order to arrive at an efficient allocation of the permits. The transaction and administration costs for this permit system will be too high in relation to the number of permits to be traded. It is thus not very likely that an optimal allocation, after grandfathering the permits, will take place.

Another possibility is that the permits are sold through auctioning, so that the actors in the market do not have to trade because the initial allocation is already efficient. But also when the permits are distributed through an auction, the transaction costs will be high because of the large number of

participants. The costs for consumers will be too high to make the system politically feasible.

The permits however, do not necessarily have to be bought by the consumers of the fossil fuels. They can also be bought by the producers and importers, who have often a regional or urban orientation who can raise the prices for the fossil fuels to account for the permits they bought. The number of producers and importers of fossil fuels is rather low (in the Netherlands 40 to 50), and the transaction costs per permit will be lower. Secondly, the costs of control will be much lower. The environmental authority only needs to control the producers and importers who hold the permit (MEZ 1992). Since with this system the price for fossil fuels will rise, the consumers will receive clear incentives to economize on energy use. A difficult element in this system is to set the price that the consumers have to pay extra for the fossil fuels that they use.

6.4. The transport sector

The transport sector plays an important role in western society. Transport allows personal mobility for both work and leisure activities. Transport also provides a vital lubricant to trade and has permitted the advantages of geographical specialisation in production to be more fully exploited (Button and Rothengatter 1993). These advantages however, are also the cause of many environmental problems. Many people regard the transport sector as the main contributor to environmental problems in the urban area. The transportation sector is responsible for approx. 28% of global carbon dioxide emissions, about 54% of the nitrogen dioxide emissions and about 90% of all carbon monoxide emissions. In 1991 the transport sector was responsible for 30,8 % of the energy consumption, up from a level of 23,8 % in 1970 (OECD 1993).

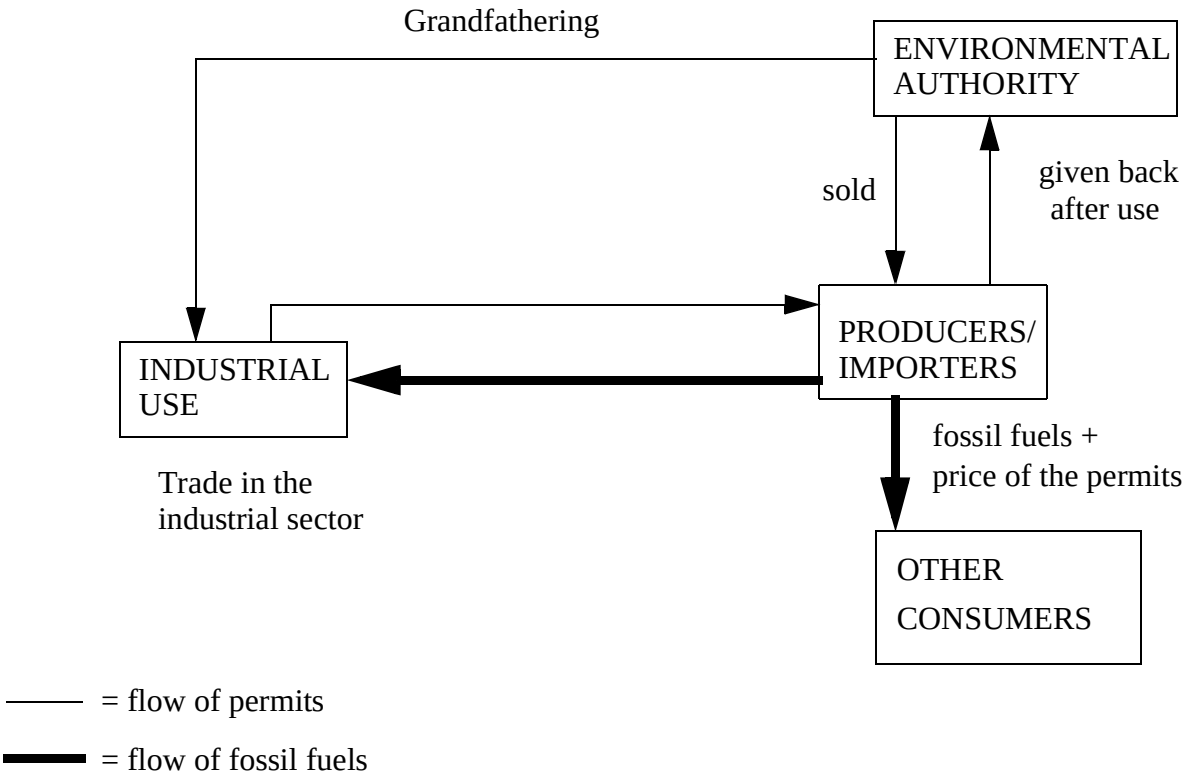
Like in the residential and commercial sector the number of consumers in the transport sector is very large. The amount of fossil fuel per consumer is again relatively low. Grandfathering of the permits in the transport sector, has thus the same disadvantage as in the residential and commercial sector. Also when the permits are sold the transaction costs will be high, because of the large number of consumers (see also Vleugel 1995).

A possible solution will be to use the same system as suggested above for the residential and commercial sector. The permits might be sold to the vehicle producers and importers. Consequently the prices of fossil fuels would increase, because the producers and importers would have to pay for these permits. Trade of permits in the transport sector will then not take place among car drivers since these users are not the holders of the permits.

6.5. An Integrated Energy Permit Market

As argued above, it is difficult to establish a permit market in the residential / commercial sector and the transport sector on the basis of a permit for the fossil fuels used by the consumers. Nevertheless it may be possible to create one overall fossil fuel permit market for the three sectors distinguished above. As mentioned above the costs of control and transaction are too high with many participants using relatively small amounts of fossil fuels. In the industrial sector we do not have these problems, so that permits in this market may be distributed through grandfathering, leading ultimately to a minimization of the costs of abatement. Since the transaction costs in the other two sectors will be high in relation to the amount traded, the result of trading will not be that the costs of abatement will be minimized.

A possible solution may then be that the permits for the two other sectors are sold to the producers and importers at the level of the initial distribution. The permits distributed through grandfathering in the industrial sector can then also be sold to the importers and producers of fossil fuels when the industrial company has to buy fossil fuels from them. A big advantage of such a system is that the environmental authority has to control only a limited amount of permit holders, namely the producers and the importers of fossil fuels. In the Netherlands this would mean that approx. 35 % of the fossil fuel permits would be distributed through grandfathering and the rest would be sold to importers and producers (MEZ 1992). In most industrialized countries the energy used by the industrial sector is approximately the same. As said before a trading market in the industrial sector will result in an efficient use of fossil fuels and/or the use of renewable resources. But also the importers and producers of fossil fuels will have these incentives. When these actors are able to reduce the fossil fuels in the residential/commercial sector and the transportation sector, they can sell their permits to the industrial sector. Information provision on energy saving techniques to the residential sector is important in this respect. Of course, the industrial sector might also sell permits to producers and importers, when it is cheaper for the industrial sector to reduce the use of fossil fuels. Clearly this is something else than giving the permits to the producers and importers when the industrial company buys the fossil fuels. The system for the entire fossil fuel permit market is shown in figure 1.


Grandfathering
ENVIRONMENTAL AUTHORITY
sold
given back after use
PRODUCERS/ IMPORTERS
INDUSTRIAL USE
Trade in the industrial sector
fossil fuels + price of the permits
OTHER CONSUMERS
= flow of permits
= flow of fossil fuels

7. Tradeable Emissions for Other Pollutants in the Urban Area

7.1. Tradeable emission markets for water pollution

The control of water pollution through an urban emission permit system is difficult. Usually it is necessary to control water pollution on a larger scale (for instance, all polluters in a river). This is done, for instance, in the Fox River in Wisconsin (US). This project demonstrates that water pollution control strategies allowing transfers between dischargers can be both cost effective and capable of maintaining any desired water quality standard. Transferable permits appear to be as appropriate for national water quality as offsets and bubbles have been for air policy (O'Neill et al. 1983). A permit system with the input as the base is difficult to implement, since there is no unique input for all the pollutants. Therefore, a permit on the emissions is here more appropriate. The permit system for controlling water quality is not further described here, because the quality of water is in any case difficult to control on an urban scale.

7.2. Tradeable emission markets for solid waste disposal

An interesting proposal for a tradeable permit system for solid waste disposal is currently considered by the State of Minnesota (Howe 1994). The State would set an upper boundary on the tonnage of (heterogeneous) solid waste to be accepted by disposal facilities state-wide. The base for the permit would thus be the tonnage of solid waste. The traders in the system are the producers of

relatively large sums of waste, while households do not participate in this system. This system may easily be controlled, since the amount of solid waste can be measured by the disposal facilities. Participants in the trade can buy permits when they want to increase their waste disposal, from other participants who can reduce their amount of waste disposed.

The system may have the effect that the participants will recycle their waste, since buying permits may be more expensive. Results from the study in Minnesota are not yet available, but the system seems a good policy since the administration costs and the costs for control are relatively low.

7.3. Tradeable emission markets for noise disturbance

A permit market for noise disturbance is not totally new. In the present Dutch legislation, norms are already imposed for critical limits in some industrial areas. The noise levels should not exceed the norms on these borders and the companies within this zone are responsible for reaching this norm. This policy is not really a permit market, since the participants do not hold permits which they can trade. Noise disturbance has a highly local character in contrast to, for instance, greenhouse gases. A tradeable permit system on a large scale in which the participants can trade also with other areas is therefore, not possible. Since such a tradeable permit system should be implemented on a local scale, the danger arises that the number of participants is too low to establish a market. As mentioned above one of the requirements to establish a permit market is the existence of a large number of potential traders. A permit system for noise disturbance does therefore not likely reach an efficient allocation among the traders.

7.4. Tradeable emission markets for congestion

It is clear that the transport sector is an important component of sustainable development policy, because it has both economic and environmental effects. The present situation of the transport sector in many urban areas is clearly unsustainable, and future developments show us that the number of cars will continue grow. For an urban area it is important, for both the quality of life the economic progress of the city, to put restrictions on the use of cars. The traffic speeds in some cities (for example, Athens) are now as low as 7 to 8 km per hour, while in Paris it is 18 km per hour and 20 km per hour in London (Button and Rothengatter 1993).

Some cities have already put restrictions on the use of cars by closing the inner city (Milan), or by allowing car use on only some designated days (Athens, Mexico City). However, with the closing of the inner city the effect on the surrounding areas has worsened, because of an increase of cars in these areas (STOA 1994). And by allowing to use the cars on only specific days, many people have incentives to buy other cars to use them on the other days. A good illustration of this is the case of Mexico city where the effect on the natural environment even worsened (Goddard 1994). Such restrictions do apparently not offer a solution to the problem of the increase of cars in the city.

Other policy recommendations for controlling traffic congestion focus on the use of road pricing techniques (see Nijkamp et al 1995). Indeed, with advances in electronic technologies, there are experiments and applications in which road authorities collect toll charges with the use of these technologies. For an urban area such a system would not be feasible, because of the complicated technical requirements needed for a control on such a system.

A permit system as explained above with fossil fuels as the base for the permit system is likely not sufficient when the goal is to reduce also the congestion in the urban area. Since the transport sector and in particular private car use is rather inelastic, a rise in the price of fossil fuels will likely not produce the desired effect of reducing the congestion in and around urban areas. In this context it is interesting to refer to a recent paper by Goddard (1994) who describes a tradeable permit system for large cities (e.g. Mexico City). The base for the permits which he uses is the number of days someone can use the car. A permit system with a limitation on the number of days for driving the car is able has the capability to reduce the number of cars in the urban area in both the short run and the long run. The basic idea is to set the total supply of permits to achieve specified targets for ambient air quality and congestion reduction. These permits may be sold or distributed through grandfathering. The grandfathering of existing vehicles avoids serious political resistance to this mechanism. Everyone has a permit to use the car on, for instance, three days only. When someone wants to use the car on more days, or when he wants to buy a new car, he has to buy a permit from someone else. The permits can be bought and sold leased, rented and lent. In this way the total amount of cars used is limited both in the present and in the future, since the number of permits is fixed.

The system will require enforcement, but a judicious choice of the magnitude of fines and a reasonable probability of being caught should be enough to encourage substantial compliance (Goddard 1994). The system will however require a fair amount of administration of all transactions. The danger of this system is thus that the transactions do not take place because of insurmountable transaction costs. This is an important issue that needs to be studied further.

The permit system as described above may be an interesting policy to put restrictions on car use

in the urban area, but at this point the system is still largely conceptual in nature.

7.5. Tradeable emission markets for depletion of energy resources

An other important aspect of sustainable development is that the resources should not be overused in order to offer also the next generations the ability to meet their welfare needs. With a permit system based on the use of fossil fuels the depletion of the energy resources will be significantly reduced, as shown already above.

7.6. Conclusion

In Table 3 the different permit markets are shown, in relation to their effects on the reduction of pollution. Clearly for some pollutants the reductions may be more significant than for others. A few final remarks are still in order.

A fossil fuel permit market seems a promising solution for both the problem of air pollution and the use of fossil fuels. It provides good incentives to favour renewable energy and to use the fossil fuel more efficiently. Such a system may be implemented at various levels ranging from the urban scale to the national scale. The system may be made flexible with the help of different air quality standards for different areas, and with the help of offset and bubble policies, in order to prevent the dispersion of polluting activities to relative 'clean' areas.

Table 3. Overview of different urban permit markets

Permit market	**Reduction of environmental problems**
Fossil fuel permit market	- air pollution (CO_2, NO_X, CO, VOC and SO_2) - depletion of energy resources
Vehicle use permit market	- air pollution (CO_2, NO_X, CO, VOC and SO_2 and Particles) - depletion of energy resources - congestion - noise disturbance
Water pollution permit market	- water pollution (on a larger scale)
Solid waste permit market	- solid waste disposal

A permit market for vehicle use in the urban area has a great many advantages, but the concept until now is mainly theoretical. There are several issues that still need to be evaluated before such a system can be implemented, the most important one being the administration of the system.

A water pollution permit market is only possible on a larger scale, like the one for the Fox River in Wisconsin. The system for the Fox River shows that it is possible to reduce the pollution in such a system.

A solid waste permit market may be relatively easily applied in an urban area. The number of participants is large enough and zones are not needed. The control is relatively easy (except when participants take their waste to other areas where there are no restrictions on waste disposal).

In conclusion, the system of marketable permits for achieving urban sustainability looks rather promising. Several field experiments would have to be undertaken to test the feasibility of this idea in an actual urban setting.

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Telematic “Piazze” Network (Electronic Square Network)

Claudio Bertola

PUBBLITECNICA - ROME - I

ABSTRACT

The boom in computer networks and their increasingly widespread diffusion promise new social horizons and new forms of information-based democracy with revolutionary consequences for communication, education, transportation, services, industry and the workplace. Yet while these potential technological upheavals bring to mind immense opportunities, they may also give rise to new risks.

The current problems of metropolitan areas (and in particular the undifferentiated urban peripheries) can for the most part be traced to the loss of local social and cultural identity, due to the globalization of trade and the saturation of the city’s functions. In the future, these might be compounded by a sort of electronic isolation, leading to social unease of unprecedented nature.

The potentiality offered by telematics must not, therefore, be allowed to further isolate the citizen, confining him to his home in front of a multimedia workstation, ever more indifferent to the degradation of the social and urban environment surrounding him. On the contrary, a new policentric urban structure must be created, based on a network of “Telematic Piazze” (Electronic Squares). These squares are conceived as:

- access centers to the “information highway” and to the “information common space”; they are thus public facilities available to all citizens, built through project financing drawing upon both public and private capital.
- physical places playing within the urban fabric the semantic role of the square, offering a site for social gathering as well as for professional relationships of the highest quality, due to its advanced telecommunications tools.
- service centers where the general public can access public data banks and take advantage of “added value” services provided by both public and private enterprises (thus nurturing new job opportunities).

The project/idea for a network of “Telematic Piazze” requires:

- a careful assessment of information services offered in the square so as not to conflict with

those already available in the home.

- a strategic siting of the centers, convenient to the route of commuters between the home and the workplace but also in such a way as to create local attractions, thus promoting local economic and social revitalization.
- a more general methodology for the study of urban systems and phenomena, through the re-use of existing urban settlements and the redefinition of the management models for the most important urban services, both traditional and innovative, taking advantage as much as possible of new technologies.

Pubblitecnica S.p.A.

Company Profile

Pubblitecnica, an engineering and consultancy firm, is specialized in planning and design of urban utilities:

- water supply and distribution
- sewage treatment
- natural gas distribution
- solid urban waste collection and disposal
- urban transport planning and traffic control systems

Pubblitecnica is often called to plan and develop computer systems and software for the above fields.

The shareholders of Pubblitecnica include the Association of Italian Municipalities and the Association of Local Government Public Utility Agencies.

Key issue of Pubblitecnica activity is the transfer of technology from advanced urban context -- plants development, management models and software application -- to low industrialized or low economi-

cally developed areas.
To achieve this goals, Pubblitecnica acts as an “export agency” of technology and know-how, supplied from more than 500 Italian urban utilities agencies supplying such services for more than the 70 % of the Italian population, mainly in large and medium size towns all around the country.

