EVALUATION IN PLANNING

CITTA 1ST ANNUAL CONFERENCE ON PLANNING RESEARCH

EDITED BY PAULO PINHO AND VITOR OLIVEIRA

FCT FEUP Citta

PROCEEDINGS OF CITTA 1ST ANNUAL CONFERENCE ON PLANNING RESEARCH

EVALUATION IN PLANNING

Coordination Paulo Pinho, Edition and Design Vítor Oliveira

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Colecção *Planeamento*
Série *Investigação*
Direcção *Paulo Pinho*
Projecto gráfico *Vítor Oliveira*
Impressão e acabamentos ----------(?)
1.ª edição, 2009
Depósito legal n.º ----------(?)
ISBN ----------(?)

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Preface

Paulo Pinho
Director of CITTA

This book contains a fair selection of the papers presented at the 1st CITTA's annual conference. In line with our initial intentions and, indeed, with the programme of the conference, the four parts of this book present a mixed and balanced picture of a wide and diverse range of research contributions coming both from our centre and from other Portuguese research centres with a particular interest in planning.

The title - *Planning Evaluation* - reflects the general theme of the conference. As a research topic, the evaluation of planning activities already has a long history and yet, it is still a rather difficult and controversial issue to address. The first contributions date back to the 1960s. At that time, a number of evaluation methodologies appeared in the planning literature as refinements of the classical Cost Benefit Analysis. Their general conceptual framework was very much in accordance with the then dominant rational comprehensive planning model. However, those early days left very few records of practical applications, at least documented in the international planning literature.

With the subsequent evolution of planning theories, from the mid 1980s through to the turn of the century, and the emergence and steady dissemination of the collaborative planning paradigm, new and more complex methodologies have been proposed but, again, very few contributions can be traced in the planning literature of systematic applications in local planning departments or in independent planning research units.

Everyone seems to agree that evaluation is an essential component of the planning process and an indispensable instrument to (re)design responsive planning policies. But, actually, very few invest their time and resources in systematic planning evaluation exercises geared towards the preparation and implementation of a particular land use plan or planning policy document, or towards the assessment of the role and overall performance of a particular regional or local planning department. In this respect, the reader can find in the first part of this book a number of contributions coming from different CITTA's research units and also from elsewhere, trying to bridge, albeit modestly, this most noticeable gap between theory and practice. The other three parts of the book group several contributions under the general themes of CITTA's research units, namely *Planning and Environmental Assessment*, *Urban policies and Housing* and *Transport Planning and Logistics*. Each part starts with a brief introduction written by the chair of the respective session. To all involved, chairs and papers' authors, our most sincere thanks.

Our Secretary of State for Planning and the Cities, Prof. João Ferrão, gave us the honour to open the conference. His opening address follows this introduction. It is our firm believe that planning research has a fundamental role to play in planning practice, in Portugal and elsewhere, either helping to improve the general quality standards of planning practices or facilitating knowledge and more rigorous, comprehensive and innovative methods and policy instruments.

Opening address

João Ferrão
Secretary of State for Spatial Planning and Towns

A realização desta Conferência não pode ser mais oportuna.

De facto, vivemos actualmente um contexto decisivo de dupla transição, ao nível nacional e comunitário, cujos efeitos reciprocamente benéficos interessa potenciar e reforçar.

Ao nível interno, creio poder afirmar que está hoje em vias de consolidação a transição do paradigma moderno, racionalista e normativo de ordenamento do território típico do período do pós-guerra, mas com impacte tardio em Portugal, para uma visão mais estratégica, participada e humanista.

Ao nível externo, a consagração no Tratado reformador de Lisboa da coesão territorial como terceira componente da Política de Coesão comunitária vem permitir que o ordenamento do território deixe de ser, como até aqui, uma competência exclusiva dos estados-membros para se afirmar no futuro como uma competência partilhada entre a União Europeia e os estados-membros.

Felizmente, dispomos hoje dos instrumentos essenciais para garantir a coerência e, espero, a irreversibilidade dessas duas transições.

Em termos de documentos enquadradores, o PNPOT – Programa Nacional da Política de Ordenamento do Território, ao nível nacional, e a Agenda Territorial e a Carta de Leipzig para o desenvolvimento sustentável das cidades, ao nível comunitário, garantem a definição de linhas de rumo estratégicas baseadas em princípios orientadores claros e mobilizadores.

Em termos de concretização, os PROT – Planos Regionais de Ordenamento do Território, que deverão cobrir integralmente o território de Portugal continental a partir de 2009, e, ao nível comunitário, o Plano de Acção da Agenda Territorial, aprovado durante a presidência portuguesa, e o Livro Verde sobre Coesão Territorial, que a Comissão Europeia irá colocar em debate público em Setembro de 2008, permitirão definir programas orientados para a acção.

Finalmente, e no que se refere à dimensão de acompanhamento e avaliação das políticas de ordenamento do território, o início das actividades do Observatório do Ordenamento do Território e do Urbanismo, que funciona junto da DGOTDU, e o reforço do papel do ESPON no quadro das competências comunitárias permitirão identificar, em tempo útil, aspectos que importa corrigir ou reforçar de modo a que os objectivos prosseguidos pelas políticas de ordenamento do território e os resultados e efeitos esperados se possam concretizar.

Neste contexto particularmente promissor, mas em que nada está ainda garantido, a realização desta Conferência é não só oportuna como útil. Na realidade, são encontros deste tipo que contribuem para uma maior robustez técnico-científica dos debates sobre ordenamento do território e para uma maior socialização do conhecimento e das competências que esses debates exigem entre os profissionais com actividade neste domínio. E essa é a boa via – a única via – para que o domínio do ordenamento do território abandone definitivamente o estatuto algo dormente, ao nível nacional, e quase furtivo, ao nível comunitário, que hoje o caracteriza.

Opening address[1]

João Ferrão
Secretary of State for Spatial Planning and Towns

The timing of this conference could not be more appropriate.

Indeed, we are living in a critical context of a twofold transition, both at national and European levels, and whose reciprocal beneficial effects must be explored and strengthened.

At the national level, I believe we are currently consolidating the transition from the modern, rational and normative paradigm of territorial planning, characteristic of the post-war period but with a late impact on Portugal, to a more strategic, participated and humanistic vision.

At the European level, the statement on territorial cohesion as the third component of the European cohesion policies, in the Lisbon Treaty, enables territorial planning to be more than an exclusive competence of the different member states (as until now) to become, in the near future, a competence shared by the European Union and the member states.

Fortunately, we have the needed instruments to ensure the coherence and, I hope, the irreversibility of these two transition processes.

As far as the major framework documents are concerned, the *Programa Nacional da Política de Ordenamento do Território* / PNPOT (National Programme for Territorial Planning Policy) at the national level, and the Territorial Agenda and the Leipzig Charter for the sustainable development of cities, at the European level, ensure the definition of strategic lines based on clear guidelines and mobilizing principles.

As far as implementation is concerned, two different contributions should enable the definition of action-oriented programmes. The first corresponds to the *Planos Regionais de Ordenamento do Território* / PROT (Regional Plans) that should cover the mainland of Portugal in 2009. The second, at the European level, corresponds to the Territorial Agenda approved during the Portuguese Presidency, and to the Green Paper on Territorial Cohesion, that the European Commission will shortly submit to public debate in September of 2008.

Finally, in terms of monitoring and evaluation of territorial planning policies, the launching of the Observatory on Planning and Urbanism (working alongside with the *Direcção-Geral do Ordenamento do Território e Desenvolvimento Urbano* / DGOTDU) and the reinforcement of the role of ESPON, within the European framework of competencies, should contribute to fulfill the objectives of territorial planning policies, and to achieve the foreseen results and effects.

In this context, rather promising but still not yet guaranteed, this Conference is both timely and useful. Indeed, meetings such as these contribute to a more robust technical and scientific debate on territorial planning and to a wider dissemination of knowledge and skills among planning professionals. This is a good way – perhaps the only way – to move territorial planning beyond its current state, somehow inactive at the national level, and almost secretive at the European level.

[1] Translation from Portuguese by the editors.

Part 1. Evaluation in Planning

Introduction to Evaluation in Planning

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However understood, evaluation is a key activity in planning work. These days, there is a widespread expectation that public policy interventions should be judged on whether they achieved their goals and on their wider impacts and effects (Seasons, 2009). Planning and urban policy interventions are no exception. In proposing an intervention, whether a project or a programme, politicians, funders and those to whom they are accountable will want some indication about whether it will 'work', that is get implemented and achieve the intentions sought, without serious adverse consequences. They will want to know whether a different approach may achieve better results. Once underway, they may well want to monitor whether the intervention is progressing as intended and whether it needs adjusting in any way, especially where the programme proponents are under continual watchful and critical scrutiny. Once an intervention is achieved, or has become well-established, many parties may have an interest in assessing whether it has worked out as intended, what its wider impacts have been, and whether, on balance the programme or project created 'more good than harm', and whether it was worth the effort expended on it.

These all seem quite straightforward questions to ask, but answering them raises a host of difficulties, which lie at the heart of the challenge of combining the political and technical dimensions of planning work, and of determining which kinds of knowledge should be privileged. 'Evaluating' involves establishing a value stance, yet interventions may be agreed to by parties motivated by diverse values, seeking to get different outcomes from an intervention. Connecting an intervention with its effects, on 'outputs', 'impacts' and 'outcomes', can be very tricky as most outcomes in the urban planning field are the consequence of multiple interacting factors, only one of which is the intervention in question. We have come to recognize this in the planning field through the understanding that planning interventions, still less plans, cannot 'control' urban development outcomes, though they may come to have an important shaping, or structuring, effect (Healey, 2007). Impacts of interventions can have very complex effects, stretching across space and time, affecting different people and places in different ways. Even where the 'causal chains' connecting an intervention with an impact can be established conceptually, finding appropriate measures to establish the scale and nature of impacts and connecting these to selected values means coming to a view about the kinds of knowledge to use and how far it can be aggregated into some kind of 'performance measure' or indicator.

In recent years, the evaluation literature has expanded from a focus grounded in policy science and economics, to become a much richer tradition, proposing an array of approaches and specific methods[2]. Oliveira and Pinho in their paper provide a very useful review. Distinctions are commonly made between ex-ante (or a-priori) evaluation to guide intervention choice, monitoring

[2] See Hill 1968, and Lichfield, Kettle and Whitbread 1975 for early contributions; see Lichfield 1996, Mastop and Faludi 1997, Alexander (ed) 2006, Pawson and Tilley 1997 and Seasons 2003, 2009 for more recent work.

(when intervention is underway), and ex-post evaluation, to assess the outcomes and effects of a completed programme[3]. It is now common for many programmes and projects to be accompanied by all three forms of evaluation. Yet although there has been a great proliferation of evaluation practice across Europe, in part encouraged by the European Union, the literature on evaluation methods and experiences, including the practices surrounding evaluation activity itself, has received less attention than it deserves in the planning and urban policy literature[4].

For this reason, these two papers are especially welcome. Oliveira and Pinho focus on how to create a methodology for evaluating a formal city plan. Their concern is to find a way to bridge the ex-ante, monitoring and ex-post dimensions of evaluation, and to provide a methodology which focuses not whether outcomes conform with plan specifications but on whether they perform appropriately when judged against plan policies and principles (see Mastop and Faludi, 1997). They provide a very helpful review of approaches relevant to evaluating a city plan, before putting forward a framework which they feel could be helpful not just in Oporto, but to many others seeking an evaluation methodology as part of a plan-making intervention. Breda-Vázquez, Conceição and Móia focus on a different evaluation challenge. They undertake an ex-post evaluation to assess how far eight separate urban policy interventions in Oporto have contributed to developing a particular dimension of governance capacity in the city. Their focus is on strengthening the collective capacity for integrated action in a fragmented governance context. The extent of this fragmentation is evident in a very telling diagram (their Figure 1). And they conclude that the context has been too fragmented and too unstable to enhance mutual learning and collaboration, which in turn undermines the accumulation and exchange of knowledge.

Although inspired by the challenges presented by context of CITTA's home city of Oporto, both papers enhance the wider literature on evaluation in the planning and urban policy fields. Hopefully, there will in the future be more papers on the politics and technologies of evaluation practices from the CITTA group.

References

Alexander E (ed) (2006) *Evaluation and Planning, evolution and prospects* (Aldershot: Ashgate).

Hill M (1968) 'A goals-achievement matrix for evaluating alternative plans', *Journal of the American Institute of Planners* **34**(1):19–29

Lichfield N (1996) *Community Impact Evaluation* (London: UCL Press).

Lichfield N, Kettle P, Whitehead M (1975) *Evaluation in the planning process*, Pergamon, Oxford, UK

Pawson R, Tilley N (1997) *Realistic Evaluation,* London, Sage

Seasons M (2003) 'Monitoring and evaluation in urban planning', *Journal of the American Planning Association* **69**(4):430–440

Seasons M (2009). Monitoring and evaluation in urban planning: Chapter 9 in the *UN-Habitat Global Report: Revisiting Urban Planning*. Nairobi, UN Habitat (www.unhabitat.org).

[3] The literature now uses the terms *formative* evaluation instead of monitoring, to underline the value of re-shaping an intervention as it develops and learning from the experience of implementation. This is distinguished from *summative* evaluation, undertaken once the main period of intervention has been completed, to assess outputs and outcomes (Seasons 2009).

[4] But see the Journal, *Evaluation*, which publishes the work of Lichfield, Mastop, Khakee and Voogd.

Evaluation for integration of urban policies: a methodological proposal

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The issue of articulation/integration in urban policies, in a context of institutional diversity and fragmentation, is a challenge to evaluation tools and practices. The main aim of the paper is to discuss and present a methodology directed to the evaluation of interaction capacities between different policy instruments and different agents and to the enhancement of collective capacities associated with that interaction. The proposed methodology, which takes into account several contributions to this debate by Innes and Booher (2003), is based on four main dimensions of inquiry, related to: i) diversity of actors; ii) interaction by actors; iii) development of selection mechanisms, based on the accumulation of knowledge and reflexive capacities; and iv) normative framework(s) that inform policy strategies and initiatives. The methodology is applied to the study of eight urban policy initiatives developed in the municipality of Oporto, Portugal. The analysis is based on documental research and semi-structured interviews with actors involved in those initiatives. The main result of the study – and the main test to its relevance - is the identification of factors that inhibit (or promote) reflexive learning and collaborative capacities, in contexts of fragmentation of urban policies.

Keywords: evaluation; urban policies; learning processes

1 Introduction

This paper presents some results of a more general research project entitled "Evaluation for the integration of urban programmes and policies" (see Breda-Vázquez et al., 2007)[5]. The project aimed at the development of an evaluation methodology centred on interaction capacities between different urban policy instruments and different agents. The research framework has taken into account the importance of "integration" in urban policies, in contexts of institutional complexity and fragmentation, which has been discussed by several authors (Andersen e van Kempen, 2003; Crochrane, 2003; Imrie and Raco, 2003). Integration is often conceived as a dynamic and continuous process, closely related to transformative institutional dynamics and collective actor capacity building (Healey, 2006a, 2006b, 2007), and the project aimed to explore the role of evaluation in such learning processes (see also, Palermo et al., 2002).