Pubblitecnica is offering its services in the above mentioned fields, including:

- studies of public utilities demand and evaluation of the conditions for the optimal supply
- preliminary and final design of utilities for water and gas supply and distribution
- transportation systems planning and design
- technical assistance in public utilities management and maintenance
- planning and design of waste collection and disposal systems
- training for management and maintenance staff
- planning and development of related computer systems

Pubblitecnica is involved (directly or as partner in Consortium) in R&D projects: with CNR (PFT2, PFE - computer models applied to transportation and environmental issues), SEP pollution (environmental), ENEA (energetic problems) and CNEL (social-economical issues).

Since 1990, the Italian Division of AM/FM/GIS (the International Association for Geographical Information Systems) is using the operational structure of Pubblitecnica, in an effort to support local administrations.

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Degree in chemistry engineering in 1972, followed by post university specialisation in Industrial economy at the "Centro Studi della Confindustria".

1973-74 Research for "SOMEA SpA" (SEMA-OTH Group), consulting company.

1974-77 Project engineer at "ITALIMPIANTI SpA", engineering company (IRI Group).

1978-80 Responsible for planning and project control of ITALCONSULT SpA, engineering company (MONTEDISON Group).

1980-81 Responsible for financial project control of "FIME Leasing SpA" (industrial holding company)

1981-83 General Manger of "MIES SpA" and consultant for management control to "ANSALDO Groupe".

Since 1984 General Manager of "Pubblitecnica SpA" (consulting and engineering company) and member of the technical committees and research groups formed with th followoing associated companies: SIEMENS, ENIDATA, ESRI Italia, TELESPAZIO, SEAT/STET.

Since 1990 Secretary General of the Association AM/FM/GIS (Automated Mapping/Facilities Management/GIS, Italian Section of the AM/FM European Division.

Current responsible of the operative unities for the following projects of the National Centre of Research (CNR):

- monitoring information system in support of the planning strategy for big urban areas;
- environment information system for public transport companies.

COMMUNICATION AS A TOOL TO PROMOTE DEMOCRACY AND SUSTAINABILITY IN CITIES

Josef Hochgerner

Centre for Social Innovation, Vienna

1. MAIN TOPICS

- Analyse potentials of I&C technologies to promote environmental, ecnonmic and social sustainability
- Enable „shortcuts“ to sustainability in a wide european context
- Research areas:
  - Existing knowledge,

- Resources
- Examples / Case studies
- Applications such as:
- distance learning,
- teleworking,
- trans-european networks

2. POLITICAL CONCEPTIONS AND MEASURES - THE CASE OF VIENNA

- - Basic precondition:
  - Equal opportunities of access to networks
- „Telework stations“
- Teleworking as part of an integrated social policy
- „Digital City“ Concept

- Technology policy in a network of European cities
- Information policies:
  - + The „Global Village“ Process
  - + „Telework 96“
  - 3rd European Assembly on New Ways of Working

3. Examples of „Urban Utopias“

- Self Governance
  - „Moving from administration to organization“
- The City as a Learning Organization
  - „Utilization of changing knowledge basis"
- Strategic Planning for Urban Development
  - „Reflecting future scenarios in present planning processes“

- Decentralization
  - „Allow a multiplicity of communication and participation“
- Global Culture
  - „Local democracy and sustainability depends on global integration or segregation“

Tabelle 4:

Challenges	**UTOPIAS - „VISIONS“**	**TOOLS**
Destruction of democracy and environment	*Self Governance in cities*	„Focussed groups“ Digital City: - Interactive networks (‘municipia’) - Equal access (TEN, MAN ...) - Tele-Centres - Telework Assemblies - Issue Voting

Tabelle 4:

Challenges	UTOPIAS - „VISIONS“	TOOLS
Increasing segmentation : ‘winners’ vs. ‘loosers’ (info-rich and info-poor)	*The city as a learning organisation*	Enhancing CORE Competences Distance Learning New Learning Concepts
Long term perspective <-> Short term obligations	*Strategic Planning*	Prospecitve Studies Scenarios of various futures Selection of aims Present decision
Surveillance (Telematic Kaleidoscope)	*Decentralization*	Case Studies Experiments Best Pracitice
World Wide Competition Pure Market Solution	*Global Culture*	Co-opetition „New social contracts“ „Global Village Process“

To design new cities to avoid saturation

Andrew Wright

Richard Rogers

Practice profile

Richard Rogers Partnership is a 90 strong architectural practice led by 10 directors of which Richard Rogers, John Young, Marco Goldschmied and Mike Davies are the founder partners and senior directors.

Although best known for designing Lloyd's of London, the practice's recent commissions range widely in type and include Heathrow Airport’s fifth terminal; the new European Court of Human Rights in Strasbourg; the headquarters of Channel 4 Television in London; the conversion of the 19th Century Billingsgate Fish Market into a financial Dealing Room; a headquarters and data centre for Reuters in London; offices in Tokyo and Berlin; and masterplanning for London Docklands and the cities of Florence, Dunkirk, Dortmund and Pu Dong, Shanghai.

A design process to relieve saturation

Today our cities are heavily polluted to levels that are becoming intolerable. Major congestion clogs most of our urban centres. The situation is increasingly uncomfortable and the standard or urban life is falling.

Social cohesion being lost. Central urban areas are increasingly blighted. Areas that are traditionally multilayered and have social richness are becoming monofunctional. As well as this, imbalances in affluent and deprived urban areas are accelerating.

Many complex factors are involved but one of the most fundamental and overriding reasons is that the different urban systems such as social planning, transportation, public space, waterways and waste do not work together. In most cases political and economic pressures do not assist mutual interaction.

One of the most significant factors is the proliferation of the private motor car and road traffic in general. The problems this causes are abundantly obvious both in terms of congestion and the amount of black toxic smoke in most urban and industrial centres.

Alongside all these problems, a particular concern is the gradual process of uncontrolled urban sprawl. For as central urban pressures increase people are being pushed to the periphery of urban clusters. Swathes of land, usually along major transportation arteries, are being taken up by low scale and continuous development. This has the knock on effect of congesting and overloading these city arteries thus seriously compounding already prolific problems.

The Richard Rogers Partnership has a long history of concern for public space and the quality of urban social life. This concern ties in closely with ecological values and is drawing the practice to focus on new opportunities in the design of new urban communities.

To this end, and to tie in with the concerns previously explained we aim to carefully target our energies at investigating the design of new sustainable urban communities.

In the design of such development our concern is focusing on issues such as how social activities are mixed and layered to ensure urban areas are lively and active. We are also focusing on the linkage of public spaces but especially on how the separate urban systems such as transportation, the provision of green space an parks, as well as the use of waterways and lakes, interact to ensure a fluid overall urban matrix. An objective is to investigate and illustrate how this interaction can be facilitated.

Recent work has begun to look more carefully at sophisticated agriculture irrigation systems, including the growing of energy crops that do not increase levels of pollution when they are burnt to produce energy. These systems will form an important part of the study.

We do not see sustainable development as isolated island, unconnected to surrounding areas and local networks. It is our aim to illustrate how new development can make the most of its local diversity and natural resources by the use of integrated application of traditional technologies in combination with introduction of relevant new technologies in fields such as hydrology, geology, transportation and energy distribution, amongst others.

An objective is to create high quality yet balanced environments that offer real alternatives to dense

urban saturation and take some of the pressure off existing over burdened urban systems.

This paper focuses on the ParcBit project in Mallorca to illustrate our developing design process.

The programme at the EU Conference, Berlin will include our competition winning proposals for a new business summary in Shanghai and the proposals for a new ecologically based town near Paris.

The three projects have very different scales and are within changing types of urban context.

It will be Andrew's intent to illustrate how a common methodology is applied to these radically different problems.

ParcBIT, Mallorca/General Description

Introduction

The Government of the Balearic Islands became interested in developing a pilot urban project for an area north of Palma, which would create a community in which key professionals could to live and work.

The competition, held in May 1994, called for ideas for an urban development which made maximum use of the islands natural resources.
Ten international teams were invited including Sir Norman Foster & Partners, Hiso Hara, Koetter Kim, and Spanish and local teams.
In the competition Richard Rogers Partnership won the highest overall number of awards particularly

in the category concerned with landscape and ecology.

The site is approximately 2 km square and is 8 km north of Palma at the base of the mountains. The climatic conditions of the island mean arid summers when water is scarce and very wet winters. The required of the brief was for a residential population of 3,500 people and a peak working population of some 7-8000 people.

Urban Concept

The aim was to create a vibrant publicly focused community within an enriched rural landscape, which would make best use of the naturally available resources on the site.

The masterplan was assembled by analysis of the following elements:

Social Fabric: The urban community is made up of three villages. Public activities are concentrated at the centre of each cluster and diffuse out to quieter residential areas on the periphery.

Water: Water is collected in the winter storms to irrigate crops in summer

Agriculture: The water stimulates a rich landscape, diversifying crops from olive tress and carobs to include potatoes and onions and strawberries.

Transport: The proposals include a hierarchical transportation system. Emphasis is on a public tram system rather that the private car.

Energy: The irrigation system allows high demand energy crops to be grown. These crops are gasified to provide local power.

Use of water as an amenity

The winter storm waters run through the site along two small valleys separated by a spur of land. They are collected into two new lakes that form the focus for two of the three villages. The third village, which is more business oriented, sits on the central spur enjoying good views over the site.

The lakes are full in the winter and the level of water falls gradually over the summer as water is taken for irrigation and drinking. As the level of the water falls so the shore of the lake steps down to expose walkways and spaces for sitting alongside the shore. Devices that capture the suns energy are revealed to provide shade and power small water pumps to aerate the water and thus control mosquitoes.

Use of water as for irrigation

The water is distributed by a series of channels in the upper reaches of the site and by gravity lower down to irrigate a series of agricultural terraces. The soil in these terraces contains a high level of organic matter so as to soak up water and increase the moisture content. Higher water demand crops such as onions, strawberries and tomatoes are grown in the wetter upper terraces. Lower demand crops such as potatoes and maize are grown in the lower terraces.

On the lower and flatter areas of the site simple underground pipes irrigate the fields enhancing the

soils productivity.

The intent is to grow energy crops such as sweet sorghum and willow in these areas. These crops grow quickly and are coppiced over a period of years and then used as fuel to power small local generation stations. This method of generating power means that CO2 levels are not increased and as the power is close to urban development waste heat can be used to heat housing and schools.

Neighbourhood

The central lakes are a vital part of the urban infrastructure as well as being a social amenity. They provide a cool central focus to the dense pockets of urban activity in the centre of each cluster.

Integrated Approach

A wide range of urban issues and problems were examined from early on in the design process. Engineering and specialist expertise were integrated from the start.

- Overall environmental engineering: Battle McCarthy
- Agriculture, landscape and hydrology: Nicholas Pearsons
- Energy: Energy for Sustainable Development
- Costing and value engineering: International.

"Two environmental strategies for land use and infrastructure"

A research project proposal submitted by

Norwegian Institute for Urban and Regional Research,

Western Norway Research Center, and

VTT Communities and Infrastructure, Finland

Dr. Petter Naess

1. Summary

The aim of the project is to explore the possibilities for how our cities can comply with the principles of sustainable development. by critically examining two environmental strategies for urban development. These strategies represent different approaches in order to meet present and future challenges.

Urban development in the post-war period has to a high extent been characterized by a strong spatial expansion of the urban area. This development has been made possible by a significant growth in private car ownership and increasing demands of low-density residential and industrial sites. The floorage expansion has not only taken place as outward expansion ("urban sprawl"), but also as density increases and infill projects, often at the sacrifice of urban green areas. These traits of development have led to a significant loss of natural and agricultural areas, increased energy use in buildings and for transportation, and air pollution with local and global impacts. In addition, current waste, sewage and water management in urban areas imply an excess conversion of resources into discharges polluting water and soil.

Contrary to the above, a sustainable urban development must secure:

- A reduction of the city's per capita energy use and emissions.
- A minimizing of the conversion of and encroachments on natural ecosystems.
- A replacement of "open-ended" flows where natural resources are transformed into wastes, with "closed cycles".
- A sound environment for the city's inhabitants.

A number of ideas and solutions already attempted or proposed by cities to cope with these challenges will be reviewed as a part of the project.

Among urban planners, two rather different strategies have been proposed for a sustainable urban development. The *compact city* strategy focuses on energy use, air pollution and the conservation of undeveloped land surrounding the city. The *short cycles* strategy focuses on local self-sufficiency of agricultural products and energy, and on the possible educational gains from making material cycles short and visible.

By means of a scenario method, these two strategies will be analyzed in the light of criteria for a sustainable urban development: A compact city scenario and a short cycles scenario for the future development of the city of Oslo will be compared to each other and a third, trend-based scenario. In all three scenarios, the elements of urban development will be sorted into fixed conditions (parameters to be held constant across the scenarios, e.g. the amount of new housing units to be constructed), independent variables (features spesific to each separate scenario, e.g. the density and location of development), and dependent variables (the relevant impacts of the independent variables, e.g. in terms of energy use or water pollution).

The likely consequences of the various scenarios to the dependent variables will be evaluated utilizing knowledge from recent empirical research within relevant fields. When possible, the features of the three scenarios will be estimated in quantitative terms, making use of the urban models "EcoBalance" and "Emicus". The main part of the evaluation will focus on the effects of the spatial pattern of development. In addition a discussion of possible transport policy measures associated with each scenario will be made.

The project also comprises a discussion of relevant measures public authorities may employ for the

implementation of either of the two environmental scenarios, and an analysis of the feasibility of each of the strategies. The latter analysis, focusing on conflicts, obstacles and opportunities, will be rooted in planning theory and implementation theory, and findings from previous empirical studies of, among others, attitudes to urban development, and the outcome of planning processes.

2. Background

Trends

Since 1960 when auto sales were deregulated in Norway, individual transport by car has increased exponentially and is now the prime mode of transport. Car ownership has increased from 50 cars per 1000 inhabitants (1960) to 310 (1980) and now (1993) 450, and still on the rise. Road transport accounts for 18 percent of total Norwegian inland energy use, and 50 % of the fossil fuel consumption and carbon dioxide emissions. Of this, emissions from private cars make up for 50-60% (Norwegian Petroleum Institute 1992; Bartlett 1993.)

In spite of goals of noise reduction, and a series of measures taken in the 1980s, surveys show that the number of people seriously affected by noise has not been reduced. One out of three homes nationwide are still exposed to noise levels exceeding 60 dBA (Solberg 1990).

In the same period a considerable increase in developed area of towns has taken place, not only caused by increase in the urban population, but also because each citizen on average uses more space than before.

Size and standards of dwellings have changed considerably in Norway during the last 20 years. Average size of all Norwegian homes 1988 was 108 m^2, which gives an average floorspace per person of 43 m^2. (Statistics Norway 1990). Housing is among the sectors where growth in energy demand has been greatest over the last 10-15 years. In 1991, the residential sector accounted for 24% of the total inland energy use in Norway (Bartlett 1993). Single family homes, which have dominated production through the 80's, are a relatively energy demanding type of dwelling.

One of the consequenzes of urban growth has been a continuous destruction of natural areas at the fringe of cities. Urbanization has consumed recreation areas and cultivated land, and thus changed the landscape. Natural areas of great importance to health and wellbeing of the public have also vanished. Distances to recreational areas have increased, and new developments have created barriers for city dwellers. Hence people more often are dependent on car transport to reach green areas.

The urban growth and sprawl have required substantial investments in infrastructure and created urban areas with high operating costs. In combination with generally poor public economy, urban public administrations face severe problems of funding services such as street maintenance and cleaning.

Increasing distances within towns have created a transportintensive and cumbersome daily life. More leisure time is spent on transportation. Some numbers will illustrate increases of mobility over the years:

Average traveling distance (km)
1948 1 500

1960 3 000
1986 12 000

By 1990, travel by car amounted to 80% of total person kilometers (Sørensen 1992).

The amounts of waste in towns have increased steadily. According to SFT (1990), Norway's population of 4 mill. produced these amounts of solid waste in 1990: (Metric tonnes in thousand)

Domestic	800
Industrial	12000
Hazardous waste	200
Sewer dry weight	100
Car wrecks, textiles	70

An estimated 60.000 tonns annually bypass the waste collection system and are lost. Discharge from towns represents a permanent threat to rivers and fiords, especially eutrofication and poisonous substances. 40% of all phosphor and over 25% of all nitrogen emissions to rivers and fiords stem from

municipal treatment plants.

Our interpretation of sustainability

The World Commission on Environment and Development (1987) has launched the concept of sustainable development as a superior principle for long-term choices of political strategies. It combines norms of justice and equity with an acknowledgement that nature's ability to receive man-made encroachments and emissions is limited: The development must both in the present and in the future secure that all humans can have their basic needs satisfied, and the development must be sustainable within the carrying capacity of the natural ecosystems.

The term sustainable development, thus, is a more specific concept than the general term of environmental protection. At the same time it encompasses some aspects not included in the latter concept. Basically, sustainable development comprises those aspects of environmental protection that are fundamental for the long-term uphold of conditions for human life and well-being. Equity between generations is a main issue. Sustainable development also has a strong element of intra-generational distributive ethics, focusing on how the material standard of the World's poor can be raised without bringing the total resource consumption and emissions to an unsustainable level. Thus, policies to promote a sustainable development typically address issues like the protection of the athmosphere against the accumulation of "greeenhouse" gases, the protection of biological diversity, and the redistribution of levels of consumption between industrial and developing countries.

Accordingly, a sustainable urban development must secure:

- A reduction of the city's per capita energy use and emissions.
- A minimizing of the conversion of and encroachments on natural ecosystems.
- A replacement of "open-ended" flows where natural resources are transformed into wastes, with "closed cycles".
- A minimizing of the consumption of material resources
- A sound environment for the city's inhabitants.

These criteria reflect two different focal points within urban environmental policy: The city as a part of the larger natural ecosystems, and nature and environmental qualities within the city. (See Foss and Næss (1994), Næss (1995a) and Næss, Sandberg and Thorén (1996) for a further discussion.)

The main focus of the study will be on issues related to the spatial pattern of development of cities. Relevant transport policy measures associated with the spatial developmental strategies will also be discussed, but not so thoroughly as the spatial strategies themselves. Of course, a lot of other issues are relevant to the question of a sustainable development (e.g. technologies for better pollution control in industrial plants, more energy-efficient vehicles, resource conserving construction materials etc.) However, we have chosen to focus on those aspects of sustainability which can be related to spesific urban characteristics like the spatial distribution of population, buildings and activities, infrastructure and policy measures of urban transport. This implies that the scope of the discussion will mainly be that of urban physical planning.

Two strategies for creating sustainable cities

Two strategies have been developed to address the problems of saturated cities. The first strategy focuses on use of energy and encroachment on nature, and suggests concentration of urban development. The second concentrates on the circulation systems, and recommends lower density. The two directions of thought interpret cities and their problems in different ways, and reach opposite conclusions.

The compact city strategy

This strategy view land use and energy consumption and claims that:

- Land must be utilized far more intensively than today.
- New development must be localized where need for transportation and energy use is minimized.

Supporters of the Compact city consider land as an important resource, and believe that saturation and problems of overloading is due to wasteful land use and low population pr. m^2 of land.

Empirical studies show a clear relationship between urban density and form and energy use for transport. An investigation of 22 Nordic towns and cities indicates that differences in urban area per capita and in the degree of decentralized distribution of the population over the urban area, together account for a difference in per capita energy use for transport of 60% (Næss 1995b; Næss, Sandberg

and Røe 1996). Comparisons of residential and workplace areas with different location and density within Greater Oslo show similar results (Næss 1995b, ibid.; Næss, Røe and Larsen 1995; Næss and Sandberg 1996). A low population density implies longer distances between the various functions within the metropolitan area. Hence infrastructure, public service and public transportation systems becomes more inefficient and expensive to run.

Urban sprawl and increasing space per capita also leads to destruction of open space and increased energy use for heating, freshwater and garbage. The compact city strategy thus calls for space-efficient homes such as apartment and semi-detatched houses.

One goal in the strategy is to considerably reduce the overall volume of transport by concentrating development to central areas and nodes in the public transport infrastructure. People travel to reach specific destinations and if these are closely spaced, the need for transport and energy use could be reduced.

In the Norwegian research project "Environmentally Sound Urban Development" (Næss 1993) the following principles for development are recommended:

- Minimizing and concentration of encroachment on nature.
- Effective use of land.
- Restructuring of the transport system from car towards public transportation and non-motorized modes.

This leads to a strategy for land use were densification of the urban areas is central. New development shold be consentrated inside existing urban demarcations, but on SLOAPs, road- and parking areas and other waste land, rather than on parks and other green and recreational areas. By a simultaneous densification and restructuring of the transport system towards more public transport, energy use and saturation of cities could be reduced.

The strategy described above is also supported by recommendations of the European Commission (1990).

The Norwegian Ministry of Environment has defined densification to be a general objective for urban development.

The "short cycles city"

This strategy regards the city as a metabolism, a series of cycles where substances are brought in, consumed and then transformed to waste material that is expelled from the system. The input is foods, consumer goods, water, energy, materials for construction, etc. Market forces and public administration are responsible for bringing the input to the public at the right time, and for the handling of wastes. Hence we all take part in and are dependent on cycles of variable lengths, where nature and resources are put into production and adapted to consumer needs, transported, consumed and as waste returned to air, soil and water. These cycles may be analyzed as chemical substance taking part of larger processes that invariably end up somewhere in nature.

The Short cycles strategy claims that the way in which this is conducted at the present, nature will

be overloaded.

Firstly, far too much raw materials are spent. Western economy and lifestyle spend and waste materials unprecedented in history. We use products of very short lifespan, the metabolism of cities work at high speed and resource waste is correspondingly high (Petterson 1994).

Secondly, the processes are open ended; i.e. materials are not recycled and brought back to original state. This results in discharge to nature and pollution. Among the most serious pollutants are phosphorus and nitorgen compounds to water, heavy metals that accumulate in living species and soils, and emissions of oxides of carbon, nitrogen and sulphur in the air.

Thirdly, the cycles are long, often global, due to the globalization of world trade. This makes it nearly impossible to close the cycles by bringing the wastes back to the source. Long cycles require extensive energy use for transportation, of which almost the entire amount is fossil fuels for transport at sea, by land or in the air.

Supporters of the "short cycles city" point out that intrinsic mechanisms of the cycles most often are invisible to the public. Supply of materials and waste management are handled by organizations and take place in systems where we can only rarely observe what goes on. We can perceive leaks in the shape of polluted rivers and air, but we are ignorant of how pollutants spread and their impacts on nature. This alienation is considered to be a main obstacle to changes in attitudes and system improvements. (Knudsen 1994)

Short cycles city is a fundamentally different approach for improving the metabolism of cities. By

formulating demands to the properties of material cycles, a new approach is attempted for addressing urban problems. The most important demands are:

- *Fewer and slower cycles.* This implies resource saving by means of lower consumption, simpler, better and less polluting products, waste minimizing, and increased re-use and recycling
- *Closed and shorter cycles,* where wastes are dealt with as resources and led back to the source
- *Visible circuits,* where the management of the cycles to a high extent is controlled by the local population, and where responsibility and understanding of natural proceses are promoted.

The "Short cycle city" strategy aims at self sufficient food production within the city. Energy for heating is gathered locally from the sun and the earth, heat pumps in water and biomass. Waste materials are collected and returned to the source, thus closing the cycle. Spent water and solid waste is handled by the households, thus making cycles visible and leading to greater responsibility to nature through education. Proximity between residence and nature strengthens these ties to the natural environment.

The concept calls for considerable open space in the proximity of residences for cultivation and sewer processing. The urban density will be decided by these requirements, and will be much more lower than in "Compact city". Orrskog (1993) visualizes an urbanized system consisting of small, self-sufficent units dispersed over a large area of cultivated landscape.

3. Usefulness of the project

The two schools of thought lead to widely different conclusions. While the "Compact city", as described, among others, in the CEC (1990) Green Paper on the Urban Environment, is supported by researchers from Norway and Finland, the strongest advocates of the "short cycles city" are found in Sweden, Denmark and the Netherlands.

Presently, the discussion between the two views seems to be deadlocked. A project concretizing and realistically exploring the impacts and possibilities of the respective concepts, might have a significant influence on future strategies for sustainable cities in Europe. The project should be designed in such a way that proponents of both camps can identify with the way their concept has been described.

By comparing the two environmental scenarios against a third - "Trend" - we will be able to estimate what can be achieved through the environmental scenarios. We will also be able to discuss relevant measures for implementation, and possible conflicts associated with their use.

4. Project design

The project consists of three principle phases:

1. Developing of three scenarios for Oslo.
2. Evaluation of the scenarios against goals for sustainable urban development.
3. Discussion of options and obstacles for implementation.

The project aims to explore the different sides of the contradiction between the competing environmental strategies analytically. We need knowledge about the characteristics of each of the two strategies, about the possibilities to bridge the gap between them and the utilization of positive traits of each of the concepts. A number of ideas and solutions already attempted or proposed by cities to cope with these challenges will first be reviewed. However, the main approach of the project will be based on a scenario method.

In order to examine the Compact city and the Short cycles city consepts, we have to concretize these strategies, and apply them to a real-life situation. As indicated by the call for tenders, a scenario technique will be the best method for this purpose. The development and testing of three scenarios will therefore be a main part of the project.

When choosing the type of scenarios, our experience suggests that relatively detailed *situation scenarios* for a future year should be developed, rather than process oriented scenarios. We imagine

three situation scenarios for the city of Oslo; one based on today's trend, the second based on the concept of the Compact city, and the third scenario based on the Short cycles city strategy.

Developing scenarios is an analytic exercise. The most important elements of urban development will be sorted in three categories:

- Assumptions common to all scenarios
- Independent variables, i.e. the driving forces in shaping cities. These will be defined in such a way that they are mutually consistent and plausible and reflect a relevant span of options.
- Dependent variables, i.e. the relevant impacts of the independent variables, varying with the characteristics of the driving forces. These are the effects to be studied in a goal achievement analysis.

Certain basic assumptions are common for all scenarios for the purpose of evaluation. These are:

- Time horizon will be equal in all three scenarios.
- Growth in population, economy and employment will be equal in all three scenarios.
- Number of residences and floorspace of industrial, commercial and public buildings to be constructed will be equal in all three scenarios.

- All scenarios will operate within a common planning area extending some distance beyond the existing urban fringe, including parts of the natural and cultivated areas of the region.
- The general technological development will be viewed as common in all three scenarios, but different types of tecnology could be applied in each scenario, particularly water-supply and sewage treatment. The possibilities for new technological development will be realistically assessed, without exaggerations in direction of technology-optimism.
- General attitudes and preferences among the public will be equal in all three scenarios.
- Except for transport infrastructure, transport policies will be treated as fixed and equal in all three scenarios. However, a discussion of possible transport policy measures assosiated with each scenario will take place in connection with the evaluation of the scenarios (see below).

Developing scenario "Trend"

Alternative paths of development regarding the independent variables give the foundation for a suggestion of different scenarios. A prolongation of the trends leading to the existing situation will be the base of the trend scenario, with the exception of traits of development where a prolongation must clearly be considered as unlikely. The trend scenario will be a reference scenario for the two

environmental scenarios. The trend scenario will be founded on the long term traits of development seen in Oslo in recent decades. Norwegian and international statistics on land-use, transportation, energy demand, etc. will be utilized for the description of the most probable development. Long term governmental assessments of the Norwegian economical development would be analysed as a base for estimates on private consumption and urban growth. Existing municipal land-use plans for the city-region of Oslo will be used as an indication of the probable land-use development.

The following preliminary assumptions could be applied to the trend scenario:

- The city continues to expand outwards, primarily along the main transportation corridors towards west, northeast and south. Built-up land per capita increases, although at a slower rate than in the 1960s and 1970s.
- The central area would still have the most of public services and administration, culture and entertainment and some trade. Some jobs would continue to move out to the urban fringe, in particular in the industrial and office sectors. This is particularly owing to the level of ground rent and cheaper wages.
- An accumulated need for new residential development appears. This is in particular dependent on the large amount of smaller appartements previously built in Oslo. Housing

development is market oriented, individual homes in the outskirts and denser apartement housing centrally. Some densification would occur on centrally located sites.

- Car transport would continue to grow at the expence of public transport. The number of person kilometers in car would still increase considerably more than population due to increased trip lengths. Accessibility by car will deteriorate in substantial areas of the region to approximately the same accessibility as public transport.
- Retail trade is concentrated downtown and at regional shopping centers.
- The city is without economic resources to maintain and improve tecnical, underground infrastructure (i.e. water supply and sewer pipelines). Gradually, sorting of solid waste at the source becomes more customary.

Building of to alternative sustainable scenarios

The main independent variables that constitute the differences between the two envirnomental scenarios will be:

- *Principles for urban growt*h. Densification will be the guiding principle for the Compact city.

The Short cycles city will have an opposite development, new eco-villages will be developed beyond the existing urban borders.

- *Types of housing and densities.* The Compact city will develop according to, in a Norwegian context, relatively high densities, while the Short cycles city will develop with individual homes, semi-detached houses and duplexes.
- *The location of jobs.* In the Compact city jobs will be concentrated centrally and at nodes in the public transport system, while jobs in the Short cycle city will be developed in all parts of the region.
- i*nfrastructure for water, sewers and solid waste.* In the Compact city facilities will be consentrated and existing systems will be improved. In the Short cycle city will developed decentralized and based on local treatment of sewer and solid waste.

Differences in the amount of transport, modes of transport, and energy use owing to these independent variables will be studied as dependent variables. Corresponding analyses will comprise resource and energy use in buildings. Issues regarding encroachment on nature, exploitation of natural resources, pollution and quality of life will be similarly evaluated.

Evaluation of the three scenarios

The evaluation of likely environmental impacts from each of the scenarios cannot be given with great precision, as neither the preferences and life-styles among the future population, nor the available future technologies are known. In order to make the evaluations feasible, several assumptions have to be made. One important assumption is that all variables which are not explicitly manipulated in the three scenarios, are constant across the scenarios. For example, people are not presupposed to have different professions, education levels, norms or values in the Compact city scenario than in the Short cycles scenario (nor in the Trend scenario), and their behavior is not supposed to differ except as a result of their adaption to the material conditions in each scenario. The social and life-style related characteristics of the population in each of the three scenarios are supposed to be broadly the same as today, except from changes that can be expected from long-term projections of e.g demography, education levels, etc.

The scenarios will be evaluated against the following objectives for a sustainable urban development (cf. paragraph 5.2 above):

1. Minimizing of the city's per capita energy use and emissions:

- Criteria:

ag) Energy use for urban transport:

- Annual energy requirement per capita for urban transport, given today's level of

mobility.

- Vulnerability (in terms of reduced access) to possible curtailments of mobility.

ah) Energy use in buildings:

- Annual energy requirement for space heating (given current insulation standard etc. prescribed for new buildings being constructed today).
- Feasibility of the utilization of various renewable, environmentally sustainable sources of energy.

ai) Total, annual energy requirement for urban transport and space heating.

aj) Total emissions per capita from urban transport and space heating of the following pollutants (given today's distribution between different sources of energy): Carbon dioxide, carbon monoxide, sulphur oxides, nitrogene oxides, hydrocarbon, and particles.

2. Minimizing of the conversion of and encroachments on natural ecosystems:

- Criteria:

- Conversion per capita of cultivated land, of this:
  - within existing urban area.
  - outside existing urban area.

ak) Conversion per capita of natural areas, of this:
  - within existing urban area.
  - outside existing urban area.
  - forests.

al) Conversion of particularly sensitive types of nature:
  - scarce forest types.
  - wetlands.
  - undeveloped parts of the 100 m zone along the shoreline.

am) Encroachments in wildlife areas.

3. Minimizing the pollution of soil and water.

- Criteria:

- Waste management:
  - total amount of waste per capita delivered for final disposal.
  - total amount of foodstuff waste per capita delivered for final disposal.

an) Water management:
  - total amount of fresh (“white”) water per capita used for residential purposes.
  - total amount of fresh (“white”) water per capita used for other purposes, as commercial and public buildings, outdoor uses, etc.

ao) Sewage management:
  - total amount of sewage water per capita being untreated or partly treated.
  - -total amount of sewage per capita from treatment plants plants delivered for final disposal.

4. Minimizing of the consumption of material resources.
  - materials for residential construction

- materials for construction of other buildings
- materials for construction of transportation infrastructure
- materials for construction of other infrastructure

5. A sound environment for the city’s inhabitants.

- Criteria:

- Local air quality.
  - Noise.
  - Traffic accidents.
  - Access to areas for outdoor recreation.

When possible, the features of the three scenarios will be described in quantitative terms. This applies for criteria 1a to 1d where estimates will be made in terms of annual megajoules per capita and annual tonnes of carbon dioxide per capita, and criteria 2a to 2c, where the annual numbers of square meters of conversion per capita will be calculated, and for criteria 3a to 3c and 4, where the amounts will be estimated in tonnes. For the remaining criteria (2d and 5 a to 5d), it will be possible only to give verbal and qualitative descriptions. The aim is, however, to make these verbal descriptions as precice as possible.

The estimates of consequences of the different scenarios for transport energy use and emissions will be based on knowledge from recent empirical studies of Nordic towns, where the separate effects of several physical, socio-economic and socio-demographic variables on energy use per capita have been ivestigated by means of multivariate analyses (Næss 1993 and 1995b, Næss, Røe and Larsen 1995, Næss and Sandberg 1996, Næss, Sandberg and Røe 1996). The estimates concerning energy use in buildings will be based on previous research from various authors dealing with the effects of built form, density, local climate, etc. (among others Robinette et al. 1977, Owens 1986, Lamm 1986, Duun et al. 1988, Granum 1989). The estimates of the consumption of material resources will not include life-cycles analyses, but will concentrate on the materials delivered to the building site, relying on rather rough data such as house types, average number of floors, building density, sewage systems etc.