More specifically, the project envisaged to evaluate the mechanisms that allow, or not, the construction of collective capacities, through the comparison of several initiatives, or intervention programmes.

The main questions tackled by the research project were the following:

i) Which are the relevant dimensions for an evaluation methodology?

ii) Which forms of articulation between actors and policy instruments may be found? Which motives may underlie these interactions?

iii) Which factors contribute the most to restrict the integration/interaction of policies and actors?

[5] This research was supported by Fundação Ciência e Tecnologia (FCT) – project reference FCT-POCTI/AUR/47303/2002

iv) To which extent the chosen case study and the rehearsed methodology provide important inferences for the articulation of urban policies and, therefore, for the generalisation of the evaluation methodology?

Aiming at finding answers to these questions, an evaluation methodology was developed to analyse urban policy initiatives according to their capacity to introduce learning processes. Following closely the proposals of Booher and Innnes (2002) and Innes and Booher (2003), the methodology is founded on four main dimensions, related to i) the diversity of actors, ii) the interaction between actors, iii) the development of selection mechanisms, based on the accumulation of knowledge and reflexive capacity and, finally, iv) the normative frameworks that inform policy strategies and initiatives.

The methodology was applied to the analysis of eight urban policy initiatives, which were chosen according to several criteria, related to:

i) An overlap of their spatial scope, in this case, in the "centre" of the city of Oporto, Portugal.

ii) Their capacity to frame a particular issue: in this case, the urban deprivation problems of the area in question. Therefore, the general issue of urban regeneration takes on a central role.

iii) The diversity of objectives: each of the initiatives envisages specific objectives, which reflects the diversity and fragmentation of urban policies directed towards a same territory.

iv) The diversity of agents involved in the decision-making and implementation processes.

v) The existence of different stages of development: initiatives in progress, initiatives in the beginning of the process, initiatives already completed; and, finally,

vi) The diversity of results, from the point of view of their specific characteristics and learning conditions.

The analysis of the eight initiatives was based on documental research and semi-structured interviews with representatives of entities having responsibilities in the implementation of the initiatives.

From this analysis – which is the focus of the following section – conclusions were drawn mainly related to i) the contribution of the evaluation methodology towards the identification of the aspects that undermine reflexive learning and collaborative capacities; and ii) the role of the methodology as an important tool for the challenge of articulating or integrating urban policies at a local level.

2 Case study: evaluation for the integration of urban programmes and policies

2.1 General characterisation of the initiatives

The evaluation methodology presented in this paper was applied to a number of programmes implemented in the centre of the city of Oporto. These programmes correspond to experiences which were carried out as from the nineties, and which aimed to invert the processes of the demographic and economic decline and of urban deprivation that afflict the territory in question:

- A Special Regime for Subsidising the Recovery of Rented Properties (RECRIA), directed at the renovation of rented housing.

- A Special Rehousing Programme (PER), meant to provide new housing to the population living in shanties;
- A system of incentives for Commercial Urbanism projects (URBCOM);
- An EQUAL project to revitalise the historical centre of Oporto (Porto de Partida), directed at the employment of socially vulnerable groups;
- A programme aimed at the valorisation of the urban landscape (Porto com Pinta);
- A programme based on research and intervention in terms of social exclusion and security issues (Porto Feliz), focused on drug addicts and the homeless who were suffering from extreme social exclusion;
- The interventions of the Rehabilitation Society of Porto (Porto Vivo), which aims to facilitate the work of private agents in the urban rehabilitation of the city centre;
- A project stemming from the "Digital Portugal" Programme (Porto Digital), which aims to promote the use of information and communication technologies.

Table 1 provides us with a description of the main characteristics of the initiatives. Their diverse nature should be noted: the various initiatives under analysis present very distinct spatial extents, and adopt different objectives and intervention methodologies, in addition to mobilising distinct types of agents. Furthermore, the public investment associated with each of the initiatives is just as diverse, triggering private investment in extremely variable proportions.

The programmes which have been analysed define their spatial scope in diverse forms: whilst some programmes are directed at the entire municipality of Oporto, or even at the entire metropolitan area (as is the case of Porto Digital), others are aimed at city areas defined by a number of criteria (central parishes, the historical centre, urban axes). Nevertheless, it is noticeable a predominant reference to problems associated with the situation of urban deprivation of central Oporto, which have in turn been treated differently by many of the initiatives under analysis.

It should also be noted that the interventions were spaced out in time. From the launch of the RECRIA programme in 1992 to the closing date of the Porto Digital programme (2007), it was only in 2004 that there were activities associated with each of the eight programmes under study. A tendency for the existence of simultaneous activity amongst the various programmes towards the end of the period in question should however be noted.

The diversity of objectives and agents should also be mentioned: each of the various initiatives has specific objectives. This in turn reflects the diversity and fragmentation of the urban policies directed at the same territory. However, the importance of the actions which aimed to rehabilitate buildings and which were present in the various initiatives should be stressed.

Table 1. Basic description of the various initiatives

	Spatial and temporal context	Objectives and content of the interventions	Agents involved and beneficiaries	Investment involved (millions of euros per year)
RECRIA	Oporto municipality Approximately 70% of the total number of interventions in the 8 central parishes 1992 –... (in Oporto)	The rehabilitation through public financing of rented buildings in a degraded state.	Managing Organisation: The local administration (DMU) Other Agents: central administration, local administration, owners and landlords, tenants	Between 1994 and 2004: Public Investment: approx. 0,77 Private Investment: approx. 0,7
PER	Oporto Municipality 1994 - ... (in Oporto) 2008: forseen date of conclusion in Oporto	The erradication of shanties and the rehousing of families, through the construction, acquisition and rehabilitation of housing or the financing of the buying price of the housing for the families which need to be rehoused.	Managing Organisation: The local administration (Domus Social) Other Agents: central administration, local administration, families in need of rehousing.	Approx. 3,17
URBCOM	Some urban axes of the city of Oporto 2000-2008 (in Oporto)	A project of Commercial Urbanism, with interventions aimed at the modernisation of commercial units, the revitalisation of public areas and at the promotion of cultural animation.	Managing Organisations: Local administration and the Associative Commerce Structure (ACP) Other Agents: local and central administration (including regional and decentralised organisms), companies and merchants.	Component of intervention in public space: about 2,6 million euros
PORTO COM PINTA	Interventions focused on the 8 central parishes of Oporto 2001 -...	The rehabilitation of facades and the gables of buildings and monuments, made possible through the sponsorship of private companies and tax exemptions.	Managing Organisation: APOR Other Agents: local administration, proprietors of buildings and private companies.	In 2,5 years: Public Investment (exemption of taxes): approximately 0,06; Private Investment: approx. 0,48
PORTO DE PARTIDA	The Historical Centre of Oporto (4 central parishes) 2001-2004	The creation and consolidation of companies and jobs with particular emphasis on the inclusion of vulnerable groups. Animation and training activities.	Managing Organisation: A development partnership Other Agents: local administration, International public partner and private entities (including associative structures as well as the local community), the potential creators of companies/jobs	The second phase: (the implementation of the project) involved about 0,31 million per year)
PORTO FELIZ	District of Oporto 2002-2007	A socio-sanitary intervention in case of extreme social exclusion, the reinforcement of security matters and sensitization of public opinion	Managing Organisation: Local administration (FDSP) Other Agents: The local and central administration (including regional decentralised organisms) and local public entities (hospitals, universities), beggars, the homeless and drug addicts.	In 4 years: Aprox. 1,7
PORTO VIVO	A Priority Intervention Zone (a subclass of the 8 central parishes) 2004 - ...	The promotion of urban requalification, through strategic and urban planning and the facilitation (in terms of awarding licenses, expropriation, rehousing and rehabilitation) of the intervention of private agents.	Managing Organisation: Porto Vivo SRU Other Agents: Central administration, local administration, building owners, tenants and private investors.	No values are available at this time.
PORTO DIGITAL	Oporto Municipality (some of the sub-projects: the entire metropolitan area) 2004-2007 (Managing Association continues to carry out its duties despite the end of the project)	The promotion of the use of information technology in education, companies and the public administration.	Managing Organisation: The "Porto Digital" Association Other Agents: Over 40 public and private partners including the local administration, other public entities in addition to business-related associations.	In the 30 months of the project's existence: Approximate amount of public investment: 3,45 Approx. private Investment:. 0,48

2.2 The internal functioning of the programmes

The evaluation framework takes into account four distinct types of analysis in terms of the internal functioning of the initiatives: i) the analysis of diversity, ii) the analysis of interaction, iii) the analysis of selection processes and iv) the analysis of results. The main elements resulting from these analyses will now be presented.

i) Analysis of diversity

The analysis of diversity aims to describe the diversity of the participants in each of the interventions, the transformations of that very diversity throughout the decision making processes and the existence and quality of the participation processes. It also seeks to understand the diversity of the actions associated with each of the programmes as well as the alterations verified in terms of the range and the types of activities that were developed. Table 2 provides a summary of the main elements that characterise the diversity in terms of the internal functioning of the programmes.

Various levels of diversity of the agents involved in terms of each initiative have been registered. It should be noted that the more "physical" programmes, as is the case of those which are directed at urban rehabilitation, each present a smaller range of actors in comparison to the initiatives which are directed at the so-called "immaterial" issues (such as Porto Feliz, Porto de Partida and Porto Digital), in which the range of the actors involved is more diversified.

One can also verify the predominance of public entities over elements of the local community. In a more detailed analysis of the various agents involved in each of the initiatives, the local administration comes forth as being an omni-present actor, but also as a complex actor with multiple organisation structures. The information obtained reveals that the "City Council" is often referred to as being an agent (Porto Digital). In other cases one of the City Council's departments is referred to (RECRIA), a municipal foundation (Porto Feliz) or some other organisational structure partially or completely controlled by the City Council (Porto com Pinta) have been referred.

On the other hand, a strong presence of the central administration in a number of the programmes reveals the importance of the central state when it comes to local investments, control procedures and the definition of agendas. Several of the programmes which were analysed (RECRIA, PER, URBCOM, Porto Vivo, Porto Digital), correspond to initiatives of the central administration or result from such initiatives, through the creation of specific legislation. However, one should note that this heavy presence of the central administration reveals a segmented rationality, resulting from the presence of various organisations, some on a national level and others which correspond to decentralised services performed at a regional level.

This co-existence of "leaderships" of central and local level, in addition to the relative fragmentation of institutional structures of the central and local administration, represent the most distinctive characteristics of the existent system of public actors, whose dominant representation has already been referred to.

Table 2. Analysis of diversity (internal functioning)

	Diversity of actors	Forms of participation	Diversity of actions
RECRIA	Central administration, local administration, landlords (and construction companies), tenants. Changes related to the re-organisation of the central administration's intervention in housing.	An apparent absence of mechanisms of participation: access conditions regulated by law. At the beginning, some landlords were involved in a "coercive" manner (brought about by the local administration or by the tenants).	Rehabilitation of buildings and temporary rehousing of households.
PER	Central administration, local administration. Changes related to the reorganisation of the central administration's intervention in housing; throughout the time, diverse models of organisation of local administration's intervention.	An apparent absence of mechanisms of participation. In Oporto, the involvement of non-profit social organizations (which was foreseen by the law as a possible complement of local administration's intervention), did not occur.	Demolition of shanties. Construction and acquisition of dwellings, rehousing of families (including the possibility of support of housing acquisition by the households involved).
URBCOM	Local administration, central administration (including decentralised departments), local business associations, small and medium sized commercial units, "external" actors as suppliers of services (consultants)	Surveys and public consultation mechanisms during the elaboration of the proposal. In Oporto, a special unit for the management of the entire programme was not created	Modernisation of commercial units. Interventions in the public space. Street animation.
PORTO COM PINTA	Local administration (mainly through a local public-private agency for urban development), building owners and publicity companies.	Direct negotiations with the main agents	Rehabilitation of façades and of monuments. .
PORTO DE PARTIDA	Private companies, non-profit organisations, local administration, international partner. Changes related to the re-organisation of the local administration's intervention in the historical centre of Oporto.	Public presentations and work sessions with local agents.	Support to job creation and training, street animation, simplification of administrative procedures.
PORTO FELIZ	Local administration (through a Foundation), central administration ((including decentralised departments), other public organizations (hospital, university).	Inquiries carried out amongst the beneficiaries and telephone surveys directed to the community.	Socio-sanitary intervention (including professional training and support to job creation), reinforcement of security and sensitization of public opinion.
PORTO VIVO	Partnership between local and central administration. Private and public companies, building owners, real-estate developers. Other suppliers of services (consultants).	Public presentations and negotiations with private agents.	Facilitation of building and urban rehabilitation, simplification of administrative procedures.
PORTO DIGITAL	Local administration, local business associations, and a number of public and private entities, involved in sub-projects.	No information is available at the present time.	Improvement of computing and communication infrastructures, promotion of the use of Internet, support to job creation, modernisation and simplification of administrative procedures, cultural animation.

Alterations in terms of the roles of the actors involved are frequent and result primarily from the re-organisation of public administration actions and structures. The particular case of the PER programme elucidates these processes. It allows us to verify alterations associated with the re-organisation of the intervention of the central administration in the housing domain, and the presence and posterior fusion of two public Institutes. It is also possible to verify alterations

throughout time in the intervention models of the local administration: in the beginning this model is based on different municipal departments; a specific work group is then created for the development of the programme; this responsibility is later transferred to a municipal company which adopts various successive designations and scopes of action.

As for the participation mechanisms, one is able to verify their diversity which promotes different concepts or forms of participation. On the one hand, initiatives which promote an “active” participation, and which involve local agents and beneficiaries as far as the development of intervention strategies are concerned (eg. Porto de Partida) are to be found. On the other hand there are initiatives which promote a “passive” participation and which solely involve communication mechanisms based on the dissemination of studies (e.g. URBCOM). It is also possible to refer to certain forms of “coercive” participation (e.g. RECRIA).

Generally speaking, each initiative does not present a significant level of internal diversity in terms the intervention dimensions. As exceptions, one can refer the initiatives which place a greater emphasis on “immaterial” actions (e.g. Porto Digital). This illustrates how sectional approaches are more common than approaches composed of different integrated dimensions.

ii) Analysis of interaction

The analysis of the interaction in the process seeks to understand the interactions observed within the scope of each initiative, both in terms of the agents involved (partnerships, internal interactions in organisations and work relations amongst actors) and the articulations among the actions themselves. Table 3 synthesises the main elements that characterise the interaction of the internal functioning of the programmes.

The interviews that were carried out revealed several types of coordination or implementation structures, with different levels of formality. Some were based on dedicated institutions, such as in the case of the APOR organisation (Porto com Pinta) which has a majority of municipal capital, or the Porto Vivo SRU society which was the direct result of a partnership between the local and central administration (Porto Vivo). Others were based on specific contracts such as the URBCOM, RECRIA and PER programmes. However, various situations occurred in which the interactions among agents or institutions were referred to as being less formally motivated and more dependent on personal relations (e.g. Porto de Partida), or even on external entities to the programme (e.g. the role of the University in Porto Feliz).

Table 3 presents the importance of the concept of partnerships in the development of the initiatives under analysis. The predominance of public-private and institutional relationships which were created among different public organisations (e.g. Porto Feliz) is to be felt, although there are also social partnerships which involve the participation of local associations (e.g. Porto de Partida). Apart from direct participation in a number of these partnerships, the central government also has, as has been previously noted, a significant and general influence over the formatting of the organisational choices, which have been enacted by law for the creation and regulation of partnerships which form and initiate the programmes.

Table 3. Assessment of interaction (internal functioning)

	Existence of partnerships	**Articulation amongst agents: interactions of the main development agent**	**Articulation amongst actions**
RECRIA	Institutional partnership (between the central and local administration) and a social partnership (between the public administration, landlords and tenants), initiated by specific national legislation.	With local and central administration structures and with private agents (landlords).	High level of articulation.
PER	Institutional partnership (between the central and local administration) initiated by specific national legislation.	With local and central administration structures and with private agents (building companies).	High level of articulation.
URBCOM	Institutional partnership (between the local administration and a private association), subject to control by the central administration, and social/business-related partnerships (among beneficiaries and private associations) initiated .by specific national legislation.	With local and central administration structures, and with public and private companies (commerce).	Actions are interdependent at a financial level but there is an apparent low level of coordination.
PORTO COM PINTA	Public-private management partnership (through a company with a majority of municipal funds)and a public-private operational partnership (between the local administration and private parties).	With local and central administration structures, and with private agents (building owners, publicity companies).	Non-applicable: an intervention of a one-dimensional character.
PORTO DE PARTIDA	Development partnership (between the local administration and private entities including an associative structure).	With local and central administration structures, and with local associations and private companies.	Articulation difficulties arising from coordination problems among entities were referred to.
PORTO FELIZ	Collaboration agreement between the central and local administration and local private entities.	With local and central administration structures and other public and private entities.	High level of articulation.
PORTO VIVO	Institutional partnership between the central and local administration Specific operational partnerships with other private or public entities.	With local and central administration structures, local associations and private companies.	High level of articulation is to be foreseen.
PORTO DIGITAL	Diverse partnerships between the local administration, business associations and a large group of other public and private agents.	No information is available at this time.	Some sub-projects are highly interdependent. However, there is no information on their overall coordination.

In practically all of the interventions, it was possible to register multiple interaction intensities between the agent who was responsible for the implementation of the project in the field and other agents. These interactions are particularly strong when it comes to the actors linked to the implementation of the interventions. The high level of interdependency among specific actions in each initiative is, without any doubt, the factor that promotes such intensity. This means that the capacity of interaction is facilitated by the relative sectoral nature of the programmes, in other words, by the relative homogeneity of the dimensions of intervention found in each programme.

According to the agents interviewed, the interaction intensity between agents associated with each initiative does not often remain constant throughout time. It evolves so as to become more intense (e.g., DMU-CMP and Porto Vivo in RECRIA), or alternatively less intense. Various causes are associated to these variations which may be maintained by conflicting relations between agents and institutions (e.g. URBCOM), by the development of (more integrated) functionalities within the scope of specific institutions, but also due to the development state of the programmes. The “time factor” presents itself as an important factor in terms of the “internal” opportunities of interaction and in their (greater or lesser) stability.

Generally speaking, a high level of articulation between actions in each initiative is to be noted. This articulation is facilitated by the existence of less diverse intervention dimensions as far as the initiatives are concerned.

iii) Analysis of selection

The analysis of selection in the process seeks to study the choice mechanisms between different opportunities and ideas, the choice criteria of projects for the programmes and the choice of the development structure for the interventions. Table 4 synthesises the main features of the selection mechanisms in the internal functioning of the programmes.

In a number of cases, the definition of the problem is brought about by the physical space rather than the targeted individuals (the cases of Porto Vivo, Porto com Pinta, RECRIA, or even URBCOM). In other cases the inverse situation is to be found (the cases of Porto Feliz or of Porto Digital). In some cases, the definition of the problem, opportunities and of the agents to be involved is done on a national scale and regulated through general legislation (the cases of RECRIA, PER and of URBCOM). Alternatively, in a number of other cases this definition is developed by institutions in the field, assuming a definite local scope (the cases of Porto com Pinta, Porto de Partida, Porto Feliz, Porto Vivo, and Porto Digital), despite the fact that it may have the supervision – and financing - of supra-local instances. The development of studies is also a source for the definition of problems, opportunities and agents (e.g. Porto Vivo). The “technical” identification of problems, priorities and beneficiaries predominates. Therefore, this process is primarily developed in the political spheres and in specific public/private organisations/institutions. In the majority of the cases a strategic vision for the territory shared by the agents and the communities targeted by the interventions does not seem to have been previously defined.

iv) Analysis of results

This evaluation dimension seeks to identify conventional results (direct and tangible), in addition to less conventional results (indirect and intangible) associated to the development of capacities and learning processes for the agents involved in the initiatives.

The precise quantification of direct results is not always an easy process. This is due to a number of reasons such as the absence of previous quantification of objectives and results as well as the lack of tracking mechanisms directed at obtaining and continuously analysing data. Based on the information obtained from the agents one can say that each initiative – considered as an isolated case - is not very diversified in terms of results However, the diversity of results gains significance when considering the initiatives as a group.

Table 4. Measurement of selection (internal functioning)

	Choice of projects	Definition of problems, opportunities, agents and vision
RECRIA	Based on legislative criteria: the conformity to legal requisites implies the selection of projects. Recently, priority has been given to interventions under the actions of the Porto Vivo SRU.	Importance of the national legislation which defines the programme. An implicit strategic vision for the territory was not identified.
PER	Identification of the population in need of rehousing based on legislative criteria. Model for the construction/rehabilitation of housing based on a strategic study and on the analysis of previous processes.	Importance of the legislation which defines the programme and of a study developed during the operational phase of the programme (with a strategic vision for the territory).
URBCOM	Based on legislative criteria and on a strategic study.	Importance of the legislation which defines the programme. An implicit strategic territorial vision has not been identified.
PORTO COM PINTA	Based on physical and locative criteria related to visibility conditions.	The model of intervention is based on a programme which was implemented in Barcelona. An implicit strategic territorial vision has not been identified.
PORTO DE PARTIDA	Based on criteria related to the "novelty" and "consistency" of projects.	Importance of the European EQUAL project and of a study carried out by the university. A territorial vision shared by the agents involved in the programme was not created.
PORTO FELIZ	Based on criteria defined by studies and on the personal evaluation of technicians: the importance of the concept of extreme social exclusion.	Importance of the visibility of the "beggar" problem and of the political position which was adopted in the face of this problem An intervention model based on a study by the university. An implicit strategic territorial vision has not been identified.
PORTO VIVO	Based on general criteria specified by legislation, on more casuistic criteria (opportunity, visibility) and on general strategies defined by studies.	Importance of legislation which supports the programme and on studies developed within the initiative's ambit. Strategic territorial orientations defined in two studies (by the University and by the managing entity of the programme).
PORTO DIGITAL	Based on criteria derived from the objectives of a governmental programme (POSI),within the ambit of the III CSF.	Definition of problems and opportunities based on a plan of action and a governmental programme. An implicit strategic territorial vision has not been identified.

As far as the less-conventional results are concerned, in a majority of the cases the agents involved referred an increase of knowledge about the territory where they had worked in. This learning process not only included the characteristics of the territory, but also the manner which they evolved in relation to specific solicitations/ interventions. In many initiatives, the importance of acquiring knowledge about the operational conditions of the interventions should also be referred to. The creation and/or the reinforcement of the relations between agents (e.g. Porto com Pinta) should also be noted, even though, in some cases, these relations depended on factors of a more personal than institutional nature (e.g. Porto de Partida).

Some secondary effects in several of the initiatives have been responsible for local multiplication effects (e.g. RECRIA) or alternatively, for ideas for new projects (e.g. Porto com Pinta). Some programmes also produced "subproducts" which may be considered as being indirect results such as contact databases and territorial diagnoses (e.g. Porto de Partida).

2.3 External articulation

In the same way as in the analysis of the internal functioning of each initiative, the evaluative framework takes into account four distinct dimensions of analysis of the articulation of each initiative with the exterior: i) analysis of diversity, ii) analysis of interaction, iii) analysis of selection and iv) analysis of results. Hereafter the main elements resulting from these analyses are presented.

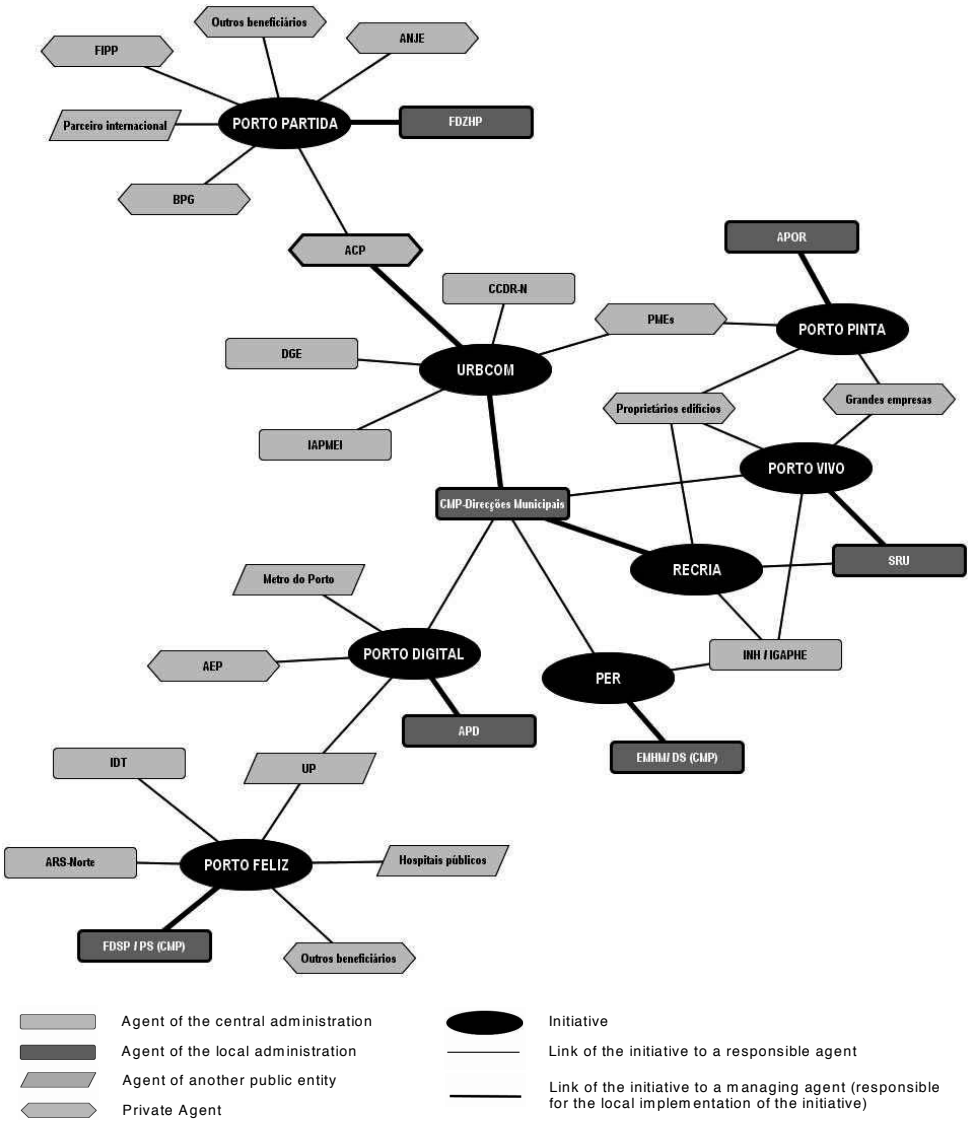

Figure 1. Network of programmes and responsible actors

i) Analysis of diversity

This dimension of evaluation takes into account the diversity of agents and actions of each initiative in relation to the agents and actions of the other initiatives.

The diversity of active agents in the territory is not a constant factor: as each initiative is launched or brought to an end, that same diversity varies. Figure 1 illustrates various overlaps of the actors responsible for different programmes. It should however be noted that these overlaps are conditioned by the periods during which these programmes were implemented: they have a specific temporal ambit. Finally, one should stress the fact that the municipality (the local administration including its sub-structures) represents the actor with the majority of overlaps in terms of the interventions which were taken into consideration.

As far as the diversity of the actions is concerned (see table 5), one notices the fact that this exists mostly because each intervention includes at least one type of action that has not been considered in the remaining initiatives. Generally speaking, each initiative also presents actions of an identical nature to those in the other initiatives, even if the focus and the conditions associated with these actions may vary significantly. This is the case of the actions directed at the rehabilitation of buildings, which are at times defined by the forms of occupancy (as in RECRIA, focused on rented housing), the presence of commercial activities (URBCOM), special visibility conditions (Porto com Pinta) or certain location criteria (Porto Vivo).

Table 5. List of the various dimensions of intervention by initiative

	PER	RECRIA	URBCOM	PORTO PARTIDA	PORTO PINTA	PORTO FELIZ	PORTO DIGITAL	PORTO VIVO
Building Rehabilitation/Construction	■	■	■		■			■
Intervention in public space			■					
Socio-sanitary intervention						■		
Rehousing of households	■	■						
Support to job creation				■		■	■	
Cultural/ Street Animation			■	■			■	
Dinamization of business			■	■				
Promotion of the use of the new technologies							■	
Simplification of administrative procedures				■			■	■
Sensitization of public opinion						■		

Regarding each of the initiatives, apart from actions with an identical - and therefore complementary - nature, the presence of a set of actions with distinct but also complementary

nature should be noted. For example: the actions envisaging the simplification of administrative procedures developed by the Porto Vivo programme may contribute to objectives of rehabilitation of buildings present in other programmes (RECRIA, URBCOM, Porto com Pinta). It should however be stressed that the actions of different programmes are rarely conceived and implemented at the same time. Therefore, the timing of the interventions is a critical issue in the definition of complementarities and intervention opportunities.

ii) Analysis of interaction

This evaluation dimension seeks to analyse the inter-connections between agents and the actions of each initiative, as well as the agents and actions of other initiatives. Table 6 is a summary of the main elements resulting from such an analysis.