The above empirical results will be used as input for model calculations, making use of the urban models "EcoBalance" and "Emicus" (Lahti 1995). These models have recently been developed by the Finnish research institute VTT Communities and Infrastructure and appear to be better suited for this kind of broad, environmental analyses than most other urban modeling tools.

transport policies

The formal evaluation of the three scenarios (Trend, Compact city and Short cycles) will focus on the spatial pattern of development, notably land uses, densities, distribution of functions, and physical infrastructure. In order to facilitate for the comparison of alternative spatial patterns of development, other policy measures should be held constant to as high extent as possible. This also applies for the

transport policies, although in the real world, there is a reciprocal interaction between land uses on the one hand, and transport policies on the other hand. For the sake of comparison, the evaluation of spatial alternatives will be based on the assumption that no particular environmentally oriented transport policy measures are implemented, neither in the Trend nor in the two environmental alternatives[1].

The latter assumption, however, does not appear very realistic, because a society leading the spatial urban development in the direction of either of the two environmental scenarios, is unlikely to carry on with the current transport policies. In addition to the formal evaluation of spatial developmental alternatives, a discussion of possible transport policy measures will therefore be made. The measures to be discussed include the following:

- Significantly increased fuel prices.
- Local tax on driving within certain zones of the developed areas.

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1. In the formal evaluation, the transport-related consequences of the three scenarios (cf evaluation criteria no. 1a, 1c and 1d) will be estimated on the basis of the spatial pattern of development only, not including the effects of transportation infrastructure investments varying between the scenarios (e.g. roads being built to serve new residential and industrial areas) . The evaluation of the impacts of the three scenarios regarding conversion of and encroachments on natural ecosystems (cf evaluation criteria no. 2a to 2d) and consumption of construction materials (evaluation criterion no. 4) will, however, include the effects of such transportation infrastructure investments.

- Increased parking fees.
- Traffic calming by rebuilding urban roads to obtain speed reductions.
- Pedestrianization.
- Changes of urban road and parking capacity.
- Redistribution of existing road capacity for the exclusive use by buses etc.
- Strengthened public transportation.
- Measures to encourage car pooling.

The transport policy measures will probably differ between the two environmental scenarios, reflecting the differing conditions set by the different spatial structures in the Compact City and the Short Cycles scenario. The project includes a discussion of what kinds of transport policy measures may be appropriate in each scenario. Estimations will also be made of the probable environmental (e.g. in terms of energy use, emissions and noise) and social (e.g. regarding accessibility to various functions, traffic accidents)consequences of the various transport policy measures in each scenario. When possible, these estimates will be in quantitative terms[1]. However, the possibility for

1. Among other sources, we will utilize the results from an empirical study presently being carried out at NIBR about the effects on the modal split between car and public transport from different kinds of transportation investments in cities (new urban freeways, and transit system improvements).

quantitative assessments is limited by the fact that the empirical knowledge of the effects of some of the relevant transport policy measures may be poor. In particular, the sum effect of a range of transport policy measures may be difficult to estimate. Furthermore, the extent of e.g. fuel price increases necessary to obtain considerable traffic reductions probably go far beyond the span of experience from which price elasticities have ever been calculated. The quantitative estimates of policy measure impacts will therefore necessarily be rough, and the main part of the discussion will be based on qualitative judgements.

Aspects of accomplishment of the two environmental scenarios

measures for implementation of the two environmental scenarios

After having identified the likely environmental impacts of each scenario, and the relevant transport policy measures associated with the Compact city and the Short Cycles scenario respectively, a discussion will take place, focusing on relevant measures public authorities may employ for the implementation of the spatial pattern of development and the transport policy strategies of each of the environmental scenarios. The types of measures to be discussed here, include:

- Legal measures, e. g. planning and building legislation, traffic legislation and pollution legislation.
- Economic measures, e. g. taxes, duties and subsidies.
- Administrative measures, e. g. concerning local autonomy versus central authority control,

and measures to improve cross-sectoral cooperation to promote a sustainable urban development.

- Policy instruments within related sectors affecting the possibilities for a sustainable urban development, e.g. housing policy, agricultural policy, energy policy.
- Information and campaigns.
- Cooperation with grassroot organizations and/or the business sector.

The discussion of measures for implementation will take the Scandinavian context as its point of departure, as this is the actual context for the case study cities (Oslo and Gothnburg). However, a discussion will also be made on the extent to which the situation in other European countries makes up other conditions for implementation and indicates the use of other measures than in the Scandinavian context.

Feasibility of the two environmental scenarios

Planning for a sustainable urban development requires that measures are made use of to i.a. minimize energy use and globally/nationally significant pollution, conserve land and valuable biological resources, reduce local pollution problems etc. Many of these measures will affect human activity and patterns of behavior, and the effects will vary significantly between socio-economic groups.

Thus, a discussion of the feasibility of each of the environmental scenarios for urban development is an important part of the project. Are the measures necessary for the implementation of the various scenarios conflicting or compatible with the system intrinsic forces of current development in European cities? This general question may be formulated more precisely as a number of sub-questions:

- Are the environmental scenarios compatible with the life-style preferences among the population?
- Must any present or potential benefits be renounced in either of the scenarios?
- What are the roles of economical and political driving forces?
- Can citizen solidarity be mobilized as a power for change towards sustainability?
- Are new technological options (e. g. within information technology) likely to favor or counteract the implementation of the different scenarios?
- What are the likely effects of each of the scenarios in terms of distributional equity?
- What kinds of conflicting interests are associated with the respective scenarios?
- How well suited are the various scenarios for the promotion of environmental consciousness?
- Is it possible to identify particular population groups that constitute a base for political

support of any of the scenarios?

- What planning procedures should be employed to promote a sustainable urban development?

The feasibility of the two environmental scenarios will be dicussed in the light of planning theory, implementation theory, environmental philosophy and findings from previous empirical research projects. The latter includes studies of attitudes among the population to various measures in urban development (e.g. Brög 1992, Næss 1993b, Haveraaen 1993), perceptions among experts and politicians of obstacles to a more environmentally-oriented urban development (e. g. Owens 1986 and 1992; Næss, op. cit.; Rydin 1992; Masser, Svidén and Wegener 1992) and evaluations of planning processes (e. g. Flyvbjerg 1991, Larsen et al. 1992), and the utilization of scientific knowledge in public administration (Naustdalslid and Reitan 1994). The project will also take advantage from an on-going research project where the environmental considerations in physical planning in a Polish and a Norwegian municipality after 1970 are being compared (Næss, Dunin-Woyseth, Sandberg and Thorén 1996).

The project will also discuss to what extent spatial urban changes (leading to either of the environmental scenarios) are likely to occur as a result of market responses to the internalization of environmental costs which are presently external to economic profitability analyses, e.g. increased fuel prices (Small 1980, Owens 1986). If such responses occur, public land use planning aiming to realize the respective scenarios might to some extent be supported by market mechanisms. The project will discuss the relative significance of regulative land use planning and the use of economic incentives as measures for implementation of the scenarios.

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Boforholdsundersøkelsen 1988 (The Housing Conditions Investigation 1988)
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Appendix A

Project budget itemized by main activity

hase	Item-ized de-scrip-tion of stages in the project.	Man-months	Price NOK	Price ECU

1	* Prep-ara-tion of trend sce-nar-io, in-clud-ing: - St	5		39.000,-

2	* Description of most relevant challenges * Description of ideas	2 3		15.600,- 23.400,-

3	* Conceptual development and description of new ideas:	2 2 1		15.600,- 15.600,- 7.800,-

4	* Detailed conceptual description of the chosen solution and	5 3 5		39.000,- 23.400,- 39.000,-

5	* Description of a program of action * Final report	4 3		31.200,- 23.400,-
		35	2.280.590,-	273.000,-

* All prices are given in ECU, with a change rate of 1 ECU = 8,3538 NOK

* Prices for man-months are based on the normal time-rate for researchers at the Norwegian Insti-

tute for Urban and Regional Research. These rates are sett according to qualification; researchers with the minimum qualification of a Ph.D. or equal (senior staff) will charge a higher rate than other researchers (junior staff). For the given price above, a average time-rate is used.

* The price for one man-month is set to ECU 7.800,-, which aproccematley equals NOK 65.200,-.

* Travel and sustenance expences related to the propsed project are estimated to 5% of the personel expenses.

* Expenses relating to meetings anticipated by the Commission are estimated to 2,5% of the personel expenses.

* Expenses for secretarial and support staff are included in the time-rates used as a base for the prices of man-months.

Expenses	**Price (ECU)**

Personnel expenses:	273.000,-
Travel and subsistence expenses	13.650,-

Expenses relating to meetings with the Com-mission	6.825,-
Total ex-penses	**293.475,-**

Appendix B

Staffing of the project

The project will be staffed by the following researchers for parts of or the whole project:

Project leader:Petter Næss.

Project members:Karl Georg Høyer
Pekka Lahti
Jon Guttu

Næss and Guttu are employed by the Norwegian Institute for Urban and Regional Research in Oslo. Høyer is employed by the Western Norway Research Institute, Sogndal. Lahti is employed by VTT Communities and Infrastructure, Helsinki. Curriculum vitae for the project leader is enclosed.

Appendix C

Curriculum vitae of project leader

March 1996

CURRICULUM VITAE

NORWEGIAN INSTITUTE FOR URBAN AND REGIONAL RESEARCH
P. O. Box 44, Blindern, N-0313 Oslo, Norway. Tel: + 47 22 95 88 00 Fax: + 47 22 60 77 74

Name: Petter Næss
Job Title/Profession: Research manager/Dr. ing.
Born: 9 July 1951
Nationality: Norwegian
Civil status: Married, one child
Years with the firm: 8
Years of experience: 19
Languages: Norwegian, English (fluent), German (fair), French (poor)
Countries of work: Norway
Professional Societies: Member of the Norwegian Association of Architects

Key Qualifications

Urban planning, Energy and urban form, Planning theory, Environmental planning, Environmental philosophy.

Pronounced to be competent as a Researcher 1 (from 1 July 1995).
Pronounced to be competent for a professorship in land use planning at the Norwegian University of Agriculture (October 1995).

Education

Graduated in 1976 as a Civil Architect majoring in Urban and Regional Planning from the University of Trondheim, The Norwegian Institute of Technology, Faculty of Architecture. General mark: 2.3. Optional subjects: Philosophy, Sociology in planning and Environmental issues.

Defence of doctoral thesis (Dr. ing.) took place at the Norwegian Institute of Technology, Trondheim, in April 1995 Title of thesis: *Urban Form and Energy Use for Transport. A Nordic Experience.* The thesis was evaluated to obtain the mark of 1.5.

The Dr. Ing. study includes optional doctoral courses with a compulsory total extent of 96 load periods. The examinations of these courses have been passed with the following results:

Main subjects:

Environmental impact analysis (examination January 1993). Mark: 1.5.
Planning theory (examination June 1993). Mark: 1.0.
Energy and built environment (examination August 1994). Mark: 1.0.

Subsidiary subjects:

Environmental problems - a philosophic perspective (exam. Dec. 1990). Mark: 1.6.
Topics of environmental philosophy (examination August 1992). Mark: 1.9.
Methods of social science (examination May 1994). Mark: 1.9.

The examinations of the three main subjects were held at the Norwegian Institute of Technology, while the examinations of the three subsidiary subjects were held at the University of Oslo.

In addition, a doctoral course on Theory of science for architects (without examinations) was attended in 1992.

Other training:

An educational program on Project management was attended 1986 - 1988
(10 courses, each lasting one week) at the Norwegian School of Management

Experience

From 95.01.01
to present: Research Manager, Norwegian Institute for Urban and Regional Research

93.01.01-94.12.31: Researcher and Ph. D. student, Norwegian Institute for Urban and Regional Research

89.01.01-92.12.31: Research Manager, Norwegian Institute for Urban and Regional Research

88.02.15 - 88.12.31: Researcher, Norwegian Institute for Urban and Regional Research

86.09.01 - 88.02.14: Senior Architect, Ministry of Environment, Oslo (mainly researh and developmental work, including preparation of research programs)

84.04.01 - 86.08.31: Senior Consultant, Ministry of Environment, (mainly research and developmental work)

82.09.01 - 84.03.31: Consultant, Ministry of Environment (mainly evaluation of municipal plans)

77.03.01 - 82.08.31: Several architectural and planning work (mainly as an employee of architectural firms, but also some jobs for a non-governmental environmental organization)

International representation

Member of ECE task force preparing the 8ht Conference on urban and regional research, to be held in Spain in 1998.

Participant in European research network on density and green structure in cities (seminars in Dordrecht 26-27 October 1995 and Oslo 25-26 January 1996)

Speaker at the European Conference "Urban Utopias: New Tools for the Renaissance of the City in Europe", organized by the European Commission, DG II, and the TVFF institute, 15 to 17 November 1995 in Berlin.

Participant of Nordic researcher networtk on sustainable urban development and urban ecology (coordinated by the cooperation committee of the Nordic institutes of planning and building research), 1993 and 1994

Norwegian delegate to the CEMAT committee of senior officials' meetings in Strasbourg 25 October 1993 and in örnsköldsvik 23 March 1994 (CEMAT = European Conference of Ministers Responsible for Regional Planning)

Member of the editorial board for the anthology *Planera för en bärkraftiq utveckling* (Planning for a sustainable development), published by the Swedish Council for Building Research, October 1993.

Rapporteur for the ECE 7th Conference on urban and regional research, Ankara, 28 June to 3 July 1992. Head of the Norwegian delegation to the same conference. Participant of meetings in Copenhagen, Geneva and Izmir with the ECE secretariat during the preparation of the conference.

Norwegian member of the arrangement committee of the Nordic research seminar on Sustainability in Municipal Planning, Hørsholm, 28 and 29 August 1991

Norwegian participant in the ECE Research Colloquium on City Ecology at Piestany, Czechoslovakia, November 6th to 9th, 1990

Norwegian delegate at a meeting in the ECEs Working Party on Urban Planning and Research, Geneva, June 21th and 22th 1990

Norwegian delegate at a meeting in the OECD Project Group on Urban Environmental Issues, Paris, June 18th to 21th 1989

Norwegian delegate for the International Symposium on Protected Landscapes, Lake District, October 5th to 10th 1987, arranged by Council of Europe /The Countryside Commission for England and Wales.

Others

External examiner for doctoral courses on Urban Ecology (1993) and Planning Theory (1995) and for a M. Sc. dissertation (1994) at the Norwegian Institute of Technology, Trondheim

Appointed as an external examiner for subjects within the Department of urban and regional planning,

The Norwegian Institute of Technology, Trondheim, for the period from 1. sept 1994 to 31 Aug 1997

Referee for papers submitted for the journals *Scandinavian Housing & Planning Research* (1994) and *Journal of Environmental Planning and Management* (1995).

Adviser for the Swedish Council for Building Research about the evaluation of applications for grants for several research programs (1993, 1994 and 1995).

Publications

Scientific articles

Scientific journal articles having been subject to referee reviewing:

"Energy Use for Transportation in 22 Nordic Towns". Accepted for publication in *Scandinavian Housing & Planning Research*, Vol. 13, 1996. Co-authors: S. L. Sandberg and P. G. Røe. Of the total number of pages, approx. 75% were written by Næss.

"Workplace Location, Modal Split and Energy Use for Commuting Trips". Forthcoming in *Urban Studies*, Vol. 33, No. 3, 1996, pp 557-580. Co-author: S. L. Sandberg. Of the total number of pages, approx. 75% were written by Næss.

"Central Dimensions in a Sustainable Urban Development". *Sustainable Development*, Vol. 3, No. 3, 1995, pp 120-129.

"Travelling Distances, Modal Split and Transportation Energy in Thirrty Residential Areas in Oslo". *Journal of Environmental Planning and Management*, Vol. 38, No. 3, 1995, pp 349-370. Co-authors: P. G. Røe and S. L. Larsen. Of the total number of pages, approx. 75% were written by Næss.

“Normative Planning Theory and Sustainable Development”. *Scandinavian Housing & Planning Research*, Vol. 11, No. 3, 1994, pp 145-167

“Transportation Energy in Swedish Towns and Regions”. *Scandinavian Housing & Planning Research*, Vol. 10, No.. 4, 1993, pp 187 - 206

“Can Urban Development Be Made Environmentally Sound?”. *Journal of Environmental Planning and Management*, Vol 36, No. 3, 1993, pp 309 - 333

Scientific journal articles not subject to referee reviewing:

"Environment Protection by Urban Concentration." Short Note in *Scandinavian Housing & Planning Research* 8:247 - 252, 1991

"Sustainable Urban Development." Short Note in *Scandinavian Housing and Planning Research* Vol.

6, No. 1, 1989, pp. 45 - 49.

***Scientific reports* (1992 and later)**

1996:

Bærekraftig byutvikling - mål og prinsipper (Sustainable urban development - goals and principles) NIBR Working Paper 1996:102. 92 pages. (Co-authors: Synnøve Lyssand Sandberg and Kine Halvorsen Thorén. Of the total number of pages, approx. 80% have been written by Næss)

1995:

Urban Form and Energy Use for Transport. A Nordic Experience. Thesis for the doctorate. 346 pages. NTH Dr. ing. thesis no. 1995:20. Trondheim: Norwegian Institute of Technology

Transportenergi og ulike mål for befolkningstetthet. (Transportation energy and different measures of population density) NIBR Working Paper 1995:130. 40 pages.

1994:

Hvor jobber de som kjører mest? Energibruk og reisemiddelfordeling for arbeidsreiser ved seks bedrifter i Stor-Oslo (Energy use and modal split for journeys to work among employees of six companies in Greater Oslo). NIBR report 1994:17. 146 pages. (Co-author: Synnøve Lyssand Larsen. Of the total number of pages, approx. 70% have been written by Næss.)

Liikenteen vaatima energia ja kaupunkirakenne (Transport energy demand and urban structure) Tielaitoksen strateginen projekti, S1. Tielaitoksen selvityksiä 9/1994. Helsinki, Tielaitos keskuhallinto (Finnish Road Administration). 48 pages.

Arealplanlegging og kostnadseffektivitet. Er offentlig arealplanlegging en kostnadseffektiv måte å styre arealbruk og utbygging på? (Land use planning and cost-effectiveness. Is public land use planning a cost-effective way to control land use and development?). NIBR report 1994:8. 76 pages. (Co-authors: Jan Mønnesland og Arvid Strand. Of the total number of pages, approx. 60 % have been written by Næss.)

Energibruk til transport i 22 nordiske byer (Energy use for transport in 22 Nordic towns). NIBR report 1994:2. 214 pages. (Co-authors: Synnøve Lyssand Larsen og Per Gunnar Røe. Of the total number of pages, approx. 85% have been written by Næss.)

1993:

Hvor bor de som kjører mest? Bruk av bil og kollektivtransport blant beboere i 30 boligområder i Stor-Oslo (Who use most energy for urban travels, and where do they live? Use of car and public transport in 30 residential areas in Greater Oslo). NIBR report 1993:22. 152 pages. (Co-authors: Per Gunnar Røe og Synnøve Lyssand Larsen. Of the total number of pages, approx. 75% has been written by Næss.)

Planleggingsteorier for en bærekraftig utvikling? (Planning theories for a sustainable development?)- NIBR working paper 1993:115. 62 pages

Transportenergi i byer og pendlingsregioner. En undersøkelse basert på svenske data (Transport energy in towns and commuting regions. An investigation based on Swedish data). NIBR report 1993:2. 94 pages.

Natur- og miljøvennlig tettstedsutvikling. Oppsummering fra NAMIT-prosjektet. (Environmentally sound urban development. Summary of the NAMIT project). Norwegian Institute for Urban and Regional Research, 1993. 34 pages. (Co-authors: Jon Guttu and Inger-Lise Saglie. Of the total number of pages, approx. 45% were written by Næss.)

1992:

Miljøfilosofiske essays (Essays on environmental philosophy). NIBR working paper 1992:115. 277 pages

Natur- og miljøvennlig tettstedsutvikling. Faglig sluttrapport. (Environmentally sound urban development. Final report.) NIBR report 1992:2. 407 pages.

Tenke det, ønske det, ville det - men gjøre det? Om muligheter for å gjennomføre en natur- og miljø-vennlig tettstedsutvikling. (Thinking it, wishing it, wanting it - but doing it? On the possibility of implementing an environmentally sound urban development). NIBR report 1992:1. 275 pages. (Co-author: Pelle Engesæter. Of the total number of pages, approx. 85% were written by Næss.)

Articles in anthologies og professional journals without referee reviewing **(1992 and later)**

1995:

"Transportreduserende planlegging: Fortetting av tettstedene" (Planning to reduce the amount of transportation: Densification of urban settlements). *Plan,* 4/1995, pp 42-49

"Miljövänliga tätorter - långt mellan ord och handling" (Environmentally sound urban settlements - a wide gap between rhetorics and action). In Lothegius, J. (ed.) *Kilowatten. Fakta i energifrågan* (The Kilowatt. Facts about energy issues). Stockholm: Naturia.

1994:

"Kan vi nå miljømålene gjennom kommunal planlegging?" (Can we achieve the environmental goals through municipal planning?) In Naustdalslid, J. og Hovik, S. (eds.): *Lokalt miljøvern* (Local environmental policies), pp 54-76. Oslo: TANO

"Vil vi miljøvennlig byutvikling?" (Do we want an environmentally sound urban development?) In Naustdalslid, J. og Hovik, S. (eds.): *Lokalt miljøvern* (Local environmental policies), pp 271-300. Oslo: TANO

“Tettstedsarealer - utvikling og konsekvenser” (Urban areas - trends and consequences). In Brunvoll, Frode (ed.): *Naturmiljøet i tall* (The natural environment quantified), pp 201-203. Central Bureau of Statistics, The Directorate of Naure Management and the Directorate of Pollution Inspection. Oslo: Universitetsforlaget. 1994

1993:

“Møtet mellom ideal og virkelighet i miljøpolitikken” (The meeting between ideal and reality in environmental policy). I Kullinger, B. og Strömberg, U. B. (red.) (1993): *Planera för en bärkraftig utveckling* (Planning for a sustainable development), pp 155 - 166. (Co-author: Jon Naustdalslid.Of the total number of pages, approx. 60% were written by Næss.)

“Dichte Städte und Dezentrale Regionen Lassen Den Verbrauch Sinken”. *Raum*, Vol. 9, 1993, pp. 43

- 45. (Publisher: österreichischer Institut für Raumplanung, Vienna)

1992:

“Tettsteder. Kriterier for avgrensning brukt i prosjektet Energi og bygde omgivelser” (Urban areas. Criteria for demarcation used in the project Energy and built environment). *Kart og Plan*, Vol. 56, No. 6, 1992, s. 455 - 462. Co-authors: Synnøve Lyssand Larsen og Per Gunnar Røe. Of the total number of pages, approx. 40% were written by Næss.)

Papers for international conferences (1992 and later)

1996:

Kunsten å bære staur. Hvordan samordnes ulike mål i kommunal arealplanlegging? (The art of carrying poles. How are diverging objectives being co-ordinated in municipal land use planning?) Paper for the Nordic seminar "Nasjonale miljømål og lokal styring - koalisjon eller kollisjon?" (National environmental objectives and local management - coalition or collition?) Oslo, 14-15 March 1996. Co-author: Terje Kleven.

1995:

Two environmental strategies for land use and infrastructure. Paper for the EU conference "Urban Utopias, New Tools for the Renaissance of the City in Europe", Berlin, 16 and 17 November 1995. (Co-author: Jon Guttu)

Environmentally sound urban development: less motoring, more nature conservation. Paper for the colloquium "The spatial organization and the closing of production chains", Dordrecht, Netherlands, 26 and 27 October 1995

Land Use Planning and Cost-Effectiveness. Paper for the international conference on Strategic Planning, Lillehammer, 20 and 21 June 1995. Co-authors: Jan Mønnesland and Arvid Strand. Of the total number of pages, approx. 40% were written by Næss.)

The Sustainable Citty and the Use of Energy. Paper for the conference "The European City- Sustaining Urban Quality", Copenhagen, 24 - 28 April 1995. (Co-author: Sigmund Asmervik. Of the total number of pages, approx. 65% were written by Næss)

1994:

Strategies for a Sustainable Pattern of Development of Urban Regions in Europe. Background study (CEMAT (94) 3) for the European Council's 10th Conference for Ministers Responsible for Regional Planning (CEMAT), Oslo, 6 and 7 September, 1994. (Co-author: Olaf Foss. Of the total number of pages, approx. 60% were written by Næss.)

Transportation Energy and Modal Split in 30 Residential Areas. Paper for the ECE seminar "Renewal and Modernization of Human Settlements: Strategies for Policy Implementation", Vienna, 13 - 17 June, 1994. 29 pages. Co-authors: Per Gunnar Røe og Synnøve Lyssand Larsen. Of the total number of pages, approx. 70% were written by Næss.)

Fysisk bystruktur og energibruk til transport (Physical Urban Structure and Energy Use for Transportation). Paper for the Nordic research seminar "Byøkologi og strategisk atferds- og miljøregulering i kommunal planlegging og forvaltning", Espoo, Finland, 17 - 18 February, 1994. 9 pages. Co-author: Synnøve Lyssand Larsen. Of the total number of pages, approx. 60% were written by Næss.)

1993:

Transportenergi og bystruktur (Transportation Energy and Urban Structure). Paper for the Nordic Committee for Transport Research conference “Styringsmidler for bedre miljø i bytrafikken” (Policy measures for a better environment in urban traffic), Odense, 27 - 29 October 1993. 39 pages.

Planleggingsteorier for en bærekraftig utvikling? En vurdering av planleggingsteoretiske bidrag i lys av økologiske utfordringer i fysisk planlegging. (Planning theories for a sustainable development? An evaluation of conttributions within planning theory in the light of ecological challenges in physical planning). Paper for the international symposium on planning theory, Tromsø, 19 - 21 August 1993. Organizer: The University of Tromsø and Forum for education in public planning. 45 s. (Also published as NIBR working paper 1993:115.)

1992:

Urban Development and Environmental Philosophy. Discussion paper for the ECE's Seventh Conference on Urban and Regional Research, Ankara, 28 June to 3 July 1992. 18 pages. (Also available in French and Russian version.)

How Feasible Are Environmental Measures in Urban Development? Response paper for the ECE's Seventh Conference on Urban and Regional Research, Ankara, 28 June to 3 July 1992. 15 pages.

Urban Concentration Saves Nature. Response paper for ECE's Seventh Conference on Urban and Regional Research, Ankara, 28 June to 3 July 1992. 18 pages.

Norwegian Institute for Urban and Regional Research (NIBR)

Norwegian Institute for Urban and Regional Research (NIBR) is a national centre for applied local, regional and environmental research. The Institute is engaged in interdisciplinary environmental research in cooperation with environmental agencies.

NIBR is developing know-how relevant to environmental policies in all its research areas, and assigns priority to research tasks in this field both in Norway and abroad. The Institute participates actively in a network of international professional organizations, and disseminates results via international conferences and publications.

NIBR is also actively engaged in a growing number of projects abroad, particularly in the subject area of environment and development. Besides Nordic projects the Institute is engaged in projects in Central and Eastern Europe, Asia and Africa. A number of the projects are being carried out in collaboration with foreign authorities and research institutions. NIBR has established a national centre for development of environmental impact assessment (EIA), and a network centre for research into planning and building regulations.

The Institute employs more than sixty researchers with a background in social sciences and planning:

sociologists, political scientists, economists, demographers, anthropologists, geographers, architects, engineers, land use planners and land use architects. The Institute utilizes a job placement system where placement is decided after external evaluation of the candidate's qualifications. Improvement of individual qualifications is a prioritized target, with PhD programmes as one of the means of achieving this.

NIBR is a self-owned foundation with a board appointed by the Research Council of Norway. The Institute receives an annual basic grant form Ministry of the Environment on the advice of the Research Council. The major clients are the Research Council, Ministry of Local Government and Labour, Ministry of the Environment, Ministry of Health and Social Affairs, Ministry of Children and Family Affairs, Ministry of Transport and Communications, Norwegian Association of Local Authorities, Norwegian Agency for Development Cooperation (NORAD) and the local authorities (municipalities and counties).

Fields of research

NIBR's research is divided into seven research groups, each headed by a research manager.
The major focuses of research include:

Research on Environment and Development

carries out research related to development problems and Norwegian aid programmes. One purpose is to utilize our expertise in the field of environmental policies, regional development and local administration in research with a broader international scope. The Institute also performs research related to Norwegian agreements on environmental cooperation with Central and Eastern European countries.

Central tasks

Environmental strategies
District development and local government
Public administration in developing countries
Development and transfer of technology
Population, demography and development
Knowledge and policy formulation in the management of environemental problems

Environmental Planning Research

comprises research on planning and administration of land areas, resources and urban structure. NIBR has a number of tasks in the field of environmental administration and land use, and studies the environmental impact of different development patterns. Vital research tasks are linked to the relationship between land use, transport and energy consumption. Several projects are also dealing with different aspects of the planning system in Norway.

Central tasks

Land use and transport
Urban structure and physical environment
Daily life and physical environment
Management of nature, tourism and outdoor life
Planning instruments and principles for the conservation and mangement of natural resources

Local Government Leadership, Organization and Management

covers research on local government administration and the relationship between central and local government. The role of local authorities on the municipal and county level in environmental policy, regional policy and welfare matters give rise to important research tasks.

Central tasks

Environmental protection in municipal planning and administration
Management and organization in local government

Financial management and resource utilization
Central government and local administration
Local politics and participation

Regional Research

comprises research on demography, the labour market, internationalization and new frameworks and conditions for industrial, regional and agricultural policy. The Institute also performs impact analyses of major localization decisions.

Central tasks

Labour market analyses
Regional development
Effects of internationalization
Analyses of local government finances
Demographic processes of change
Impact analyses

Research on Welfare and Living Conditions

includes a number of projects focusing on health, social services and living conditions in the major cities. Unemployment, marginalization through increased use of disablement benefits, early retirement and social assistance are significant issues. The well-being of children and adolescents and the organization of child welfare are central issues.

Central tasks

The welfare state and the disadvantaged groups
Studies of living conditions and social segregation
Youth and the labour market
The organization of child welfare
Local community programmes
Immigration studies

The National Centre for Environmental Impact Assessment (EIA*)*

at NIBR is a centre for evaluation, research and development of environmental impact assessment methods. It shall serve as a central advisory body, and be a national information centre for the those who work with EIA. It shall contribute to further develop impact assessment as a method and as an instrument in environmental policy and planning both nationally and internationally

Central tasks

Research and evaluation of the Norwegian EIA system
Advisory service
Building of national and international cooperation and networks on EIA
Provision of a library and information service
Database covering all EIAs in Norway

NIBR in North Norway

NIBR's research group in Alta, Finnmark, collaborates with NIBR's other research groups, and also with professional milieux inside and outside the region. Regional development, municipal organization and municipal services are important areas of work. The same applies to resource management, educational research and political issues related to the Sami people.

Central tasks

Regional development
Municipal organization and municipal service
Resource management
Educational research
Political issues related to the Sami people
The Barents Region

Management

Director: Jon Naustdalslid
Research Directors: Olaf Foss
Terje Kleven
Administrative Director: Jon Olav Viste
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Relevant international projects

China 1993 - 1994

Urban environmental services in China
Client: NORPLAN A/S, as subcontractor
for the NORPLAN project for the World Bank

As a part of the World Bank land programme in China, a special programme has been set up for urban environmental services. The NORPLAN project was to make case studies describing the operations and challenges for water supply, sewerage and solid waste. The study was carried on in two provincial capitals, Wuhan and Kunming, and supplemented with more rough data collection for selected secondary towns. The NIBR part of the work was mainly on economic operation (investment and daily operation costs and income collection possibilities). The study made special focus on the possibilities to rely on other income sources than public grants for financing such services in the future.

China 1987 - 1993

Transfer of Norwegian hydro power technology to China
Client: The Research Council of Norway

The objective of this research study has been to analyse the technology transfer from Norway to China, by studying four hydro power projects in China where Norwegian technology suppliers and

Norwegian funding have been involved. Three of these projects were supported with funds from the World Bank, the Lubugu, Yantan and Ertan hydro power projects, and the fourth project has been a small scale hydro project, Shi Lou Ti in Yunnan Province. The project has been focusing on institutional and technological learning in both turbin production and hydro power project construction technologies, and was based on field work both in factories, at energy utilities and at hydro power project sites.

China 1993

Evaluation of Fishery Research Vessel, Bei Dou,
Yellow Sea Fishery Research Institute, China.
Client: Norwegian Agency for Development Coordination (NORAD)

Participation in a Nordic-Chinese multidisciplinary team to review the experiences of the transfer of a fishery research vessel Bei Dou from Norway to China in 1983 and up to 1993. The objective of the study was to assess the institutional arrangement and utilization of the research vessel, the research activities that the vessel was utilized for and the research collaboration between the Institute of Marine Research, Bergen/Norway and the Yellow Sea Fishery Research Institute, Qingdao/China, including the role the vessel and the institute played in fishery development in China.

Kenya 1987 - 1990

Women, childbearing and nutrition
Client: The Research Council of Norway

This research project lasted from 1987-1990. Fieldwork was carried out in 1988. Women in Bungoma, Western Kenya, were interviewed about fertility, family planning and nutrition. The project was conducted in cooperation with a Kenyan researcher from the Kenyatta University.

Kenya 1990

Women, childbearing and child mortality
Client: The Research Council of Norway

This is a duplication of the Bungoma project, carried out in Kwale, Coast Province in Kenya. However, nutrition is less covered, the emphasis on child mortality is stronger.

Malawi 1992

Malawi environmental nexus study
Client: NORAGRIC/theWorld Bank

The project was carried out in 1992, with data collection in Malawi during April. The main objective of the study was to examine the causual linkages between population, rural poverty and natural resource degradation. The report from Natural Resource Degradation and Poverty to Sustainable Development in Malawi was submittet to the World Bank in July 1992.