Generally speaking, it is possible to observe that the existing connections between the agents of each programme and the agents of other initiatives are strong, although they are conditioned by the periods of time in which the programmes were put in action. This demonstrates that there were various opportunities for the sharing of information, and for the articulation of different initiatives. However, these interactions mostly represent a mere functional relation, derived from the presence of those very entities in various initiatives, which was related to the implementation of the interventions. Thus, despite the fact that this analysis is based on the opinion of those who were interviewed, as well as on the significance that they attributed to the connections previously referred to, it seems safe to state that the high density of this type of connections (those developed within the scope of “articulation with the exterior”), do not represent the existence of sharing processes for the articulation of different initiatives from a strategic coordination perspective and also of the valorisation of complementarities. The communication capacity amongst the wide diversity of agents is therefore limited.

Thus it was not possible to observe the existence of significant articulations between the initiatives in terms of the strategic coordination of actions. The few cooperation efforts between initiatives that took place occurred among programmes with similar dimensions (e.g. RECRIA and Porto Vivo). As for obstacles raised to the integration of the initiatives, it is necessary to stress the impossibility of accumulating financial aid (which may inhibit the development of forms of participation from the start) in addition to the existence of conflicts and political/personal changes (which, in turn limits the capacity of communication between agents).

Table 6. Analysis of interaction (external articulation)

	Co-ordination of actions
RECRIA	Articulation attempts with the actions of Porto Vivo. Importance of complementary fiscal aid (exterior to the programme). Coordination obstacles: programme support can not be cumulative with other programmes.
PER	Articulations with other interventions are not defined. Coordination obstacles: programme aids can not be cumulative with other programmes.
URBCOM	Relevant articulations with other interventions are not defined. Porto de Partida considered studies which were developed in early phases of URBCOM. Coordination obstacles: the existence of possible political/personal conflicts.
PORTO COM PINTA	Articulation attempts with the actions of Porto Vivo Coordination obstacles: interconnections with the RECRIA programme were not possible due to the impossibility of accumulating funds/aids.
PORTO DE PARTIDA	Relevant articulations with other interventions are not defined. Porto de Partida considered studies which were developed in early phases of URBCOM. Some articulation with other EQUAL projects in Porto. Coordination obstacles: attitudes in relation to other initiatives geared a lack of interest in articulating
PORTO FELIZ	Relevant articulations with other interventions are not defined. A reference is made to the fact that an attempt was made to articulate with the actions of entities who work with the homeless. Coordination obstacles related to political change and to organisational change.
PORTO VIVO	Strong connections with programmes for building rehabilitation (the RECRIA programme among others).The connection with the Porto Digital programme was also referred to.
PORTO DIGITAL	A connection with the Porto Vivo programme was referred to.

iii) Analysis of the selection processes and results

These evaluation dimensions are linked to the understanding of the reasons behind the choice, made by the financing entities, of each initiative in relation to alternative possibilities, and of the identification of possible effects of the system which resulted in the integration of actions and initiatives.

From the collected documentation and the interviews that were made, it was difficult to find information that could answer these questions. On the one hand, this is due to the fact that the coordination of the various initiatives was not very significant. On the other hand, the inexistence, as well as the fragility, of the mechanisms which accompanied the various initiatives, made the construction of indicators which permitted the analysis of the effects of the system a difficult task. One must also take into account that several of these initiatives were of an incipient nature. Thus, it is premature to make conclusions related to sinergetic effects.

2.4 A strategic vision of the territory

The fourth dimension of the evaluation framework is connected to a strategic vision of the territory. One seeks to understand if such a concept did in fact exist, and if so, what the process that brought it into being was like.

As previously mentioned, in many cases a strategic territorial vision, shared by the agents involved in the interventions, does not seem to have been created. In the vast majority of the cases, the initiatives sought to provide answers for specific problems or opportunities: the problems

resulting from the legislation that regulates the renting of housing (as is the case of the Recria programme); problems of the sector of commerce (the URBCOM programme), socio-sanitary and security problems identified by the Porto Feliz programme; opportunities of relations between individual decisions of investment in buildings and advertising (the Porto com Pinta programme).

There are a number of situations which are exceptions (e.g. Porto Vivo and PER) in which visions for the territory were developed to support interventions, through the realisation of strategic studies which provided suggestions as to the priority intervention territories and the most adequate intervention models for each specific case. However the fact that these visions were created does not necessarily mean that they have been shared among the agents involved in the initiatives. One should also stress the influence that external agents can hold over the initiatives through the development of strategic studies.

2.5 Results: signs of innovation and knowledge

The attention given to the results, both direct and indirect, of the programmes, will now be analysed from the perspective of the construction of collective capacities, which in turn, requires the valorisation of signs of innovation and learning, as well as the potential effects of the system resulting from the articulation of actions and actors.

In relation to this last aspect, the scarcity of collaborative capacities amongst the initiatives, and the limited communication capacity among the wide range of actors, as far as the sharing of information and knowledge regarding the articulation of the different activities (from a perspective of strategic coordination and of the valorisation of complementarity) is concerned, does not allow for the current and potential existence of collective capacities.

It should be said that “binary” leadership (at the level of the central and local state) which accompanies the development of the various programmes, in addition to the relatively mutable (and thus unstable) nature of the institutional structures, are factors which condition the creation of system effects. However, the very fragmentation of the agents of the various programmes and the manner in which they are carried out according to an extremely functionalist logic, associated to the undervaluing of continuous evaluation processes undermine dynamics of collective action. It is however necessary to admit the existence of innovation and knowledge signs, associated with specific initiatives (the cases of RECRIA, Porto com Pinta, and of Porto Vivo have already been highlighted). On the other hand, in a majority of the initiatives, an increase of knowledge in relation to the territory of action has been referred to. This knowledge reflects itself in a better understanding of the characteristics of the territory, but also in the way how specific actions were carried out in the territory.

However, the specificity of these situations as well as the absence of broader signs of the accumulation of knowledge along with a reflexive capacity is by no means sufficient for one to acknowledge the existence of collective experimentation and learning capacities.

3 Conclusions

A central issue of the research presented in this paper was the evaluation of forms of articulation between actors and urban policy instruments, and the comprehension of the reasons underlying those interactions. The goal was to evaluate the mechanisms that allow, or not, the construction of collaborative capacities, and situate innovation and learning factors in such process.

Different urban policy initiatives involving a high diversity of objectives and actors and focusing on local urban regeneration issues were analysed. This analysis has taken into consideration a set of dimensions, basically related to the internal operation of the initiatives and their external articulations (taking into account the diversity, the interaction, and the selection in the processes), as well as the identification of learning processes.

The study has shown, as a main evaluation outcome, the difficulty of achieving learning regarding the building up of collaborative capacities, despite the proven existence of a wide diversity of actions and actors, and of connections between them. It was concluded that these two dimensions – diversity and interaction – are not enhancive enough for learning and collaboration, and that the mechanisms of choice between different opportunities and ideas – i.e., the processes of selection in the definition of initiatives and in the criteria that inform decisions – undermine the accumulation and exchange of knowledge.

The reasons for this situation were identified. Problems were mentioned, related to the fragmentation and instability of government structures and the emergence of new institutional configurations. These findings underline the fact that the instability of the actors and of institutions constitutes a serious obstacle to joint work and knowledge sharing.

Problems were also identified in the sphere of relational capacity, in other words, in the relations between institutions and actors. On one hand, the critical role of the relationships between central and local levels of government was noted, associated to a “shared” leadership of programmes and institutions. It was underlined, as well, the inflexibility and, at the same time, the instability interactions between actors and programmes: they oscillate between “mandatory” forms of cooperation (obeying to strictly technical criteria, legislative criteria or financial criteria), and the promotion of very particular interests (as the concern with specific and partial aspects of the problem, the restrictive selection of the network of actors to be involved, or the search for immediate results). It was also observed how the undervaluing of continuous evaluation procedures – well present in the nearly inexistent organised information for the monitoring and continuous appreciation of results – reflects itself on the limited capacity of information sharing for the articulation of different initiatives.

Finally, problems associated with the conditions of convergence of the different programmes were identified. On one hand, these are associated to the length of the programmes, i.e., to the importance of the “time” factor in making possible opportunities of interaction and learning between different programmes and actors. On another hand, they are also related to the fragmentation of agendas of the various programmes, i.e., to the inexistence of a global vision capable of connecting problems, programmes, projects and resources in a strategic form.

These aspects constitute general lessons regarding the challenge of articulation or integration of urban policies at a local level. They show that the combined action of i) institutional

instability, ii) the forms of relationship between central and local government levels, iii) the rigidity and instability of interactions between actors and programmes, iv) the unequal length of interventions, and iv) the undervaluing of evaluation procedures , compromise the reflexive learning and the enhancement of collaborative capacities.

References

Andersen H T, Van Kempen R (2003) "New trends in urban policies in Europe - evidence from the Netherlands and Denmark" *Cities* **20** (2) 77-86.

Breda-Vázquez I, Conceição, P and Móia, P (2007) *Avaliação para a integração de programas e políticas urbanas: uma proposta metodológica*, Relatório Final, Faculdade de Engenharia da Universidade do Porto, Porto.

Booher D and Innes J (2002) "Network Power in Collaborative Planning" *Journal of Planning Education and Research* **21**, 221-236.

Cochrane A (2003) "The new urban policy: towards empowerment or incorporation? The practice of urban policy" in R Imrie, M Raco (Eds) *Urban renaissance? New labour, community and urban policy* The Policy Press, Bristol: 223-234.

Healey P (2006a) "Territory, Integration and Spatial Planning", in M Tewdwr-Jones, P Allmendinger (Eds) *Territory, Identity and Spatial Planning: Spatial governance in a Fragmented Nation* Routledge, London: 64-79.

Healey P (2006b) "Transforming governance: Challenges of institutional adaptation and a new politics of space" *European Planning Studies* **14**(3) 299-320.

Healey P (2007) Urban *Complexity and Spatial Strategies: Towards a Relational Planning for Our Times* Routledge, London and New York.

Imrie R and Raco M (2003) "Community and the changing nature of urban policy", in R Imrie, M Raco (Eds) *Urban renaissance? New labour, community and urban policy* The Policy Press, Bristol: 3-36.

Innes J and Booher, D (2003) "The Impact of Collaborative Planning on Governance Capacity", *Annual Conference of the Association of Collegiate Schools of Planning* (Institute of Urban & Regional Development IURD Working Paper Series, University of California, Berkeley).

Palermo P C, Pasqui G, and Savoldi P (2002) "Strumenti di Programmazione e Pianificazione Territoriale Integrata" http://nuval.formez.it.

Evaluation in urban planning: from theory to practice

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The first part of the paper addresses a number of key issues of the debate in planning evaluation. The second part focuses on the design of the Plan-Process-Results (PPR) methodology and on its application to the current planning process in Oporto. After the identification of the main contributions from the literature review, the fundamental elements of this methodology are made evident – the generic and specific criteria, the evaluation questions, the assessment techniques, and the data sources. Oporto planning process, built around its land use plan, is appraised according to rationality, conformance and performance, and a number of proposals are presented to improve it. The paper is concluded highlighting the idea that it is possible to design and apply a planning evaluation methodology, with an emphasis on urban form analysis. The assessment results contribute to enhance the quality of the urban plans, as well as the local planning processes and the built environments they are expected to shape.

Keywords: planning-evaluation, evaluation methodologies, plan, planning process, city

1 Planning evaluation theory

The first part of the paper addresses a number of issues from the debate on planning evaluation: the need for and the integration in the planning process; the timing of the evaluation; the conceptions of success in plan implementation; the relationships between plan concept and evaluation methodology; the evaluation questions, the criteria, and the indicators; the presentation of the evaluation results and their subsequent use by decision makers; and finally, the relationships between theory and practice in planning evaluation.

1.1 Evaluation in the planning process

The evaluation of planning practice is a complex but most necessary exercise (Alexander, 2006a; Alexander and Faludi, 1989; Baer, 1997; Brody and Highfield, 2005; Brody et al, 2006a; Gilg, 2005; Talen, 1997; Laurian et al, 2004a). The promotion of an evaluation exercise focused on the planning products or processes should carefully consider all the difficulties of this task, taken as a whole or approached through its different parts – the articulation between the type of evaluation and the products or processes under appraisal; the definitions of the evaluation questions, criteria and indicators; the definition of the data sources; the presentation of evaluation results; and the recommendations for the use of these results. Alexander (2006a) defends that the complexity in planning evaluation is mainly due to three fundamental aspects. The first is the inherent complexity of the evaluation subjects, such as policies, plans, projects, contexts, actors and affected parties, as well as of the evaluation process, involving different theories, methodologies, actors, concepts, tools and techniques. The second is the *inter-subjectivity* that somehow undermines the legitimacy of findings and conclusions that are objectively derived. The third is the uncertainty of planning, as an activity that deals with the unknown future.

If planning intends to have any credibility as a discipline or as a profession, it should be possible, through a systematic assessment, to have a real judgment of planning effectiveness (Alexander and Faludi, 1989). *Good* planning, or *good* plans, should be distinguishable from *bad* planning and *bad* plans (Alexander, 2002; Alexander and Faludi, 1989; Baer, 1997). Furthermore, it should be possible to conclude that a plan is too weak to be implemented (Alexander, 2002).

It should be possible for planners to validate the importance of the preparation of plans, determining, after its adoption, if they have any impact on the territory or on the community (Brody and Highfield, 2005). Only in this way, the comments of planners and theorists on the success or failure of plans will move from relying on simple assumptions to more structured empirical assessments (Laurian et al, 2004a). The difficulties, the uncertainties, and the complexity of planning evaluation, offer a context of limited rationality, in which evaluation conclusions have to be carefully bounded.

Although planning and evaluation should be two inseparable concepts there is, currently, as indeed three decades ago when Lichfield et al (1975) raised this question, a deficient integration of evaluation in the planning process. In a more recent review of his seminal study from the seventies, Lichfield (2001) raises some key issues: the evaluator should be, right from the beginning, a member of the planning team; the evaluation processes and criteria should be decided together with that team; the evaluation criteria should also be the design criteria; the required information for the evaluation exercise should be decided in the beginning of the process; on-going evaluation methodologies improve plan implementation and eventual adjustments throughout that process; and, finally, ex-post evaluation analyses if plan policies are being implemented and if the ex-ante evaluation methods are in fact suitable, contributing to their enhancement, if necessary.

The position of Lichfield (2001) about the relationships between the evaluator and the planning team is not consensual in literature. Undoubtedly, there are advantages, but also disadvantages, in the integration of the evaluator in the planning team. The main advantages of an internal evaluation are fourfold: a greater knowledge on the specific institutional context, a greater probability of adopting the final recommendations, a reduced possibility to look at the assessment exercise as a threat to the institution and, eventually, a reduced use of financial resources. The major disadvantage is the tendency to avoid negative conclusions and to accept the conventional line of thought. The main advantages of an external evaluation may be a greater objectivity in the evaluation, and the facility of external hiring during short periods of time. The most important disadvantages mirror the main advantages of an internal exercise. This reflection should also consider two different possibilities, a mixed evaluation, and an internal assessment prepared by an evaluator independent from the planning team.