Sri Lanka 1993 - 1994

Sri Lanka Environmental Action 1 Project (EA1P)
Client: Norconsult A/S/the Ministry of Environment and Parliamentary Affairs/The World Bank

The EA1P has the objective to propose measures to aid implementation of the National Environmental Action Plan (NEAP). The NEAP is financed by the government of Sri Lanka, IDA/World Bank and other donors and will be implemented during 1995-1998. The project is multi-sectoral, including priority policy and investment issues across the entire spectrum of environmental concerns (e.g. pollution control, natural resources, biodiversity, etc.) NIBR has been involved in preparing the project preparation document, especially in analysing and ranking of the investment projects to strengthen the institutional and policy framework for the environment, capacity building , and NGOs and popular participation in environmental issues.

ECE/UN 1992 ongoing

Convention on Environmental Impact Assessment in a Europe/ North America transboundary context (the Espoo convention).

Financial support by the Ministry of the Environment, Norway

NIBR has been participating in a group of governmentally designated experts to discuss specific methodological issues of EIA in a transboundary context, and to specify criteria to determine the significance of adverse transboundary impacts.

Botswana 1995

Review of the village development programme
Client: Norwegian Agency for Development Cooperation (NORAD)

Norway has provided financial assistance to a village development programme in Botswana since 1978. The general objective of the review is to evaluate the programme in relation to the over all objectives for a completion report. The objectives are: Strenghtening local institutions, improving the communication between villages and district administration, improving village access to public services and promoting productive and employment generating activities. The review is carried out in March 1995.

1992 - 1995

Environmental impact assessment (EIA) of development aid projects
Client: Norwegian Agency for Development Cooperation (NORAD)

The project has the objective to develop guidelines for EIA of NORAD's development aid projects in developing countries. NIBR has been responsible for the project, but there has been close cooperation

with NIVA, NILU and NINA (4NI) in addition to several other environmental research institutes The project has resulted in 15 booklets, one introductory booklet and 14 sectoral booklets presenting guidelines for EIA. The booklets are used by NORAD's staff in Norway and cooperating countries, as well as cooperating partners in different developing countries. NIBR has also developed a two days training course.

Tanzania 1994

Rural development and local government in Tanzania
Client: The Norwegian Ministry of Foreign Affairs

This project is an evaluation of the experiences with the NORAD-supported rural development programmes RUDEP and KIDEP in Tanzania. These are integrated, multi -sectoral programmes, and do also include environmental projects and activities. Thus, both programmes are heavily involved in water supply, afforestation, ecologically sustainable agriculture, and more generally with natural resource management. The evaluation has been focusing on aspects such as the sustainability of programme activities, and has been particularly concerned with assessing the role of local government in local and regional development. The project also has surveyed a number of other rural development programmes in Tanzania. Based on the evaluation and on the survey of experiences with other rural development programmes the project has suggested alternative approaches to supporting local development based more on an active involvement of local government institutions.

Tanzania 1995

Civil service reform in Tanzania
Client: Norwegian Agency for Development cooperation (NORAD)

NIBR has participated in a Nordic Mission to assess the experiences with the ongoing Civil Service Reform Programme in Tanzania and to advise the Nordic countries concerning a possible Nordic involvement in civil service reform in the country. The activity has provided profound insight into the problems of the civil service, including problems of planning in a developing country undergoing transition to market economy.

Tanzania 1992 - 1995

District Development and Local Government
Client: Norwegian Agency for Development cooperation (NORAD)

NIBR has over a period of three years studied local government in the regions of Rukwa and Kigoma in Tanzania aiming at learning more about the actual and potential role of local government in promoting local development. The study has been concerned with various aspects of local government and local development, including such as the planning practices of local government and the interaction between state and local authorities in practical planning.

Estonia,
Latvia, Lithauania 1992 - 1995

Environmental impact assessment (EIA)
in the Nordic and Baltic Countries
Client: The Nordic Council of Ministers,
Nordic Committee of Senior Officials for
Environmental Affairs, ad hoc EIA Working Group.

The objective of the project is to contribute to the capability of the Baltic states in carrying out EIAs. The first phase was initiated in 1992 and consisted in mapping the EIA systems in the Nordic and Baltic countries and establishing an EIA network. The second phase consisted in three case studies of the EIA procedure for the following oil terminals: Lithuania: Oil Port of Klaip da, Latvia: Oil Terminal in Liep ja and Estonia: Muuga Port. In 1995 the project is in its third phase. In this phase focus is on the screening process of projects that will have to undergo an EIA, as well as procedures for quality assurance of EIA statements. Researchers and EIA experts from all the Nordic and Baltic countries take part in the project.

Poland 1994 - 1995

Local management for a sustainable development
Clients: Governments of Poland and Norway/Bilateral environmental agreement

The project is a joint project with the Institute for Physical Planning and Municipal Economy (IGPiK) in Poland. The project is a study of the environmental management capabilities of Polish and Norwegian local self governments. The project will identify constraints and possibilities for an improved organisation and management of environmental issues at a local level. The project will include a study of the experiences from local level environmental policies in the two towns - Olsztynek in Poland and Skien in Norway. The role of local politicians and the effect of different models of institutionalised environmental concern at a local level will be studied, as well as the use of economic instruments.

Russia 1994

Pertominsk - Potentials of a crisis-ridden coastal society at the shores of the White Sea
Client: OSO-Exim International and the municipality of Primorsk (Arkhangelsk oblast)

NIBR has made a case study of the present situation in the village of Pertominsk (600 inhabitants) at the White Sea. The village is dependent upon raw materials for its only enterprise, a fish processing factory. Raw materials for the processing is now only available to a small extent. NIBR has mapped the potentials of the present infrastructure and populations for possibly alternative enterprises and has described the needs of the local community in terms of infrastructure in order to develop new industries based on local resources.

The role of scientific expertise in environmental policy planning and management in Eastern Europe and Norway.
Client: The Research Council of Norway

This ongoing project will study differences and variations in environmental expertise in Poland, the Baltic countries and the Arkhangelsk region in North-Western Russia.
The study will describe and analyze similarities and differences in educational and professional background of the environmental expertise in the various countries, the division of authority and responsibility between different sectors and levels of government, the location and allocation of environmental expertise in government authorities and public agencies, its formal status in government system, and the role - legitimacy, integrity, involvement, impact - of scientific and technological expertise in policy formulation and management. The findings will be compared to corresponding studies of the use of environmental expertise in Norway.

Botswana, Ghana,
Tanzania, Zimbabwe 1995 - 1998

A comparative study of decentralisation
in four African countries
Client: The Research Council of Norway

This is a comparative study of decentralisation in four selected African countries, Tanzania. Zimbabwe, Ghana and Botswana. The project will describe the forms of local government found in the selected countries, and explain the existing systems on the basis of the interests and justifications of different actors, including foreign donors. The project seeks to illuminate if and how the specific form of local government found varies with the relative importance of different actors in the the policy making process.

Tanzania, Zimbabwe 1995 - 1998

Legitimacy, capacity and local government
Client: The Research Council of Norway

In this project we want to study the legitimacy and capacity of state institutions at the local level in Tanzania and Zimbabwe. The project has three objectives: To give an empirical description of actual capacity and legitimacy, to analyse the causal factors determining capacity and legitimacy; and to find out how legitimacy is affected by capacity and vice versa. The project will be focused on two rural districts in each country, one relatively rich and one poor. Its main objective is to contribute to an understanding of how the public sector functions in developing countries, and of the conditions underlying effective policy implementation.

Tanzania, Zimbabwe 1995 - 1998

Local governments as implementors of state policy
Client: The Research Council of Norway

This is a study of how local level public institutions in Tanzania and Zimbabwe function as implementors of public policy. The dependent variable of the project is the outcome of policies at the grassroot level, and any discrepancies between stated policies and outcomes will be explained as results of processes in the political administrative system. The following factors are emphasised: Characteristics of the implementing organisations, the nature of linkages between public institutions and their surroundings and the nature of the policy that is implemented. The project focuses on two policy areas, water supply and environmental policies.

Tanzania, Zimbabwe 1995 - 1998

Local democracy and political priorities
Client: The Research Council of Norway

This project studies the content of local government policies in two districts in Tanzania and Zimbabwe, after the introduction of democracy and local level elections. Central questions in the project are the following: Has the introduction of democracy lead to a change in local government policies? If so, do elected local governments use a larger proportion of their resources in ways seen as important and valuable by the population? The main explanatory factors are: Existing procedures and formal structures (democracy, voting system, legislation, centrally established standards); the influence of different actors in the policy formulation process; the extent and forms of popular political participation, and the forms by which local officials are held accountable to the population.

Terms of Development and Prospects of Cooperative Planning Procedures

Rainer Kestermann

Klaus Schmals

Holger Schmidt

Summary

Typical planning- and decision-procedures are characterized by legally standardized actions and unilateral, hierarchical decisions by goverment or administration. Escpecially environmentally relevant major projects have demonstrated the limitations of those patterns of regulative control for resolving disputes between planners and planning-subjects, at least this holds for European core-areas and agglomerations. Highly complex physical and technological projects (e.g. cleaning facilities for contaminated soil, waste incinerators, road construction etc.) can hardly be implemented any more in face of fundamental social and political dissent on their usefulness and their impacts. Thus, the lack of political and social consensus becomes a barrrier for spatial development.

In the recent years, a new type of planning-pocedures appeared in practice, whose characteristics are an open, discursive procedure, comprehensive participation of all parties concerned, cooperative search for adequate solutions, a consensual approach. Together, they can be caught by the term "Cooperative Planning Procedure" (CPP).

The need for procedures of this type and their implementation in practice is quite evidently concentrated on large cities an their agglomerations. Relating to the type of plan, action or project pursued, and reacting to the resulting spatial conflicts and specific constellations of conflicting parties, a wide range of new approaches of the CPP-type has been developed. CPPs are, until now, "driven by practice" in order to overcome specific "barriers by environmental burdens", thus trying to reach a (partial) consensus. In contrast to new physical-technological approaches, CPPs could be understood as a "new social technology". Their inherent instrumental innovations seem to be constitutive for a new "planning culture" that shows to emerge all over European cities, regions and countries, despite all differences in their respective national framework of planning regulations, their specific development strategies or concrete planning objectives. Moreover, CPPs and the emerging new planning culture seem to harmonize well with efforts to formulate and implement a strategy of "sustainable development".

Until now, only poor efforts have been undertaken to analyse the CPP-approach theoretically and empirically. This exactly is the major aim of our poposal for a study to be carried out within the framework of the Act Vill- programme of the EC-Commission. It shall analyse implemented procedures of the CPP-type in Germany, concentrating on two contrasting cities/agglomerations: the agglomeration of Munich, as an example for a post-industrial region, and the Ruhr Area, especially

the city of Dortmund and its region, as an example for an old industrialized region in structural crisis. The methods used will combine theoretical work with empirical research.

The proposed project is designed in three main stages:

- Stage 1: Working out the problem background and a conceptual framework; formulation of a typology of CPPs; analyzing their constitutive elements in constrast to "traditional" approaches; the resulting changes in roles and functions of the relevant actors.
- Stage 2: Analysing Dortmund and Munich as two typical agglomerations of different socio-economic development stages; compilation of planning procedures of the traditional type and those using the CPP-approach; classification of the CPPs.
- Stage 3: Case-studies in both agglomerations; active exchange of information with experts in workshops, conferences etc.; finding new forms of CPPs, if possible; working out of proposals for future actions to promote CPPs and their effective implementation.

By the cooperation of scientists, planners, and consultants in an interdisciplinary study team (covering experience and expertise in administration, social, political and economic sciences) the results might be used effectively in active policy and planning consulting for

- evaluating the chances of implementing CPPs in different cases

- identifying the relevant parties to be include in the process
- clarifying the regulative framework needed and other conditions for the success of PPs
- exchange of experience and knowledge by publications, diverse expert-discussion workshops, conferences.

Study group: Rainer Kestermann, Klaus M. Schmals, Holger Schmidt

Project: Terms of Development and Prospects of Cooperative Planning Procedures

Short informations about the members of the group and the coordinating institution

Rainer Kestermann, born 1951, economist and planner, is member of the scientific staff of the ILS, Dortmund (see below). He is working with the department for regional planning.

Prof. Dr. Klaus M. Schmals, born 1940, is a sociologist and planner. He is professor at the University of Dortmund and director of the division ”sociological foundations” of the department for spatial planning of the University. He is speaker of the Urban and Regional Sociologists’ branch of the German Society for Sociology.

Holger Schmidt, born 1966, is a planner and is working as a planner-consultant with a major developer firm in Bonn.

The coordinating institution for the project is:

Institut für Landes- und Stadtentwicklungsforschung des Landes Nordrhein-Westfalen (e.g. Research Institute for Urban and Regional Development of the Federal State of Northrhine-Westphalia.). The institute was founded in 1971 in Dortmund (Germany) and is maintained by the Land's government. It is engaged in research and policy-consulting in the fields of urban and regional planning, including transportation themes. In addition to it's research and consulting tasks for the government the institute stresses the exchange and transfer of know-how with other scientific organisations and planning institutions.

EVALUATION OF POSSIBLE TECHNOLOGICAL OPTIONS TO RELIEVE THE CHALLENGES CAUSED BY THE SATURATION OF CITIES

Adrian Cole

Julian Wilczek

ETSU, AEA Technology, Harwell, UK

Introduction

It is well recognised that the challenges and problems facing European cities are numerous, complex and difficult to solve. The European Commission has identified three groups of problems:

- problems on the human scale, such as social exclusion, multi-cultural and multi-racial conflicts, and in agreeing consensus over the priorities and resources required for local administration and government;
- problems related to the globalisation process of national governments and international industrial organisations which has little relevance to local needs and social networks.
- problems related to the approach of saturation levels in many of the city functions and characteristics, such as traffic congestion, air pollution and social behaviour.

This paper is based on a proposal submitted to the European Commission for 'action research' into the development of technology options towards the realisation of a sustainable city. The multi-disciplinary team comprised:

ETSU, UK, part of AEA Technology

National Environmental Technology Centre (NETCEN), UK, part of AEA TEchnology

Mens en Ruimte, Belgium

The Bartlett School of Architecture and Planning, University College London, UK

An informal network of European Cities, comprising: Athens, Brussels, Madrid, Bologna, Dortmund and Southampton.

Both ETSU and Mens en Ruimte have a considerable track record in translating complex research findings into practical policies and action plans, taking full account and advantage of existing trends and intrinsic dynamics to achieve the maximum leverage effects. The Bartlett School of Architecture is a leading player in UK and international research activities on Sustainable Cities.

The proposal aimed to provide an input to the process of decision making in relevant organisations at regional, national and European level, regarding the technological innovations which might be promoted to provide solutions to the present and future problems of cities. We aimed to develop ideas to show that the scenario of a "sustainable city" is conceivable and that practical measures can be taken to create the reality.

The Sustainable City

A city is an urban agglomeration of sufficient size to perform important social, economic, civic and cultural activities. A settlement is sustainable (it can continue indefinitely) when the land to support it (including its region and hinterland) can generate all the resources necessary to service it. All pollution must be made harmless without causing the area's long term viability to deteriorate, for example, by excessive depletion of the locally available resources, or at the expense of the rural hinterland. Technology mediates both resource requirements and pollution - chosen technologies affect both the quantity and quality of resources which a given level of demand causes and the given areas of land can render harmless. The future sustainability of cities will depend upon the successful application of technologies chosen to mediate the resource requirements and pollution. The causes of

unsustainability are complex - social (including cultural, political, institutional and moral considerations), economic and ecological in nature. Solving the problem requires both the political commitment to addressing the issues, together with the necessary resources, and the appropriate technologies to achieve that goal.

Certain goals of sustainable cities have been developed and these may be useful: included here are resource conservation to cover resource maintenance for future generations, recycling, higher output (productivity), alternative technologies and substitution of environmentally harmful activities, the protection of biological diversity (habitats etc.); built development to include patterns of development that minimise energy consumption, maintain the productivity of the land, encourage the reuse of buildings - some harmony with the natural environment; environmental quality and the avoidance of processes which degrade or pollute the environment and reduce its regenerative capacity; social inequality and the intergenerational effects of non sustainable patterns of development - reducing the gap between rich and poor; political participation and notions of community, collective provision and intervention.

Cities are no longer only centres of production, based on manufacturing industries with traditional work patterns and demands on services and utilities. They are now much more varied with service functions, including information, finance, cultural and entertainment roles, recreation centres, educational activities, etc. The physical characteristics have changed from being tightly centred on the core business district, to much looser agglomerations with low densities and a high dependence on telecommunications etc. Cities must continue to maintain their vitality and viability if they are to be attractive centres in the next century - this means that they must be affordable (housing), safe and

secure centres, generating wealth, and able to offer a high quality of life (cultural and shopping/social centres) and generally offer a diversity of opportunity not available elsewhere.
It is therefore clear that amongst the technology sectors of importance are:

- energy supply and end-use
- transport
- environmental protection

Each of these sectors, in the way that they relate to Cities and their development towards sustainablility, has to be set into the Urban Planning context, and also has to take account of the social impact of technological changes.

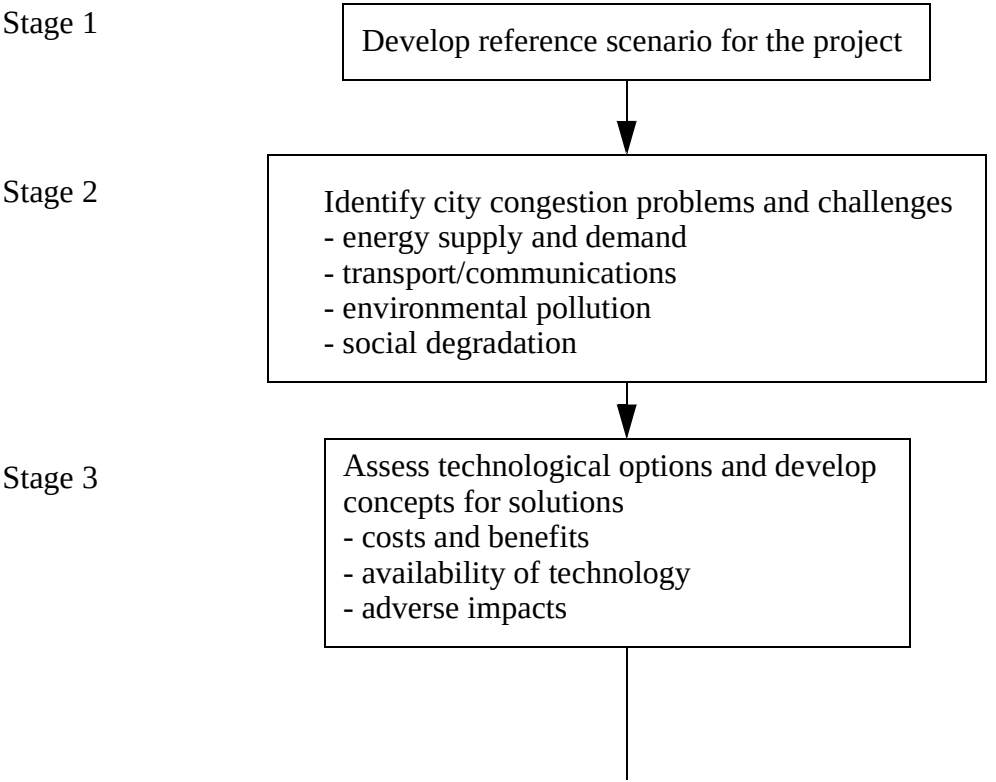
A range of specific technologies are available for improving the efficiency and for reducing the environmental impact of these demands in the urban context; we have identified the following as those of most importance:

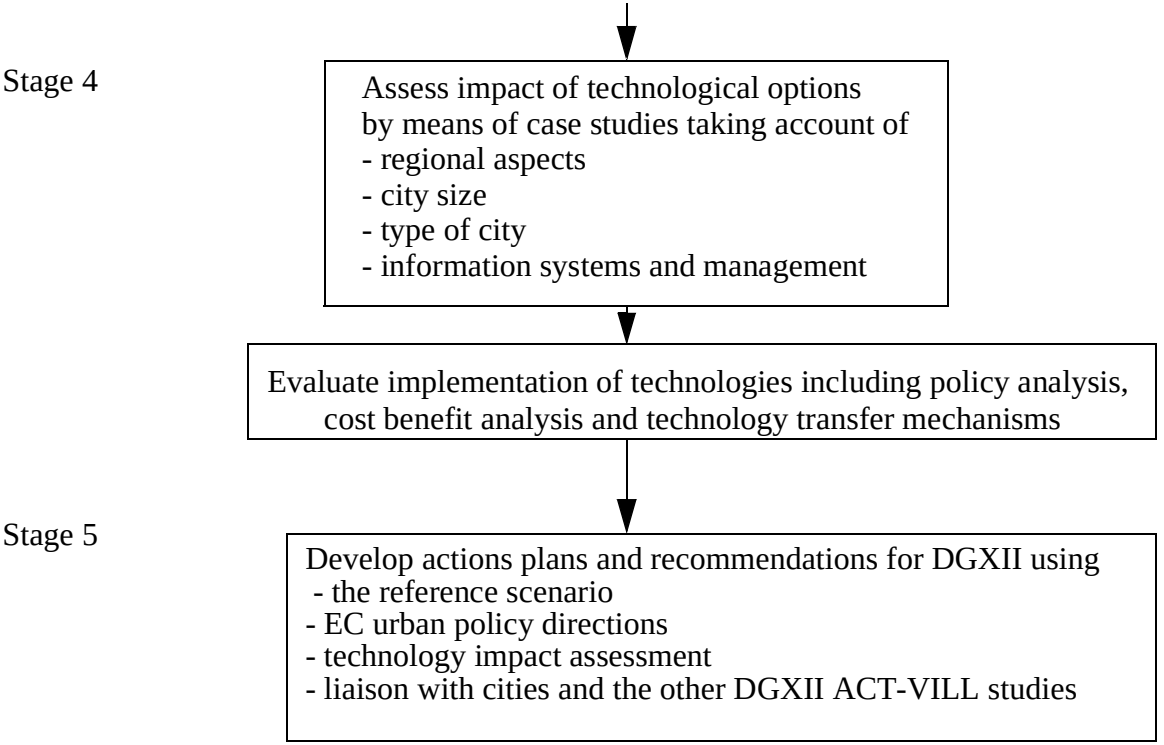
- energy efficient demand devices
- renewable energy sources
- waste as a fuel
- combined heat and power

- alternative fuels/alternative vehicle technologies
- public transport
- transport management and infrastructure planning
- air/water/ground pollution control
- waste management
- recycling
- telecommunications and teleworking (as a substitute for travel)
- information systems for environmental and traffic management
- information systems for crime detection

The essential feature of these technologies is that their implementation needs to be properly managed. In addition, technology transfer is a key element of any implementation policy. This can range from supporting technical information to brief the main decision makers, training material for those responsible for implementing new technologies, publicity material for businesses and the general public to engender support for the strategies, and securing of investment funds.

The key stages in the project technical solution are shown in Figure 1.


Stage 1
Develop reference scenario for the project
Stage 2
Identify city congestion problems and challenges
- energy supply and demand
- transport/communications
- environmental pollution
- social degradation
Stage 3
Assess technological options and develop concepts for solutions
- costs and benefits
- availability of technology
- adverse impacts


Stage 4
Assess impact of technological options
by means of case studies taking account of
- regional aspects
- city size
- type of city
- information systems and management
Evaluate implementation of technologies including policy analysis,
cost benefit analysis and technology transfer mechanisms
Stage 5
Develop actions plans and recommendations for DGXII using
- the reference scenario
- EC urban policy directions
- technology impact assessment
- liaison with cities and the other DGXII ACT-VILL studies

Human Factors

Any study concerning the concept of a Sustainable City must consider the impact of any technological changes on the humans within the system. For instance, a technological change made to alleviate an identified problem may result in a negative impact on the humans within the system. An example of such negative impact was seen following the introduction of high rise buildings in inner cities during the 60's to counter the accommodation crisis. The implementation of this solution was found in many cases to be to the social detriment of the people housed within those buildings.

The solution of one problem can create others. In order to ensure that the major problems are identified it is necessary not to simply consider the impact to the "user" of the system but to also look at the wider societal implications.
The following diagram (Figure 3) indicates the levels over which the impact must be considered:

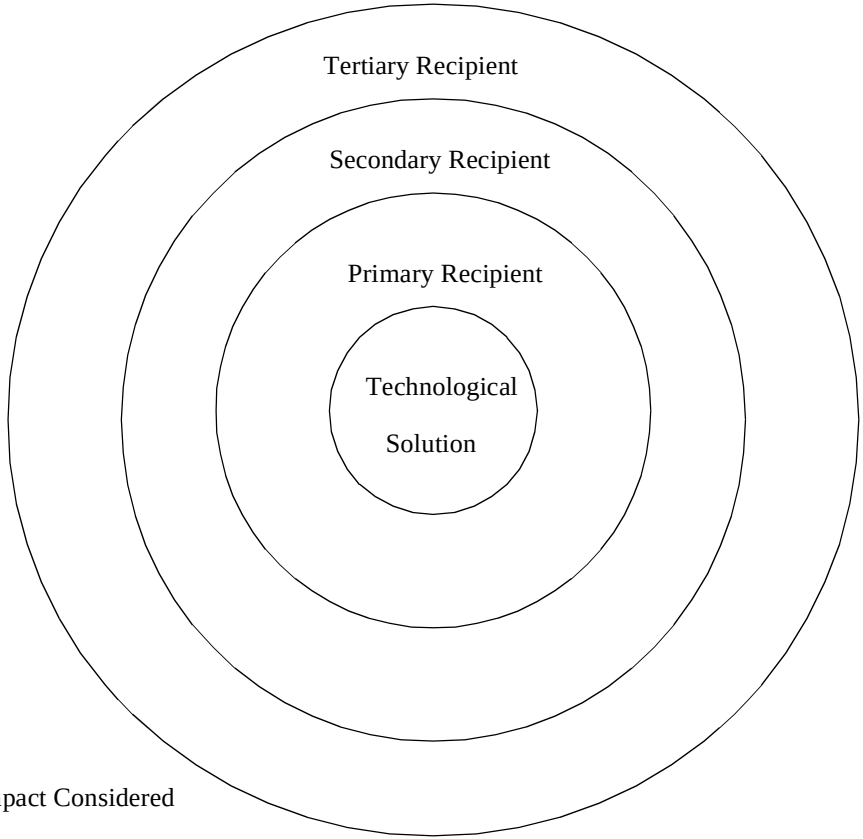


Figure 3: Levels of Impact Considered

It is obviously necessary to focus on the user (primary recipient) of a system to establish the impact any changes/solutions would have on them in terms of, for example people's perceptions and attitudes. However it is also important to look wider and also consider the impact on other people nearby (secondary recipient) and the wider community/environment (tertiary recipient).

For example, the introduction of an out-of-town retail park may appear beneficial in reducing the amount of traffic a city centre and creating jobs on the park. It would also prove convenient for shoppers who do not have to battle through city centre traffic or struggle to park their cars (primary recipients). However, it may affect similar types of trading within the city centre, possibly leading to job cuts (secondary recipient). In addition, moving out-of-town may impose on residential areas and lead to discontentment amongst the local residents due to the visual intrusion and increase in traffic on the roads (tertiary recipients).

Development of a Reference Scenario

We regard a Reference Scenario as a crucial concept. The reference scenario should embody the best in conceptual thinking in steps that will lead to the realisation of the sustainable city and what the principal characteristics of such a city would be.

Increasing urbanisation and the growing position of cities in world events has lead to an unrestrained growth of cities. As a result many of them are facing problems of liveability. Cities are confronted with the effects of the flows (internal and incoming/outgoing) of people, traffic, energy and waste.

They are all characterised by an increasing saturation.

1. The most often mentioned type of saturation of a city is traffic congestion, especially the saturation of the city by cars. This means that the environmental and technical capacities of streets for car use and parking have reached their limits. This process goes together with the deteriorating of other modes of transport (public, bike, walk). Many metropolitan and medium sized cities are facing this problem. Not only London and Paris are examples in case, but also Athens, Madrid and many others, even smaller cities such as Firenze, are experimenting with and finding solutions. Traffic congestion is not only limited to the city centres but occurs also on the regional access roads, e.g. the morning and evening peaks.
2. Another type of saturation of increasing importance is the saturation by domestic and industrial waste in cities and city-regions. Also here most of European cities are experimenting with new approaches and technology options to solve waste-congestion problems.
3. Saturation of air quality by pollution is another important type. Thanks to recent efforts, some results have been reached already in selected cities. An interesting example in this

respect is the efforts of the Italian city of Bologna to achieve a zero increase in air pollutants.

4. Saturation of population and of social solidarity faced with increased immigration is another interesting type of sociological character. In many European cities and mainly in metropolitan areas, concentrations of poverty and of immigrants, are a common problem, for which as yet no common European policy approach has been undertaken. DGV in their poverty programs did not identify possible synergy with urban planning. Brussels is an interesting case, because nearly 30% of its population is foreign, composed of about 10% high income foreigners and nearly 20% migrant workers, political refugees and other lower income foreigners. This has an important impact on the use of the physical environment, environmental quality, economic performance and social relations. The interaction of the different factors on different levels led to the conclusion that a city is not only a social and economic system but a dynamic and complex ecosystem.

The main challenge is that the city internalises the problems described above and tries to solve them instead of transferring them to others or future generations. The policy objectives are:

- close the cycles of the flows (energy, waste,...)
- save energy and resources
- increase quality
- prevention
- manage functional development

The following tools will play an important part in meeting these objectives:

- new technologies
- urban planning
- participation/behaviour of population

The Reference Scenario should combine demonstrated and available technologies in a conceptual 'best practice' strategy reflecting the most advanced strategies that have been developed in Europe.

For each technology sector to be considered there needs to be a set of assumptions e.g. for waste management - population density, waste arisings, waste composition and infrastructure of a hypothetical city.

Problems and Solutions

Energy supply and demand

European cities are areas of concentrated human and industrial activity where over 80% of total energy consumption occurs. Energy supply and demand issues are at the heart of many of the challenges posed by cities. These challenges arise directly in respect of quality and comfort of housing, the production of energy from waste, network supply, traffic and vehicle emissions. Indirectly these challenges arise in respect of financial burdens, promotion of public transport, re-establishment of close proximity between place of work, residence and leisure activities, creation of added value within the city and local employment.

Cities by their very nature, are major concentrations of energy demand, arising from the three main sources of energy consumption: buildings and their functions; industrial processes; and transport. In most member states of the EU, primary energy consumption in buildings accounts for about 50% of demand, with the majority of this associated with cities. The means of meeting this demand - or curtailing it - creates one of the major problems in modern cities. In the past, significant amounts of generation capacity has been supplied close to cities by small fossil fuelled power stations. This eased the supply network problem at the expense of the efficiency which comes from large generators and also the local effects of pollution. More recently, the trend has been towards large generating stations located at some distance from the major centres of population. These centres have therefore become net importers for the majority of the energy needs. The combination of long supply networks and

highly variable local demands that cities inevitably produce can make them vulnerable to weakness in the security of supply. The failure of the supply system to cities can have catastrophic consequences, as witnessed in some North American cities in the last decade.

The key issues for the energy supply and demand for cities include:

- efficient use of energy
- security of supply
- infrastructure requirements
- capital investment requirements
- expandability of the system
- metering
- consumer requirements - load matching

Modern technology can help reverse this trend of separation of supply from demand. Firstly, increasing attention needs to be paid to all aspects of energy efficiency, ranging from basic energy efficient building and consumer product design, through to the implications of integrated transport planning. It is not difficult to identify what is good and bad practice in such sectors. Programmes of adoption of good practice need to be drawn up and imposed Secondly, there are opportunities for embedded generation within or close to cities using both conventional and new sources. These

include:

- Conventional:
  - combined cycle gas fired plant
  - CHP
  - district heating
  - waste incineration
- New:
  - solar water heating
  - solar photovoltaic power
  - fuel cells
  - mini-hydro
  - wind power

Passive building design that optimises the benefits of daylight and heat must become standard practice. Similarly the air-conditioning of new buildings should be avoided wherever possible by adopting natural and thermal stack effect ventilation techniques. Often such techniques can result in

exciting building designs with a pleasant internal environment and at little or no extra cost. Prospective building owners need the confidence to move away from conventional energy-guzzling 20th Century buildings to the more carefully designed buildings of the low energy era to come.

The adoption of these solutions will require the involvement of a large number of actors including international regulatory bodies, national governments, local/regional /city authorities, public and private utilities, manufacturers, planning bodies and consumers. There must be incentives at every level for the improved generation and use of fossil fuels and the adoption of renewable energy technology. Existing practices must be critically evaluated and where appropriate replaced by better and proven ones.

Effective implementation will also require complimentary actions on a number of fronts requiring co-operation between many of these actors. A prime example of this is the installation of new district heating networks linked to local TIP generation.

ETSU has considerable experience of assessing these technologies and devising implementation and dissemination programmes and working with a wide range of people from government, local authorities, industry etc.

Waste Management

Historically cities have sought to export their waste and its associated impacts to their hinterland. This is an unsustainable policy which in itself has become more difficult as cities have grown and their surrounding environment has become saturated. Developments to waste management systems have

been ad hoc as necessitated by growing waste arisings. Constrained by the limited resources which authorities allocate to waste management these developments have been holding exercises rather than advances which make use of new technologies and contribute to the sustainability of the city.

The problems of waste management in saturated cities requires analysis. This should include the unsustainable export of waste, the external costs of pollution and the loss of raw materials, energy and amenity in outdated and inappropriate waste management techniques.

As an example of the kind of approach proposed, the waste management sector is developed below:

Economic assessment

Since this cost assessment is analogous to a conventional economic analysis the most cost-effective scenarios will be those most likely to be adopted due to market forces.