The type of evaluation should be chosen according to each specific context. Nevertheless, we believe that an internal evaluation undertaken by an evaluation team independent from the planning team gathers the most interesting conditions for a successful exercise. The existence of two different teams should not hinder the development of synergies or common decision taking. As such, the design criteria should be the evaluation criteria. Archibughi (2006) sustains that *self-referentiation* and the use of assessment criteria divergent from the initial plan objectives is a major fundamental weakness of evaluation.

1.2 The timing of the evaluation

Despite the specific characteristics of each country's legal framework, the planning process is frequently oriented towards the preparation, implementation and revision of its main product, the plans (Lichfield and Prat, 1998). Each of these stages corresponds, or should correspond, to a particular stage in the evaluation process. Ex-ante evaluation occurs in the beginning of the planning process and it promotes the comparison of possible alternatives, in order to choose the best solution for further development. On-going evaluation takes place during plan implementation and its conclusions can lead to shifts in the planning process. Focusing on the plan results and on the use of resources, this kind of assessment requires a set of information that should be provided by an adequate data system. Ex-post evaluation occurs in the end of the plan implementation process and it focuses on the impacts of the plan. This type of evaluation reviews the whole process of preparation and implementation of the plan, and formulates a judgment about its success.

The literature on planning evaluation consensually sustains that the study of the on-going and ex-post dimensions has a rather reduced expression, when compared with the analysis of the ex-ante dimension (Berke et al, 2006; Brody and Highfield, 2005; Brody et al, 2006; Laurian et al, 2004a; Lichfield, 1996, 2001, 2003). Lichfield (2001) analysed the more recent developments of evaluation in planning, in relation to the evaluation of programmes. In the former, on-going and ex-post evaluation have a marginal role, whereas in the latter, ex-ante evaluation is usually devaluated, due to the alleged difficulties of social sciences in providing reliable forecasts. Accordingly, this British author challenges academics and professionals on both fields to compare their research works and methodologies.

1.3 Conceptions of success in plan implementation

Conformance-based evaluation means judging the success or failure of planning, using one or two criteria – the conformance degree between the outcomes on the ground and the plan proposals, and the promotion of planning goals and objectives through the available implementation instruments (Alexander, 2006d). This approach has been developed, among others, by Alterman and Hill (1978), Burby (2003), Chapin et al (2008), Brody and Highfield (2005), Brody et al (2006), Calkins (1979), Laurian et al (2004a, 2004b), and Talen (1996a, 1996b, 1997).

Performance-based evaluation follows from defining a plan as a decision framework (Alexander 2006d). The plan performance expresses its usefulness in filling this role. It is important to understand if, in what conditions, and how the plan was consulted for subsequent decisions. What happens to the plan is the key for its assessment (Faludi, 2000). Based on the work of Fudge and Barrett (1981), who have highlighted the differences between conformance and performance, the Dutch school of planning evaluation (Driessen, 1997; Lange et al, 1997; Faludi, 2000, 2006; Mastop, 1997; Mastop and Faludi, 1997; Mastop and Needham, 1997; Needham et al, 1997; Damme et al, 1997) has been developing this approach. In some few cases, studies on plan implementation explored the potentialities of an integrated use of both approaches (Alexander and

Faludi, 1989) and their simultaneous application for comparative purposes (Altes, 2006; Berke et al, 2006).

Alexander and Faludi (1989) distinguish three views on the planning process and the associated criteria to evaluate plan quality: planning as a control mechanism of the future, implying that plans not implemented indicate failure (Wildavsky, 1973); planning as a process of decision-making under conditions of uncertainty, when implementation ceases to be a criterion of success, and whenever it becomes difficult to provide rigorous criteria of the quality of a given plan (Faludi, 1987); and, an intermediate view, that still considers implementation important but assumes that, as long as outcomes are beneficial, departures from plans may be considered acceptable (Alexander, 1981). The Policy-Plan/Programme-Implementation-Process (PPIP), presented by Alexander and Faludi (1989), integrates these views and a number of elements that are not normally considered in an inclusive way, such as plan making, operational decisions, implementation, and the final impacts of the plan.

Altes (2006) compares the conformance-based and the performance-based approaches in a case study of the Dutch national urban concentration policies. An application of the former concept reveals that the urban containment policies conform well to the plan. Nevertheless, in the context of the current stagnation in housing production, these policies have not been able to improve the decision-making process. In this sense, the author argues that plans with high conformance can have bad performances.

In the same way, Berke et al (2006) explore and compare these conceptions of success in planning. These authors sustain that plan implementation in New Zealand is weak. If implementation is defined in terms of conformance, plans and planners have an important influence on the implementation success, but if the former is defined in terms of performance, plans and planners are less influential.

1.4 Plan concept and evaluation methodology

In the literature of planning and evaluation there are a number of solid contributions on the relationships between planning models and their specific evaluation methods (Alexander 1998; Alexander and Faludi, 1989; Baer, 1997; Khakee, 1998; Voogd, 1997). Despite its reduced expression in the literature, the analysis of the evaluation practice in real contexts provide some indications that confirm the importance of these relationships (Alexander, 1998; Khakee, 2003; Seasons, 2003). As a practical illustration Voogd (1997) realises the rejection of rational assessment methods in some exceptional planning arenas in Holland, where participatory and interactive approaches seem to be preferred.

One of the main challenges of evaluation lies on the lack of a single approach, valid for every situation (Rossi et al, 1999). The literature supports the idea that each evaluation situation possesses a number of specific characteristics that should shape the evaluation methodology. The evaluator should structure his methodology according to the specific nature of the situation, and should not follow, in a rigid way, a number of standardized procedures. In this sense, he should have a strong knowledge of the strengths and weaknesses of each available method.

1.5 The evaluation questions, the criteria, and the indicators

Rossi et al (1999) define *evaluation questions* as a set of questions – developed by the evaluator, the decision-maker and the main stakeholders – that identify the issues the evaluation will investigate and are stated in such terms that they can be answered in a way useful to stakeholders using methods available to the evaluator. The formulation of the evaluation questions is probably the most important aspect in the design of an evaluation methodology (EC, 1999; Rossi et al, 1999).

Evaluation criteria are strongly linked with evaluation questions. Despite the existence of several papers on evaluation criteria (Alexander, 2002; Alexander and Faludi, 1989; Baer, 1997; Berke et al, 2006), there is a generalised view that planning, as a profession, has not developed the necessary criteria to assess the quality of its main products and processes. A consensual position in the debate is that the plan concept – or the design criteria – should provide the criteria for the plan assessment. In the case of an internal evaluation, one of the necessary professional skills should be the ability to formulate evaluation criteria as well as to prepare goals and objectives for a plan (Baer, 1997). Alexander (2002) believes that professional planners are not the only ones needing substantive plan evaluation criteria, but also national planning systems to evaluate plans in the course of their review, dispute or approval. This would complement formal evaluation, usually based on conformity, with procedural norms.

An indicator produces quantified information to help actors of public interventions to communicate, negotiate or make decisions (EC, 1999). The literature on indicators is vast. Much of the research has emerged in the 1960s and 1970s and has been expanded in the 1980s and 1990s with the emergence of the concept of sustainable development (Seasons 2003a, 2003b). Simple indicator categories include economic indicators, social indicators and environmental indicators. These traditional categories were usually developed and applied in isolation, but in the 1980s this panorama has changed with the emergence of integrative approaches on themes such as sustainability, healthy cities, and quality-of-life. A third set - performance indicators - has its origins in performance measurement and management systems (Hoernig and Seasons, 2004).

1.6 The presentation of the evaluation results and their use by decision makers

In the end of the evaluation exercise results have to be presented to decision-makers and to stakeholders. At this stage, the tension between communication requirements and technical knowledge can become a critical issue. Most evaluation methodologies rely on a technical sophistication and an advanced scientific knowledge that may not be readily understandable by the decision-maker and the stakeholders. The evaluator must decide between maintaining the complexity and the technical detail, or introducing simplifications to facilitate the communication process. This communication should work on both directions. The evaluator needs to understand what kind of information is the most significant to each of the participants in the evaluation process. These are challenges that many evaluations fail to meet, even when their methods and procedures represent the best practices to date (Alexander, 2006c).

After the presentation of the results, the value of the evaluation exercise can be judged by the utility of the conclusions and recommendations. This topic has been the subject of significant

research work, particularly since the 1990s (Rossi et al, 1999), although not so much in the field of planning evaluation but rather in the field of programme evaluation. The literature on programme evaluation seems to agree on the idea that only in some few cases evaluation results are directly used to influence the contents of the programmes under assessment or the contents of subsequent programmes. In most cases the influence of the evaluation results is, at most, of an indirect nature and rather slow to emerge. Weiss (1999) adopts a decision-maker perspective to justify this fact, and argues that the search for the best or the wisest programme or policy might be only one of the reasons that can lead decision-makers to promote an evaluation exercise. But even when this is not their primary objective, decision-makers are often subtly influenced by evaluation, in what she calls a process of *enlightenment* (Weiss, 1999).

Several authors have been debating how to enhance the use of evaluation results. Ho (1999, 2003) proposes the refinement of a programme evaluation theory close to the model developed by Pawson and Tilley (1997). Patton (2002) argues that evaluators and stakeholders should, together and at an early stage, define the purpose of the evaluation, and the different ways to use the information that will be made available by the exercise. Rossi et al (1999) propose five guidelines for maximizing the use of evaluation results: i) evaluators must understand the cognitive styles of decision-makers; ii) evaluation results must be timely, and readily available when needed; iii) evaluations must respect stakeholders' programme commitments; iv) the subsequent use and dissemination plans should be part of the evaluation design; and, finally, v) evaluation should include an assessment of later utilization. Knaap (2004) argues that the actual use of the evaluation results can be enhanced by considering, as a starting point for the whole exercise, the stated assumptions and objectives of the plan or policy under analysis.

1.7 The relationships between theory and practice in planning evaluation

Generally speaking, there seems to be a gap between evaluation theory and practice (Khakee, 2003). So far, there is not an exact notion of the nature and extent of this gap because there are no systematic surveys on evaluation practice in local planning departments or planning agencies (Alexander, 2006a). Nonetheless, a reduced number of studies can provide a picture of the existing situation in some countries in Europe (Carmona and Sieh, 2005; Khakee, 2003; Lichfield and Prat, 1998; Voogd, 1997), in the Middle East (Alexander, 1998) and in North America (Seasons, 2003). These studies help us to understand the differences between evaluation research and practice, as well as the implications resulting from this gap, the factors that contribute to the application of evaluation in planning practice, and the possibilities to link theory and practice more effectively. Furthermore, five evaluation methodologies proposed in recent years should be highlighted: the Policy-*Plan/Programme-Implementation-Process* PIPP (Alexander and Faludi, 1989), the *Means for Evaluating Actions of a Structural Nature* (EC, 1999), the *Plan Implementation Evaluation* PIE (Laurian et al, 2004a, 2004b; Berke et al, 2006), and the methods proposed by Norton (2005a, 2005b, 2005c) and by Brody and Highfield (2005) and Brody at al (2006a, 2006b). These methodologies can be seen as alternatives or as complements to the more traditional ex-ante evaluation methods, such as Cost-Benefit Analysis, Planning Balance Sheet, Goals Achievement Matrix and Multicriteria Evaluation.

2 The Plan-Process-Results (PPR) methodology

2.1 Planning evaluation literature and the design of PPR

The proposed methodology, PPR, focuses on the plan, on the corresponding planning process, and on their contribution to city building (see Figure 2). Considering evaluation as a learning process, we intend to obtain a sound and substantiated judgment on the plan, but also a better perception of the overall working of the local planning system. The strong morphological dimension of PPR makes us believe that its application should be able to contribute to improve the quality of the built environment. Indeed, the results of the PPR application are expected to support the design of responsive proposals.

PPR reflects a number of influences from planning evaluation literature. PPIP constitutes, perhaps, its main influence. Both share a similar view of planning and of evaluation, and the definition of the most general criteria. PPR also shares with a wider set of methodologies the definition of the specific criteria and the use of particular techniques. Nevertheless, three innovative aspects distinguishes PPR from PPIP and, in fact, from a number of other methodologies: i) in comparison to PPIP, our methodology places a greater emphasis on urban form issues; ii) to the best of our knowledge, PPIP has not been applied to real case studies while PPR has already been applied to two urban plans in Portugal; and iii) in comparison to other evaluation methodologies, PPR proposes a higher number of criteria and of data sources. The next paragraphs present the PPR's evaluation criteria, the main data sources and assessment techniques, and the framework for the presentation of the evaluation results.

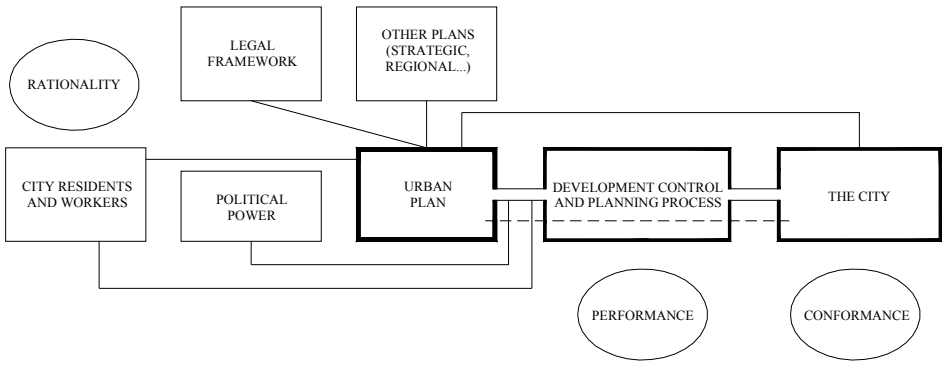

Figure 2. The PPR methodology

2.2 The evaluation criteria

The PPR methodology is composed of three generic criteria – rationality, conformance and performance – which, in turn, correspond to ten specific criteria. Five specific criteria are attached to the generic criteria of rationality. The first is the interpretation of the planning system that frames the preparation of the plan. It helps to explain differences between plans prepared in different time

periods and under different legal frameworks, and to identify elements of innovation and creativity in different plans prepared under the same legal framework. The second criterion is the relevance of the plan to the main stated needs and aspirations of the city. It involves the reconstitution of the existing situation during plan making and a comparison of this baseline situation with the main plan proposals. The assessment of the internal coherence corresponds to a robustness analysis of the linkages between the main parts of the urban plan, which, in the Portuguese case, normally are the objectives, the classes of space according to the dominant uses, the mechanisms for plan implementation, and the rights of way and planning restrictions. The fourth criterion is the external coherence. It focuses on the relationships between the plan under appraisal and other plans due to be implemented on the same territory. In this case, the main concern is to verify if plan proposals do not contradict or duplicate other planning proposals for the same city. The last specific criterion included in the generic criterion of rationality is participation in plan making. It involves a quantitative and a qualitative analysis of citizen involvement and an appraisal of the role of the local authority, encouraging or constraining this participation process.

In PPR the generic criteria of conformance is composed by two specific criteria, effectiveness and commitment of resources. The analysis of the former focuses on two different processes, plan implementation – through urban development or detailed plans or through urban design projects – and development control. Under the second criterion the analysis focuses on the planning staff and the financial resources available. The role and importance of the planning department within the local authority, the skills of the planning officials, and the way the plan is being used by these officials are analysed, in addition to the balance between capital and running costs as shown in the municipal budgets, and to the overall importance of planning issues as far as financial resources are concerned.

The generic criterion of performance is composed of three specific criteria, leadership (in the sense of direction), plan utilization and participation during plan implementation. The evaluation of leadership involves a comparison between two distinct scenarios: a hypothetical scenario of the city without the plan, and the existing scenario resulting from the process of spatial development framed by the plan. The focus is on four main issues, demography, transports and mobility, housing and economy. The second specific criterion focuses on the relationship between politics and planning and, more specifically, on the utilization of the plan by decision-makers. Similarly to the analysis of participation in plan making, the assessment of citizen involvement in plan implementation corresponds to a quantitative and qualitative analysis of this process, highlighting, in particular, the role of the local authority. The main difference is its focus on the most dynamic parts of the territory and not on the whole city.

2.3 The data sources

The application of the PPR to an urban plan involves the use of a extensive set of data sources: the urban plan documentation, other plans for the same territory, the newspapers, interviews to key actors involved in city planning, statistical information, the national planning system, the *real* city, in particular its physical aspects, a fair amount of planning applications, cartographic material, and other relevant documents prepared by the local authority. The data sources that are used in the

analysis of the largest number of criteria are the plan, the interviews, and the newspapers. Contrarily, the data sources used in the assessment of fewer criteria are the national planning system, the planning applications, the cartographic material, and other documents prepared by the local authority such as municipal budgets.

The time consuming nature of the analysis of newspapers and planning applications needs some attention. The evaluation of an urban plan using newspapers' articles as a data source involves the collection, cataloguing and analysis of a few thousand pieces of information. To enhance the use of, and the subsequent access to this information, a classification scheme was developed. Each article was classified according to four letters: the first letter represents the meaning of the event to the city (a strength, a weakness, an opportunity or a threat); the second classifies the event according to a number of themes; the third links the event with the territory; and the fourth letter represents an identifiable relationship between the event and city planning. This classification scheme has proved very useful in the cases already studied, particularly in the assessment of the relevance criterion. The assessment of effectiveness, and particularly of the effectiveness of development control, involves the analysis of a wide set of planning applications. This analysis focuses on ten main indicators that enable a characterization of new buildings, as well as of the development control process: the timings of the permitting process, the existence of negative decisions along this process, the plot area, the building coverage, the building area, the number of storeys, the number of dwellings, the land uses, a building ratio (building area/plot area), and a coverage ratio (plot area/building coverage). Finally, it should be mentioned that besides its specific techniques, the PPR uses a number of techniques well established in the planning and planning-evaluation fields, such as SWOT analysis and impact matrices.

2.4 The presentation and further use of evaluation results

This stage of the evaluation exercise raises some critical questions – the tensions between communication and technical knowledge, the articulation between the type of information presented by the evaluator and the type of information needed by the main stakeholders, and the effective integration of evaluation results in the dynamics of the planning process.

In PPR the presentation of results includes the use of two tables that aim to synthesize the whole process. We tried to make the reading of these tables as easy as possible, addressing the challenge made by authors such as Alexander (2006a) or Rossi et al (1999). The first table lists the specific criteria and related sub-criteria. A positive or a negative value is attributed to each one of the sub-criteria, and the sum of these corresponds to the final value of the associated criterion. The second table is built with the outputs of the first one and presents a judgement of each criterion, expressed by a letter. Letter D corresponds to a highly negative result, C to a negative result, B to a positive result, and A to a highly positive result. Each of these letters is associated with two possible degrees of confidence, determined by the difficulty of expressing a sound and substantiated judgement in face of the available data and techniques.

3 Evaluating Oporto planning practice

This section presents the application of PPR to the local land use plan of Oporto, the so-called *Plano Director Municipal do Porto* (PDMP). The empirical work was carried out between April and November of 2006, few months after the plan ratification.

After realizing the need for the introduction of changes in the PDMP of 1993, the Oporto City Council decided to suspend the plan and prepare the so-called *Provision Norms* (2000) and *Preventive Measures* (2002). According to the then national planning legislation, these transitory measures were intended to cover the period of preparation of the new plan. In this case, this preparation period took five years. The studies have started under the supervision of an external planning team that carried out the different stages of the planning process to the very end, the presentation of a first version of the plan to the City Council. In the meantime, a change in the presidency of the Local Council meant a change in the planning policies that had guided the preparation of the plan, giving raise to subsequent delays and the presentation of several versions of the final proposal, now under the responsibility of the Local Planning Department that, in the meantime, assumed the coordination of the plan. The plan was finally approved by the City Council in 2005 and ratified by the Central Government in January of 2006.

3.1 Plan rationality

The first criterion is the interpretation of the legal context, in this case, the decree-law no. 380/99 that establishes the instruments for territorial management and planning, at national, regional and municipal scales. Against this legal framework the PDMP reveals a positive performance, both in terms of form and substance. As to the former, the written regulations and the map of proposals for the urban space are highlighted. As to the later, the incorporation of the legal guidance for the definition of the territorial model should be referred to. In this sense, one of the most interesting aspects of this plan is the innovative interpretation of the article 85e of the decree no. 380/99 – the strategy for land use qualification through a *typological zoning* (Kropf, 1997). According to this proposal, the existing urban forms suggest the definition of the different zones and provide the criteria for the design of new urban forms (see Figure 3 for the zoning plan). In this way, the PDMP can be seen as an example of a trend that has been developing in the last fifteen years and that includes a number of plans in France and England (Oliveira, 2006).

Under the second criterion, the relevance of the plan proposals to the needs and ambitions of Oporto was assessed. A SWOT of the existing situation in the beginning of the decade highlights five main strengths: Oporto is the main city in the Northern Region of Portugal, it has considerable natural and human resources, it is one of UNESCO's World Heritage sites, and it benefited from significant central government investments in the improvement of its main road network. The fundamental weaknesses of Oporto are the decline in resident population, the growing social and territorial unbalances between the Eastern and the Western areas responsible for the emergence of a dual city, the piecemeal destruction of the built forms and of the built heritage, the steady degradation of the environmental quality, and the traffic congestion problems associated to an increasing share of private cars in detriment of public transports. The relationships between each of the four main components of the plan – the objectives, the classes of areas (zoning), the urban

infrastructures and systems, and the mechanisms for plan implementation – and the fundamental problems of the city, as perceived by the evaluators, proved to be quite positive. Two of these problems deserved particular attention from the plan – the piecemeal destruction of the built forms and of the built heritage and the steady degradation of the environmental quality.

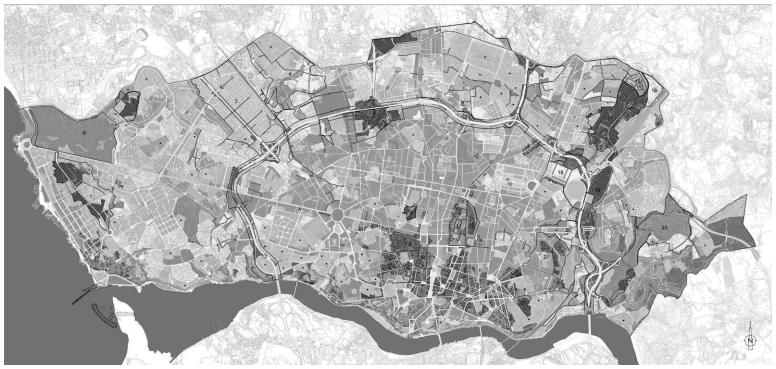

Figure 3. The zoning plan of the PDMP

The analysis (mainly through impact matrices) of the linkages between the objectives and each of the other three main components of the plan revealed a number of strong results. The less interesting result, although positive, can be found in the linkage between the objectives and the mechanisms for plan implementation. One of the reasons for this might be that the former (the objectives) corresponds to the most general level, and the latter (the mechanisms) to the most specific level of plan proposals. An analysis of the impact on each objective shows that objectives 1 and 2 – the valuation of the urban identity of Oporto and the rehabilitation of public space and the built environment – gather the highest scores. This is mainly due to their relationships with all the classes of space and with two urban systems, environment and urban heritage. On the contrary, objectives 3 and 4 – the rationalization of transport systems and the reduction of the urban unbalances – obtain the lowest scores. Objective 5 – the promotion of the historical kernel and the central area – obtains an intermediate score.

Currently, the only statutory plans enforce in Oporto are the PDMP and one detailed plan. In the absence of a regional or a strategic plan, the focus of the fourth criterion was placed on the coherence between the PDMP and an important regeneration programme, lead by the so-called *Porto Vivo SRU*, the first Portuguese urban regeneration company. The evaluation of this criterion, structured around three aspects – territorial model, strategic goals, implementation and development control – express different degrees of articulation between the plan and the regeneration programme. The first is very low, reflecting some incoherencies in terms of the definition of the ZIP (the Priority Intervention Area) and of the concept of building rehabilitation. The second reveals a positive articulation despite the reduced expression of an economic dimension in the PDMP and the lack of a clear strategy on mobility and transports in the so-called Masterplan, the guiding document of *Porto Vivo SRU*. The most interesting aspect of the articulation between the *Plano Director Municipal* and the process of urban regeneration is the *SIM-Porto* – a

multicriteria information system designed to develop the overall guidance of the PDMP into a coherent group of principles, defining building rights and linking the proactive regeneration of the old urban tissues with the planning of new urban areas. For a detailed assessment of this criterion see Oliveira and Pinho (2008).

Public participation in the PDMP had occurred during three periods between October of 2003 and January of 2005. The consultation of the plan took place in the City Hall, in the Municipal Parishes, and in the local libraries. A forum in the internet and a number of debates, promoted by the City Council and by other institutions, complemented the dissemination of the plan. Throughout the process of public participation 632 citizen's written comments were recorded, 348 in the first period, 131 in the second, and 153 in the last period. The main focus of these comments was the zoning process, particularly at the scales of the plot and of the block. The analysis of this process reveals three main findings: i) the number of interventions is relatively low; ii) the quality of these interventions is quite diverse, although it should be highlighted that 14% of these have been accepted and incorporated into the plan (particularly during the first period); and iii) there was a reasonable stimulus to public participation by the local authority.

3.2 Conformance of results

The assessment of effectiveness was negatively influenced by the timing of this evaluation exercise – only nine months had passed since the ratification of the PDMP. Besides the PDMP, only a detailed plan was approved and is being implemented since, reflecting the low priority attached to the production of lower level plans. The preparation of this plan, the *Antas* PP, was previous to the preparation of the PDMP, so a comparison is not appropriate. Nevertheless, the contribution of the PP to an emerging centrality in the city should be mentioned, as well as the fact that a significant part of the PP objectives had already been fulfilled. Nine months after PDM ratification a positive appraisal of the proposed road network (see Figure 4) could be made: 11,1% of the streets had been built and 16,7% had been partially built. The last part of the assessment of effectiveness corresponds to an analysis of fifty planning applications developed under the umbrella of the PDMP. Our sample of the new buildings was characterised according to ten indicators. Its analysis shows that the development control process based on the new PDMP is contributing to a more place responsive design.

Three conclusions can be taken from the assessment of the financial resources commitment – the first and the second negative, the later one positive. First, the administration that had been ruling the city since 2002 had not been able to promote a positive growth of the municipal budgets. Second, in 2005 and 2006, the administration did not achieve a balanced relationship between capital costs and running costs. Third, in 2006, in the so-called *Grandes Opções do Plano*, the entries of the municipal budget related to the PDMP had concentrated 55% of the total financial resources of the local authority. Within the planning staff our assessment points out to the interesting work of the so-called Office for Project Appraisal in a new process of development control, framed by a plan that somehow breaks with the traditional predominance of quantitative approaches, based on the straightforward application of urban development indices. The role of the local practitioner is, therefore, more demanding but also more appreciated.

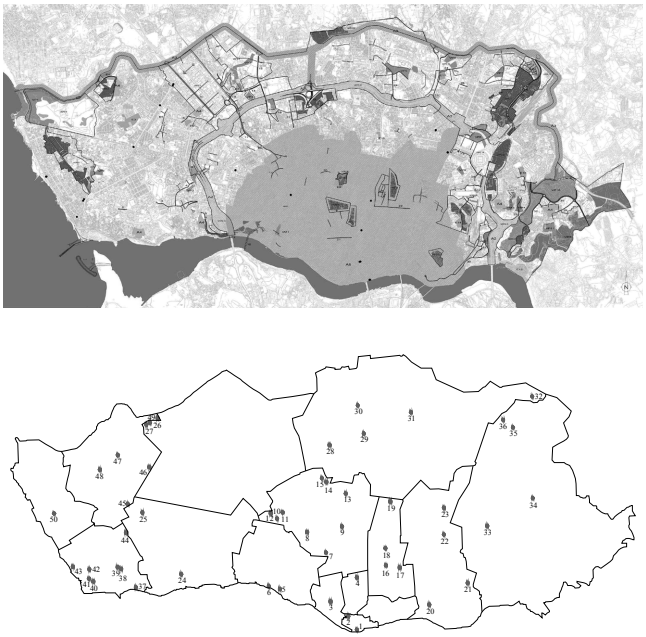

Figure 4. The assessment of effectiveness: proposed road network, planning applications

3.3 Plan performance

The assessment of leadership, mainly based on the plan proposals' impacts on the city, can not be done because of the reduced time period that passed since the PDMP ratification.

The ninth criterion is the utilization of the plan. As pointed out before, the presidency change of the Local Council in 2001 had interfered in the plan preparation schedule and had lead to changes in the plan contents. Therefore, this exercise compares two versions of the plan: the first version prepared by an external team of planning consultants, and the 2005 version prepared by the local planning department. In the overall, this new version appears less interesting and coherent than the original version. Nevertheless, it introduces some positive changes in the original version, namely through more operational mechanisms for plan implementation and more attractive conditions for investment in a large entrepreneurial zone. It should also be highlighted that most of the innovative proposals of the first version, such as the typological zoning, are present in the 2005 version. Our analysis has also revealed a lack of identification of the local politicians in power and the PDMP, during plan making and, particularly, during plan implementation.

The public participation process in the detailed plan for the *Antas* area, divided in two periods (between February of 2001 and January of 2002) had registered nineteen written comments. Four of these came to be incorporated into the plan. Their focus was on the existence and changes of some specific classes of areas, the proposed building heights, the design of an infrastructural construction map, and changes in the written regulations and in the complementary report. Like in the case of the PDMP the local authority has reasonably stimulated this process, using a similar set of means.

The empirical results gathered in this exercise point to a positive assessment of the PDMP (see Table 7). The specific criteria with the highest scores were the interpretation of the legal context and the internal coherence, both included in the general criterion of rationality. The specific criteria with the lowest scores were the external coherence (under the general criterion of rationality) and the utilization of the plan (under the general criterion of performance).