Environmental assessment

The economic assessment of scenarios does not take account of environmental impacts or external costs. These are important indicators as to the sustainability of each scenario however. Where possible a monetary value should be assigned to the externalities identified in the environmental cost function in activity 2.2 using damage cost data. This permits the performance against a range of environmental indicators for each scenario to be combined in a single monetary cost estimate.

A limited database of damage cost data should be compiled from a number of sources, including

UK Government research, EC funded research, the IEA, US EPA etc. The database would contain ranges of estimates rather than discrete values, permitting sensitivity analysis and an explicit handling of uncertainty.

This environmental assessment would indicate the scenarios which perform best against environmental criteria, but takes no account of the costs of these strategies.

Composite assessment

The combination of the environmental cost function and the economic cost function will give a single function indicating the performance of the alternative scenarios against both internal and external costs.

Non-costable environmental burdens

Where it is not possible to quantify the economic impact of environmental burdens, or where the uncertainty associated with such estimates is large, it is appropriate to employ comparative techniques other than cost benefit analysis. It was proposed that all physical burdens be grouped into impact categories for which internal weighting factors had been derived.

A number of impact categories were suggested, including those for greenhouse warming, acidification and nutrification. For each category a set of equivalency factors was derived. For example, for greenhouse warming these exist for a range of gases including CO2, CH4, CO, NOx, N2O and a number of CFCs. The resulting values for each impact category facilitate the comparison

of alternatives where environmental burdens are perceived as being important. Impact valuations can be used for comparison with other data, such as economic cost, in a multi-criteria approach to decision making.

A full 'decision matrix' of the costs and benefits of the alternatives, including non-costable burdens can be compiled to allow further interpretation by decision makers.

Transport

Key trends in urban transport are the overall growth in transport demand and the growth in modal share of private cars and road freight vehicles. These trends point towards serious exacerbation of the existing problems in urban transport:

- congestion
- noise;
- missions of local (and global) pollutants;
- accidents.

The scale of the problem is illustrated by the following examples:

- between 1970 and 1987, annual vehicle-km increased by 75% globally;
- urban traffic accounts for 40% of the total energy used in the transport sector;

- private cars meet only 66% of the urban mobility needs of passengers, yet they are responsible for over 92% of the total energy consumption due to urban mobility;
- CO2 emissions in urban environments have risen by 87% in 13 years.

These problems have wider impacts, affecting:

- quality of life;
- economic vitality;
- social amenity and integration.

The consequent cost to the European economy is estimated to be at least 50 billion ECU per year for road transport.

Particular challenges arise where a city's transport system is operating close to saturation. These include feedback loops which intensify the pressures towards urban degradation. For example, traffic congestion leads to pollution and economic loss. In response, residents and businesses tend to emigrate to peripheral areas. In turn, this leads to:

- further emigration as social and economic conditions deteriorate in the urban centre;
- worse congestion, as commuting and total vehicle usage increase;

- a decreased density of population, which may be economically unattractive to serve with public mass transport.

Similarly, intensive use of road transport in cities leads to safety problems, especially for residents and pedestrians. A common response is for people to switch to private cars and/or move away from the centre. As a result, traffic intensity increases further and safety fails to improve.

The spectrum of broad options for tackling urban transport problems includes:

- transport demand management, using information systems and fiscal measures;
- transport supply and traffic management, using operational and traffic control techniques;
- improved service quality and efficient public transport, including new vehicle and fuel technologies;
- improved intermodal transfer;
- optimisation of urban space and infrastructure, including long-term planning;
- promotion of urban public transport.

.The options for governance to implement such measures include:

- fiscal policies;

- regulatory policies;
- planning policies;
- infrastructure investment;
- research and technological development;
- promotional initiatives.

These options influence the deployment of transport technology either by direct regulation, or by influencing behaviour (transport demand, technological choices etc.), or by influencing transport volumes and related technology options.

A range of human-centred solutions can be envisaged in response to transport system saturation. Their analysis would enable policy options to be prioritised and the actions identified to facilitate their introduction.

One important area of study is the process of governance for a saturated system. For example, congestion charging is effective, since user charges increase rapidly as the traffic density edges closer to capacity. Emissions charging can be deployed in a similar way. Such measures require underpinning technologies such as roadside sensors and intelligent tags for vehicles.

Another human-centred solution is the preferential treatment of citizens of the city. Parking controls and zone access controls can be used to favour local residents.

Similar measures relate to the promotion of social integration and an enhanced quality of life. For example, pedestrian zones, better cycling facilities and good access for urban public transport can all contribute in making the city centre an attractive, vibrant hub of social activity.

Clearly, transport measures need to be efficient as well as human-centred, and these two objectives can be achieved in a compatible way. Urban public transport can provide good access in an energy-efficient manner: light rail and advanced bus technologies have proved both attractive and environment-friendly. Similarly, efficient strategies for urban freight distribution can be tailored to human needs: for example, through the introduction of appropriate vehicle technologies, zone access controls and logistical systems.

Saturation problems result not only from transport demand within the city, but also from extra-urban pressures. Therefore measures are needed to define and control the urban:extra-urban interface. Potential solutions include the provision of modal interchanges for passengers (such as park-and-ride), and the use of peripheral warehousing for freight. Such warehousing could be used to combine loads for efficient local distribution by a minimum fleet of purpose-built urban delivery vehicles.

Innovative technologies will be vital in facilitating human-centred solutions to urban transport needs. These technologies include enabling systems, such as road transport informatics for road pricing and better logistical control of transport fleets, as well as new vehicle designs and concepts. The latter area encompasses solutions such as

- self-service electric cars;

- pelletted automated systems, in which small vehicles have flexible routing options on a mass transit network;
- segregated bus systems;
- hybrid or gas-powered low-floor buses;
- light rail and guided bus systems.

ETSU have made an in-depth study of transport solutions adopted by UK cities, and we have analysed technological innovations such as light rail and information systems for urban public transport. ETSU is also experienced in leading a number of EC funded studies in this area.

Pollution Control

Poor air quality in cities leads to increased respiratory problems for the residents of the city. These problems are most noticeable in the very young and the old. A sustainable city will need to minimise the cost of health care by improving air quality. Road traffic is a major contributor to air pollution - for example in London 79% of nitrogen oxides emitted by transport. Many technological measures have been identified that will reduce emissions for road traffic. Such measures include:

- Demand Management
  - areas access restrictions

- dynamic route diversions
- road pricing
- car pooling

- Traffic Management
  - incident detection
  - localised area traffic control
  - automatic speed enforcement and policing

Parking Management
  - parking availability control
  - dynamic parking information

- Public Transport management
  - scheduling
  - operations management
  - passenger information

- Traffic Information
  - onboard navigation
  - dynamic route information
  - route guidance
- Travel Information
  - route planning
- Vehicle control
  - dynamic vehicle control.

Our current work in Southampton should demonstrate that traffic signals can be managed in such a way as to reduce vehicle emissions from queuing vehicles at signalised junctions.

The effect of traffic control measures can now be assessed using sophisticated modelling tools. For example, the effects on air quality of a shift towards public transport within a particular city could now be predicted.

Sectoral urban planning processes

Due to the increasing importance of interrelations between several actors and factors in the city ecosystem urban planning needs to integrate sectoral planning modules, those that have spatial implications. The most important of which from city viewpoint- are the following:

1. Economic planning: industrial areas and commercial areas and zones, which mainly determine the characteristics of the city structure and attractiveness.
2. Social, cultural and recreational planning, these activities need different types of larger or smaller building blocks, which have often important spatial implications as e.g. hospitals, theatres, sports stadiums, etc
3. Environmental planning aspects with spatial components as there are nature reserves, green spaces and parks, etc.. Also elements such as water purification plants, waste treatment and recycling plants, etc. are examples of sectoral environmental policies with spatial implications.
4. Transportation and traffic planning is a very important structural determining planning component, because the flow system of a city is the physical expression of the links between

the fixed and adapted space components and building blocks of a city, which allow mobility between their different parts.

5. Energy planning also is a sectoral planning component with spatial implications as for instance energy power plants, apart from the fact that it is also in the same way as environment an important aspect of several other planning components. Examples are air pollution related to the use of specific energy sources in the city, both in buildings as by the users of the flow system.
6. Safety planning also is becoming more important in cities and is directly related to spatial planning. Both physical safety, related to accidents, fires, etc.. as social safety, related to aggression, crime, etc. are very important problem areas in cities and often related to social problems, social duality, concentration of poverty in low standard housing in inner cities or as in the case of France in social building blocks in the suburbs or the outskirts of cities, etc.
7. Land planning - the design, use and disposal of buildings and neighbourhoods (for housing and economic locations) and consumer durables will have to become more efficient in terms of energy and materials. More attention have to be paid on the visual attraction and user

qualities. Station locations are typical examples of city districts which need redevelopment and revitalisation.

Logistics and communication

Desired levels of access will have to be achieved via new communications technologies as well as improved public and private transport. In many cities the principal economic role is played by consumption and no more by production.

A first important issue is transport demand management. The functional organisation of the city area will define the degree and profile of desired access. The choice of transport mode can be influenced by instruments such as car pooling, promoting urban public transport, traffic plans created by the employer,... New technologies will play an important role in increasing the quality of urban public transport. Telematica will have an impact on the amount of trips by creating the opportunities of teleworking, teleshopping,... Another set of instruments can be detected in traffic management. Both Madrid and Athens, which will be analysed in a case study, have experience on this matter. High occupancy vehicle lanes and other technological tools contribute to a better management of the flow system on regional access and main urban roads. The most intervening measure is the marking of traffic restricted areas. Many cities, mainly in the US, are experimenting with low polluting vehicles.

In order to organise an easy course in the nodes of the network we need a better concept for a multimodal system by creating nodal centres for passengers and goods. The organising of park-and-

ride facilities, logistic centres for goods on urban levels are part of this concept. M+R recently prepared a study for DG VII on nodal centres for passengers in Europe and North America.

Development processes

The city is a dynamic system and is affected by internal and external forces. It is part of an international, national or regional set of urban areas which are interdependent in such a way (demonstrated by their linkages) that any significant change in the economic activities, occupational structure, total income or population of one member city will directly or indirectly bring about some modifications in those characteristics in the whole urban system.

In a city both urban growth as urban decline can occur on very short distances of each other. Strongest growth and spatial dynamics are mostly concentrated at the urban fringes, leading to suburbanisation. It is here, where urban and spatial developments and are the most intense, that the authorities must intervene to control the negative effects of this phenomenon.

Participation and behaviour of inhabitants/visitors Individuals, households, along with other types of organisations, will have to become more aware of the importance of reducing environmental impacts of their own activities and operations. Much attention has to be paid to the production of waste and energy consumption. The socio-cultural relationships are another element. Several cities faces the problems of social inequality caused by income differences, the greying of the population and migration problems.

Case Study Cities

The consortium created an informal network of Cities for this study. For each city a partner was identified who could prepare information on the key issues for discussion and analysis in the framework of this study. The cities and partners are:

Athens: Trademco - focus on traffic management

Brussels: Mens en Ruimte - focus on immigration and sociological aspects;

Madrid: Environment, Transport and Planning - focus on traffic management

Dortmund: ILS - focus on the Ruhr and the role of environmental technologies.

Bologna: The Institute of Architecture and Urbanism - focus on "Zero increase"

Southampton: Hampshire County Council & ETSU - focus on energy & transport

In addition, the partners have established contacts with several City Networks established under previous Actions including the ROME and POLIS Networks.

The Network formed for this study comprises of Cities that have attempted solutions to some of the saturation problems of Cities. They can provide valuable insights into some of the tried solutions to input to phase 2 of the study. The main role of the Cities was to test the practicality of solutions.

Conclusions

Mankind has dominated the earth and has adopted an increasingly unsustainable lifestyle. Recognition of this reality is an essential first step towards its solution but it will take all of man's ingenuity to put in place those measures to achieve harmony with the environment.

There are no magic formulae or miracle cures to the growing problems of cities. The technologies already exist that can be adopted as part of the overall solution. We must learn from our mistakes of the past by ensuring that human factors receive as much attention as environmental and economic concerns.

In this paper we have proposed that all facets of the city saturation problems must be exposed. The examples of the best practice of solving these problems must be identified and replicated where possible. Evolution of cities must become better understood so that the effects of imposed changes can be predicted.

Saturation is by definition a critical point beyond which stage no more can be absorbed or accepted. There is a danger that before reaching the saturation point that complacency may reign. The adoption of proven solutions is the essential alternative to eventual chaos

ETSU

ETSU was established in 1974 to provide UK Government with assistance in the formulation and management of its research, development and demonstration programme in energy efficiency and renewable energy technologies. Since that time, ETSU has expanded its range of services within the UK and in other European countries.

In the UK, ETSU continues to perform a role at the interface between Government and industry for promoting the more effective use of energy in industry and commerce and by stimulating the development of renewable energy technologies.

ETSU has also developed a track record in the areas of clean coal technology, fuel cells and transport.

One of ETSU's key roles is to stimulate the development and commercial take-up of energy-related innovation and best practice in industry. It has a close interaction with a cross section of industry and understands the needs of each sector and the barriers to be overcome. Results from programmes are promoted and disseminated by a variety of techniques. Market research is used to define the audiences to be reached with highly focused information.

ETSU has provided technical management and consultancy services in the energy and environmental fields for major programmes of the UK Departments of the Environment, Trade and Industry, the European Commission (JOULE, PHARE, TACIS, Synergy, Altener, SAVE, and Thermie/OPET) and the CADDET Centre of the International Energy Agency. ETSU also continues to carry out technical consultancy, programme management and technology transfer assignments for many other public sector organisations world-wide and has been active in Central and Eastern Europe, Asia and Africa.

This consultancy has included energy projects for the European Energy Network, the World Bank and the Asian Development Bank.
ETSU has a staff of over 280, of whom about 230 are professionals from diverse disciplines and includes scientists, engineers, economists and marketing specialists. Our matrix management system allows staff with relevant experience to be brought together into teams ensuring the best possible mix to meet project requirements.

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JULIAN WILCZEK

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NATIONALITYBritish

QUALIFICATIONSBSc in Applied Chemistry
PhD in catalytic chemistry

LANGUAGESEnglish: spoken-mother tongue, written mother-tongue
`French :spoken - basic

KEY SKILLSBuilding energy, insulation technology, high temperature insulation technology, marketing and general management

PROFESSIONAL ACTIVITIES

Past member of British Standard Technical Committees on insulation and Thermal Insulation Manufacturers and Suppliers Association
CAREER HISTORY

1994 - to dateEnergy Technology Support Unit (ETSU), Harwell
Project Officer
Responsible for project management of the Passive Solar Design programme within the Solar Energy Section of the Renewable Energy Deployment Department. Special responsibilities include matters relating to building energy technology.

1993 - 1994Pilkington Insulation Ltd, St Helens

Senior Marketing Manager

12 month contract following the acquisition of the business of Ecomax (UK) Ltd. Responsible for interim management of the roofing business, ensuring a smooth transfer of major accounts, purchase and sale of Northampton premises and for co-ordinating a technical/marketing project.

1980 - 1993ECOMAX(UK) Ltd, Northampton
The UK sales and marketing company for insulation products manufactured by Rockwool AB of Sweden. UK turnover £6m and employing 20 people.

Managing Director (1992 - 1993)
Responsible for agreeing and executing the policies of the Board of Directors and for achieving profitability and product volume targets
Technical Director (1990 - 1992)
Responsible to the Managing Director and to the Board of Directors. Overall responsibility for the roofing and fire protection division and for technical and marketing matters of the company.
Technical Marketing Manager (1980 - 1990)
Responsible to the Managing Director. Responsible for technical services, training, literature and promotion. Developing a new cavity wall insulation division and the introduction of other new products.

1978 - 1980RENTOKIL LTD, East Grinstead

The UK's largest specialist building treatment and service company.
Head of Physical Services, R&D Division
Responsible to the Technical Director. Responsible for technical service to the Insulation Division and Damproofing Division and for development of new products and services.

1975 - 1978Redland Roof Tiles Ltd, Westerham
Redland Technology Ltd, Horsham
One of the UK's largest manufacturers of bricks, concrete roof tiles and other building products.
Chemical Engineer
Responsible to R&D Manager at Westerham and later at Horsham. Responsible for development of iron oxide pigments for use in concrete.

PROJECT MANAGEMENT EXPERIENCE FOR DTI (UK GOVERNMENT)

1994²Energy Design Advice Scheme
²Integrated Marketing Programme
²Building Energy Modelling
²International Energy Agency - Executive Committee
²Passive Solar Design - Programme Management

1995²Building Refurbishment incorporating Passive Solar Design

[2]Planners' Guide to Passive Solar Design
[2]Daylighting (several projects)

OTHER CURRENT ACTIVITIES

Thermie B Project participant: A global energy strategy for energy and environment for EXPO 98

APAS Project Participant: Pre feasibility study on the effectivenes of EU municipalities energy efficiency policy

Project Manager for building energy and human factors project within AEA Technology.

Authorindex