Table 7. PDMP: Evaluation final results

General criteria	Specific criteria	Score	D. Confidance	P. Results	T. Results
Rationality	Interpretation	A	2	A A	
	Relevance	B	1	B	
	Internal coherence	A	2	A A	
	External coherence	C	2	C C	
	Participation (plan making)	B	2	B B	**B**
Conformance	Effectiveness	B	2	B B	
	Commitment of resources	B	1	B	**B**
Performance	Leadership	-	1	-	
	Utilization	C	1	C	
	Participation (implementation)	B	2	B B	**B**
					B

3.4 Proposals for planning practice

The first proposal, framed by a possible plan revision after 2009, advocates a change in the articles of the PDMP regulations referring to the mobility systems and to a particular class of area, the so-called *isolated and multifamily building zone*. Mobility objectives favouring the more sustainable modes of transport should be clearly reflected in the subsequent policy options that should not encourage the generalised use of the private car, as it is the case in the present version of the PDMP. On the other hand, a compact city and an urban ambience requires significant urban densities that may not be achieved with present construction indexes, particularly if, as again it is the present case, they are not accompanied by morphological criteria.

The planning practice of Oporto should be more dynamic. In the end of this exercise, only two detailed plans were under preparation, and five priority areas had established the basis for the preparation of other plans. Bearing in mind the difficulties of articulation between the city of Oporto and its surrounding municipalities this planning context should be used to stimulate the adoption of comprehensive and more ambitious bottom up approaches, from planning policy formulation to plan implementation.

The local authority should make a supplementary effort to raise the quantity and quality of citizen interventions in the periods of public participation. The 632 written comments received as part of the PDMP public participation process may sound significant but, in fact, represents only 0.2% of the Oporto's resident population. A participated process can, and should, be timely managed. It is unacceptable such extended timings as in the case of the public inquiry developed between October of 2003 and January of 2005.

Within a stagnant national economic context, with central government finances squeezing local authority budgets, and a rather unfavourable local economic situation, it is not easy to prepare a municipal budget. Nevertheless, it is absolutely necessary to establish a balanced relationship between capital and running costs – as achieved in the budgets of 2003 and 2004 – and to allocate the necessary financial resources to plan implementation.

The recent planning practice in Oporto highlights one permanent question of the current debate, the relationships between the planners and the politicians and, in many ways, it illustrates what it is not supposed to happen. In the end, as illustrated by the *Porto Vivo* regeneration programme, a greater political commitment to support the implementation of the PDMP is needed.

4 Conclusions and further research

This final section presents a number of conclusions and suggestions for future research in planning evaluation. It is structured threefold: urban planning activity, the PPR methodology, and its use in the evaluation of the PDMP, considering the potentials of future applications.

Despite the difficulties and the complexity, it is possible, and indeed desirable, to systematically evaluate urban planning. The review of the current debate in planning evaluation, in the first part of the paper, highlighted some fundamental topics: the design of a methodology to assess this practice must be clearly linked with planning evaluation theory; the evaluation methodology should suit the object under appraisal; the planning practice must be evaluated as a whole; evaluation and planning processes should be developed together, right from the beginning; the evaluation methodology must have a balanced development over time; and, finally, the presentation of evaluation results and the analysis of their use should be valuated.

Throughout this paper we have shown that it is possible to design and apply a planning evaluation methodology, with an emphasis on urban form analysis. Furthermore, the results obtained are able to contribute to enhance the quality of the urban plans, as well as local planning processes and the built environments they are expected to shape. The comprehensive character of this type of proposal is reflected in the selection of general and specific criteria, the corresponding evaluation questions, the assessment techniques, and the data sources.

The application of the PPR provided not only a sound and substantiated judgement on the PDMP, but also the necessary grounds to conclude that there is a singular aspect in the current planning practice of the second largest Portuguese city – the innovative character of the plan proposals in terms of urban form. Three fundamental features should be highlighted: i) the typological zoning in which the existing urban forms support the classification of the territory into different zones and provide the criteria for regulation and prescription of new urban forms; ii) the careful consideration of the character of the city, clearly present in the different parts of the plan; and iii) the flexible approach to design control according to the different zones of the city.

Future research should include the development of an international study on the evaluation practice within different planning departments. Despite the numerous arenas of contemporary debate it is surprising the little we know about local authorities' planning practices worldwide. There is an enormous need for empirical work within these authorities to understand if evaluation practices do exist, how officials and practitioners see the different theoretical and methodological contributions available, if the evaluation exercises are isolated acts our continuous processes, what is the emphasis of these exercises, what are the most common criteria and evaluation questions and, particularly, if evaluation results are influencing the overall quality of planning practice.

The application of PPR methodology in the PDMP evaluation highlighted some difficulties in the assessment of the performance criterion. This should be improved through the refinement of the

three specific criteria it includes. In the case of *leadership (direction)* and *plan utilization*, the process of analysis should be enhanced in order to obtain a higher degree of confidence in the evaluation result. In the case of *participation*, the need to complement the focus on citizen intervention in detailed plans with other sub-criteria should be considered.

We believe that the PDMP should be evaluated, once more, in the beginning of the next decade, in an intermediate stage of its implementation process. Our evaluation exercise, carried out in the first year of the plan implementation process, has faced some difficulties. The most evident was surely the impossibility to assess the *leadership* criterion. The realization of a new evaluation exercise in 2011 will highlight the cyclical dimension of planning evaluation. On the one hand, it will provide new elements on the Oporto case. On the other hand, it will allow a view on the intermediate stage of plan implementation, in a time when a significant number of results will be available for analysis, and we will be able to contribute to the improvement of plan implementation.

The PPR methodology has successfully passed the test of application to the PDM of the second largest Portuguese city. Although this exercise does not allow for conclusions on the Portuguese planning system it enables us to recommend the application of PPR to other plans and planning processes in other cities. In a first stage we intend to apply the methodology to other Portuguese case studies. Then, we would like to be able to assess plans and planning practices in other country contexts. New case studies will certainly introduce new themes that have been absent from Oporto planning practice. The wider application of the methodology raises an issue that has been debated in literature – the formulation of a simplified version of the evaluation methodology. Despite the overall structure of PPR – based on three views of evaluation, with the corresponding criteria – the techniques to assess some criteria and the utilization of some data sources, particularly the ones that use more resources, should be considered.

Future research should explore the integration of this methodology in a local planning process in close collaboration with the local authority. The possibility that this assessment be carried by an evaluation team – instead of a single evaluator – having a *real client*, and with higher probabilities of an effective use of the evaluation results, will certainly open a new perspective on PPR.

References

Alexander E (1981) “If planning isn’t everything, maybe it’s something” *Town Planning Review* **52** 131-142.

Alexander E (1998) “Evaluation in Israeli spatial planning” in N Lichfield, A Barbanente, D Borri, A Khakee, A Prat (eds) *Evaluation in planning: facing the challenge of complexity*, Kluwer, Dordrecht: 299-310.

Alexander E (2002) “Planning rights: toward normative criteria for evaluating plans” *International Planning Studies* **7**(3) 191-212.

Alexander E (2006) “Problems and prospects: dilemmas in evaluation and directions for the future” in E Alexander (ed) *Evaluation and Planning, evolution and prospects*, Ashgate, Aldershot: 267-276.

Alexander E (2006) “Dilemmas in evaluating planning, or back to basics: what is planning for?”, 2nd *World Planning Schools Congress*, Mexico City.

Alexander E (2006) “Evolution and status: where is planning evaluation today and how did it get here?” in E Alexander (ed) *Evaluation and Planning, evolution and prospects*, Ashgate, Aldershot: 3-16.

Alexander E, Faludi A (1989) “Planning and plan implementation: notes on evaluation criteria” *Environment and Planning B: Planning & Design* **16**(1) 127-140.

Alterman R, Hill M (1978) "Implementation of urban land use plans" *Journal of the American Institute of Planners* **33**(1) 274-285.

Altes W (2006) "Stagnation in housing production: another success in the Dutch planner's paradise?" *Environment and Planning B: Planning & Design* **33** 97-114.

Archibugi F (2006) "Pitfalls in planning and plan-evaluation" in E Alexander (ed) *Evaluation and Planning, evolution and prospects*, Ashgate, Aldershot: 73-83.

Baer W (1997) "General plan evaluation criteria" *Journal of the American Planning Association* **63**(3) 329-344.

Berke P, Backhurst M, Day M, Ericksen N, Laurian L, Crawford J, Dixon J (2006) "What makes plan implementation successful? An evaluation of local plans and implementation practices in New Zeland" *Environment and Planning B: Planning & Design* **33**(4) 581-600.

Brody S, Highfield W (2005) "Does planning work? Testing the implementation of local environmental planning in Florida" *Journal of the American Planning Association* **71**(2) 159-175.

Brody S, Highfield W, Thornton S (2006) "Planning at the urban fringe: an examination of the factors influencing nonconforming development patterns in Southern Florida" *Environment and Planning B: Planning & Design* **33**(1) 75-96.

Brody S, Carrasco V, Highfield W (2006) "Measuring the adoption of local sprawl reduction planning policies in Florida" *Journal of Planning Education and Research* **25**(3) 294-310.

Burby R (2003) "Making plans that matter: citizen involvement and government action" *Journal of the American Planning Association* **69**(1) 33-49.

Calkins H (1979) "The planning monitor: an accountability theory of plan evaluation" *Environment and Planning A* **11**(7) 745-758.

Carmona M, Sieh C (2005) "Performance measurement innovation in English planning authorities" *Planning Theory & Practice* **6**(3) 303-333.

Chapin T, Doyle R, Baker E (2008) "A parecel-based GIS method for evaluating conformance of local land-use planning wuth a state mandate to reduce exposure to hurricane flooding" *Environment and Planning B: Planning & Design* **35**(2) 261-279.

Damme L, Galle M, Pen-Stoetermeer M, Verdaas K (1997) "Improving the performance of local land-use plans" *Environment and Planning B: Planning & Design* **24**(6) 833-844.

Driessen P (1997) "Performance and implementing institutions in rural land development" *Environment and Planning B: Planning & Design* **24**(6) 807-813.

European Commission (1999) *MEANS Collection – Evaluating socio-economic programmes* Official Publications Office of the European Communities, Luxembourg.

Faludi A (1987) *A decision-centred view of environmental planning*, Oxford, Pergamon.

Faludi A (2000) "The performance of spatial planning" *Planning Practice & Research* 15(4) 299-318.

Faludi A (2006) "Evaluating plans: the application of the European Spatial Development Perspective" in Alexander E (ed) *Evaluation and Planning, evolution and prospects*, Ashgate, Aldershot: 119-143.

Fudge C, Barrett B (1981) "Reconstruction of the field of analysis" in S Barrett, C Fudge (ed) *Policy and action: essays on the implementation of public policy*, Methuen, London: 249-278.

Gilg A (2005) *Planning in Britain. Understanding & evaluating the post-war system*, Sage Publications, London.

Ho S (1999) "Evaluating urban regeneration programmes in Britain. Exploring the potential of the realist approach" *Evaluation* **5**(4) 422-438.

Ho S (2003) *Evaluating British urban policy – ideology, conflict and compromisse*. Ashgate, Aldershot.

Hoering H, Seasons M (2004) "Monitoring of indicators in local and regional planning practice: concepts and issues" *Planning Practice & Research* **19**(1) 81-99.

Khakee A (1998) "Evaluation and planning: inseparable concepts" *Town Planning Review* **69**(4) 359-374.

Khakee A (2003) "The emerging gap between evaluation research and practice" *Evaluation* **9**(3) 340-352.

Knapp P (2004) “Theory-based evaluation and learning: possibilities and changes” *Evaluation* **10**(1) 16-34.

Kropf K (1997) “Typological zoning” in A Petruccioli (ed) *Typological process and design theory*, Cambridge, Aga Khan Program for Islamic Architecture: 127-140.

Lange M, Mastop H, Spit T (1997) “Performance of national policies” *Environment and Planning B: Planning & Design* **24**(6) 845-58.

Laurian L, Day M, Backhurst M, Berke P, Ericksen N, Crawford J, Dixon J, Chapman S (2004) “What drives plan implementation? Plans, planning agencies and developers” *Journal of Environmental Planning and Management* **47**(4) 555-77.

Laurian L, Day M, Berke P, Ericksen N, Backhurst M, Crawford M, Dixon J (2004) “Evaluating plan implementation. A conformance-based methodology” *Journal of the American Planning Association* **70**(4) 471-80.

Lichfield N (1996) *Community Impact Evaluation*, UCL Press, London.

Lichfield N (2001) “Where do we go from here?” in H Voogd (ed) *Recent developments in evaluation*, Geopress, Groningen: 7-15.

Lichfield N (2003) ”Planned development and its children” *Planning Theory & Practice* **4**(1): 48-65.

Lichfield N, Kettle P, Whitbread M (1975) *Evaluation in the planning process*, Pergamon Press, Oxford.

Lichfield N, Prat A (1998) “Linking ex-ante and ex-post evaluation in British town planning” in N Lichfield, A Barbanente, D Borri, A Khakee, A Prat (ed) *Evaluation in planning: facing the challenge of complexity*, Kluwer, Dordrecht: 283-98.

Mastop H (1997) “Performance in Dutch spatial planning” *Environment and Planning B: Planning & Design* **24** (6) 807-813.

Mastop H, Faludi A (1997) “Evaluation of strategic plans: the performance principle” *Environment and Planning B: Planning & Design* **24**(6) 815-832.

Mastop H, Needham B (1997) “Performance studies in spatial planning: the state of the art” *Environment and Planning B: Planning & Design* **24**(6) 881-888.

Needham B, Zwanikken T, Faludi A (1997) “Strategies for improving the performance of planning: some empirical research” *Environment and Planning B: Planning & Design* **24**(6) 871-80.

Norton R (2005) “More and better local planning. A state-mandated local planning in Coastal North Carolina” *Journal of the American Planning Association* **71**(1) 55-71.

Norton (2005) “Striking the balance between environment and economy in Coastal North Carolina” *Journal of Environmental Planning and Management* **4**(2) 177-207.

Norton R (2005) “Local commitment to state-mandated planning in Coastal North Carolina” *Journal of Planning Education and Research* **25**(2) 149-71.

Oliveira V (2006) “The morphological dimension of municipal plans” *Urban Morphology* **10**(2) 101-113.

Oliveira V, Pinho P (2008) “Urban planning and regeneration in Oporto, 2004-2007” (submitted to *Cities*)

Patton M (2002) *Qualitative research and evaluation methods*, Sage, Thousand Oaks.

Pawson R, Tilley N. 1997. *Realist evaluation*. Sage, London.

Rossi P, Freeman H, Lipsey M (1999) *Evaluation, a systematic approach* (6th edition), Sage, Thousand Oaks.

Seasons M (2003) “Monitoring and evaluation in municipal planning” *Journal of the American Planning Association* **69**(4) 430-440.

Seasons M (2003) “Indicators and core area planning: applications in Canada’s mid-size cities” *Planning Practice and Research* **18**(1) 63-80.

Talen E (1996) “After the plans: methods to evaluate the implementation success of plans” *Journal of Planning Education and Research* **16**(1) 79-91.

Talen E (1996) “Do plans get implemented? A review of evaluation in planning” *Journal of Planning Literature* **10**(3) 248-259.

Talen E (1997) “Success, failure and conformance: an alternative approach to planning evaluation” *Environment and Planning B: Planning & Design* **24**(4) 573-587.

Voogd H (1997) “The changing role of evaluation methods in a changing planning environment: some Dutch experiences” *European Planning Studies* **5**(2) 257-266.

Weiss C (1999) “The interface between evaluation and public policy” *Evaluation* **5**(4) 468-486.

Wildavsky A (1973) “If planning is everything maybe is nothing” *Policy Sciences* **4**(2) 127-153.

Part 2. Transport Planning

Introduction to Transport Planning

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Transportation planning has always been a challenging task. On the technical side it involves a complex interaction network of infrastructure serving a diversity of modes that are owned, managed and operated by a variety of individuals and entities with a diversity of objectives. The provision and use of these networks has repercussions on land use, economic development, welfare distribution, and the environment. Overlaid on top of all this is the use made of government at various levels to manipulate the transportation system to meet a diversity of often conflicting and changing goals and objectives. The four papers in this section add to our understanding of some elements of the array of extraordinary challenges posed in understanding, managing, and, where needed, planning this complex system. Aviation is the fastest growing mode of transport, but its implications extend as much across land use planning issues as issues as those involving air traffic control.

Álvaro Costa and his colleagues in their contribution focus on some innovative ways of addressing the development of airport strategies, taking Lisbon as a case study. While air is the fastest growing mode, so roads are the largest absolute mover of goods and people. António Antunes and Bruno Santos's chapter provides a sophisticated multi-objective approach to road network planning that considers multi-level roads and elastic travel demand, but is consistent with the Highway Capacity Manual framework. José Viegas and his co-workers, take a different approach to the specific issue of road traffic congestion in cities and discuss some preliminary work that is considering the role a variety of traffic management and incentive schemes may play in diverting travellers to less congestion causing modes. This theme of making more efficient use of the road transportation infrastructure we have, albeit in this case focusing more on the environment, is taken up by Pimentel, Melo and Costa who look at the usefulness of applying such measures as road pricing, and in particular its application to freight transport, in the Oporto Metropolitan Area

Analyzing the Effects of Transport Initiatives on the Quality of Urban Environment - Empirical Results from Porto Metropolitan Area

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The negative side of transport activities on the quality of life and on the attractiveness of urban areas has largely contributed to an increasing concern about the sustainability of these activities. Therefore, public authorities, assisted by urban planners and road managers, are currently faced with complex operational, design and management challenges. Traffic congestion makes cities less pleasant and reduces the efficiency of the transport system by increasing journey time, fuel consumption and driver stress. Thus, environmentally, economically and politically, it is important that the transport system is designed and used in the most effective way so that it satisfies the needs for personal and freight transport without creating unpleasant conditions. The paper presents the evaluation of some transport initiatives applied to Porto Metropolitan Area (Portugal) through the use of transport planning software. The objective is to analyze the mobility environmental impacts, with a special focus on freight transport, induced by some major European tendencies and policies. Results indicated that some policies, like the implementation of road pricing, can lead to social and environmental benefits as well as improvements at operational level and thus, increase the welfare of society. Authors concluded that the initiatives which would expectably have better overall results are the ones that consider in a broader way the point of view of private traffic, freight transport and public transport.

Keywords: Freight Transport; Environment; Traffic Management.

1 Introduction

Over the past decades, transportation demand has increased considerably in the European Union (EU). Growth rates vary significantly between prevailing transportation modes and unfortunately for the society, the one who has been growing more significantly is also the one who has higher external costs: road transport. To minimize the external effects of the road transport, European Commission (EC) and the legislative body in the EU currently intervenes in the organization of European transportation planning by imposing fuel taxes and designing environmental, guidelines and regulations.

Without a basic structuring project and following the major European guidelines, the metropolitan areas have been taking advantage of the opportunities afforded by the European Community funds, central government programs or occasional initiatives taken by their own municipalities. Examples of these initiatives are the attempts to solve urban problems by introducing cleaner, more energy-efficient technologies and city planning measures, which can have a diverse range of effects. Difficulties on predicting impacts in a feasible way has lead public authorities, assisted by urban planners and road managers, to face complex operational, design and management challenges in what concerns to what measures should be implemented. Pure intuition is no longer sufficient to elaborate global solutions and the use of dedicated models, helping to understand the complex mechanisms of the system and to evaluate the impacts of

several policies is becoming important. In this context, the representation is built from mathematical equations that are claimed, under specific assumptions, to reproduce a part of reality. The problems are addressed with a consistent and comprehensive approach and with planning methodology that helps to design strategies for sustainable cities. This includes an integration of socio-economic, environmental and technological concepts to improve forecasting, assessment and strategic policy level decision support.

The use of transport equilibrium modelling to evaluate alternative transportation policies, including multi-modal systems, technological development and socio-economic development, and spatial and structural urban development in general, can overcome potential misleading in transportation planning. This paper presents a case study carried out in Porto Metropolitan Area, which evaluates alternative transportation strategies through the use of transport modelling tools (*EMME/3*). Strategies were selected from the recent major European tendencies.

2 Mobility and quality of urban environment criteria

This paper is concerned with quantifying the impact of transportation strategies as a critical element in the mobility and quality of urban environment of Porto Metropolitan Area. These strategies must ensure that people have access to goods, services, employment and recreation opportunities, and at the same time, that freight circulates efficiently and enable local economies to grow. Thus, environmentally, economically and politically, it is important that the transport system is designed and used in the most effective way so that it satisfies the needs for personal and freight transport without creating unpleasant conditions. The increasing concern on the sustainability of transport systems has lead to the need to seek for more sustainable initiatives on urban areas. In the last years several initiatives have been proposed to achieve sustainable targets and some have even been pointed out as 'good practices', according with its theoretical or practical results at economic, environmental or social levels (sustainability dimensions). Taking into account these conditions, authors evaluated three scenarios applied to Porto Metropolitan Area (PMA), which had already proven to be good practices in specific contexts: reduction of maximum circulation speed (calming traffic measure), creation of dedicated lanes for shared usage of public and freight transport, and implementation of road pricing. The evaluation was made with the use of traffic simulation in an attempt to analyze if these initiatives could lead to improvements on the mobility and quality of urban environment in the study area, considering both public and private interests. The mobility and quality of urban environment will be measured on this paper with direct and indirect indicators. Delays and travel times (hours) are direct measures of mobility. Lower travel times and lower delays are a measure of a better mobility. Fuel consumption (l/h) is a direct measure of operational costs and indirect measures of the quality of the environment. Lower fuel consumptions are a measure of a better environment and better efficiency of transport. Lastly, CO_2, CO, NO_x, VOCs and PM emissions are a direct measure of air pollution (local, regional and global levels).

3 Study objective and list of scenarios

The aim of the present study is to evaluate the consequences of transport initiatives on metropolitan mobility and on the quality of urban environment, and has the following sub-objectives:

1 - Identify potential traffic management initiatives to be applied to PMA.
2 - Apply quantitative instrument for carrying out an evaluation of impacts caused by different scenarios in Porto Metropolitan Area:
Scenario 0: Current situation.
Scenario 1: Reduction of the maximum circulation speed of PMA first ring (usually labelled as VCI) from 90 km/h to 50 or 70 km/h.
Scenario 2: Creation one dedicated lane in VCI for public transport and freight traffic (shared use).
Scenario 3: Implementation of a road pricing system to the ring (all traffic that cross the ring distinguishing private cars from freight vehicles in terms of fares).
3 - Evaluate all the scenarios separately with a special focus on freight traffic and on mobility and the urban environment quality.

4 Case Study

4.1 Background of the Study
PMA is mostly urban and dense, and comprises a group of 9 municipalities, which have been generating new focuses of centrality in relation with the traditional centre of the city of Porto.

In PMA the growth rates vary significantly between prevailing transportation modes and a major shift from public to private transport has occurred in the last decade: individual transport share has increased from 31% to 52%, while public transport has decreased from 42 % to 28%, (INE, 2001) causing great urban environment distress. Towards the evidence of a prevailing use of road transport in the metropolitan areas, authors tried to evaluate the effects of specific solutions applied to the main road of the study area (first metropolitan ring) in order to reduce the negative impacts of road mode in PMA.

4.2 Scenario Definition
The structured development of energy and environment scenarios allows a range of public policies to be examined within the context of alternative assumptions about the future or alternative realities in the quality of urban environment. Scenarios are stories, not predictions or recommendations, about how the future might unfold (Nijkamp and Castells, 2001). A scenario is a hypothetical sequence of logical and plausible (but not necessarily probable) events, constructed in order to focus attention on causal processes and decision points. They are useful for organizing scientific insight, gauging emerging trends, and considering alternatives. For this paper the following scenarios are taken in consideration:

Figure 5. Porto Metropolitan Area and location of the first ring.

Scenario 0: Current situation.

In this scenario a base year was established to be used for evaluating the current situation. The private car, public transport and freight demand has been modelled according to the origin-destination matrixes for the morning peak hour (7:30 h - 9:30 h) on an average day of the year 2005. The results will be presented considering the typical traffic scheme in the study area region for the time interval that the model is calibrated and validated to work in. Besides the focus on the environment analysis, it was also enlighten the delay and operational costs values to the vehicles circulating on the area.

Scenario 1: *Reduction of the maximum circulation speed of PMA first ring from 90 km/h to 50 or 70 km/h.*

This scenario focuses on the first ring illustrated in Figure 5. In this scenario a change in the road infrastructure will be tested for evaluating the possibility of converting this highway in an urban road in terms of road capacity and its influence on mobility and environmental impacts. Both options will be tested: the one with 70 km/h and the one with 50 km/h speed reduction. In this scenario the results will be presented considering the same origin-destination matrix as in scenario 0 and differences in delay times, travel times, pollutant emissions and fuel consumption will be compared.

Scenario 2: Creation of one dedicated lane in VCI for public transport and freight vehicles.
This scenario simulates the effects of implementing a dedicate lane in VCI for public transport and freight vehicles through the reduction of one lane from private transport. The idea is that through a dedicated lane, it is assured the separation of different types of traffic and thus there's a reduction of the negative effects resulting from that interaction.

The exclusive dedicated lanes for trucks are measures that can be operated continuously throughout the day or only during peak congested periods (allowing the lane to be opened to general traffic at other times of the day). Despite the potential benefits of dedicated lanes for freight traffic, only in situations that the designated routes prove to lead to less congestion and to overall positive or acceptable results, this initiative can be put into place. Additionally, the privilege of a dedicated lane may be perceived in a negative way by other road users, unless the implementation of the measure leads to significant benefits to other users. Issues of reduced operational flexibility of use of the road may also arise (Nam and Lee, 2003).

Scenario 3: Implementation of a road pricing system to the ring (all traffic that cross the ring distinguishing private cars from freight vehicles in terms of fares).
The objective of road pricing is to use the pricing mechanism to change behaviour to reduce the negative impacts of road transport on the environment, society and the economy (Meyer *et al*., 1965 and Small *et al*., 1989). It is proposed the use of a single cordon charge, defined by the artificial barrier that the first ring (VCI) imposes in Porto and Gaia municipalities. The potential distributional impacts of a road pricing scheme are assessed in this scenario, modelling a fare of 2.5 Euros for private cars and of 3.5 Euros for heavy duty vehicles crossing VCI highway. Such taxation should reduce individual travel and freight demand for all O/D pairs that uses these road infrastructures. During this scenario evaluation it was clear that careful consideration of multi modal travel factors should be cautiously considered and more detailed information about public transport demand is needed. It is also important to focus on income segmentation, but for this model and scenario, income classes were not taken in account.

5 Estimation of effects of all the scenarios
A successful integrated model system must be responsive to the interest of stakeholders. This requires at least sufficient output indicators that satisfy the policy interests of those who focus on the key global dimension of urban management efficiency, equity and environmental sustainability. Each should have a set of practical translators of performance including indicators of emission and energy variables, transport accessibility and mobility in the same decision platform. The scenarios are evaluated considering the indicators: fuel consumption, pollutant emissions (CO_2, NO_x, CO, VOC´s, PM´s), travel times and delays segregated in private transport, public transport and freight transport.

Scenario 0 Current situation

In this scenario a set of simulated outputs are calculated, considering that a characterization of actual mobility, emission and energy values can contribute to a better understanding of the urban quality issues as well as sending warning signals on what instruments detract from sustainable progress. The characterization of the PMA results examines the usefulness of various measures of travel mobility patterns, environmental indicators of vehicle emissions and energy use.

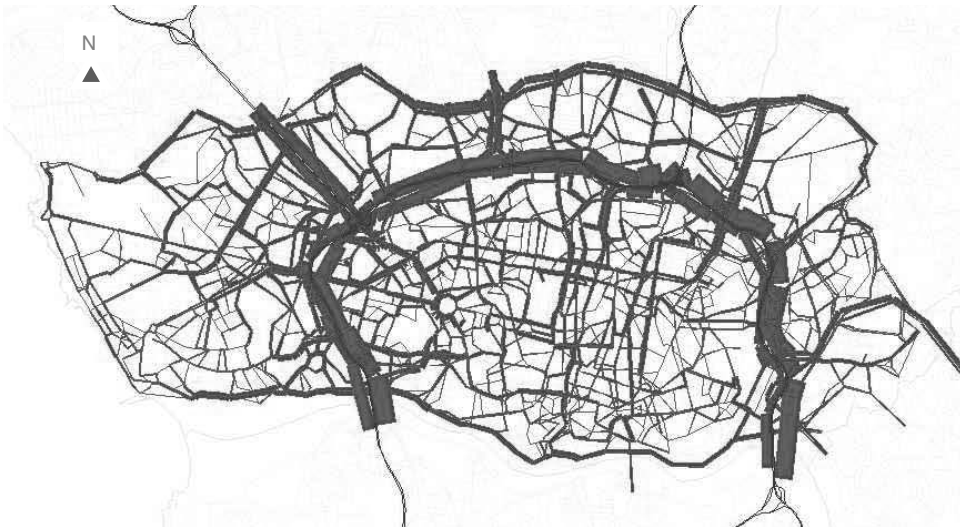

Figure 6. Traffic flow (vehicles/h) representation in the road networks in Porto municipality for Scenario 0

The analysis of transport aggregated values for PMA allowed authors to obtain the fuel consumption (l/h), CO_2 emissions (ton/h), CO emissions (ton/h), PM emissions (ton/h), NO_x emissions (ton/h), VOC´s emissions (ton/h), delays and travel times (h) indicators, which will be the basis of comparison for the following scenarios.

Scenario 1 Reduction of the maximum circulation speed of PMA first ring from 90 km/h to 50 or 70 km/h

In this scenario, attention is derived to a set of policies instruments to determine environmental and mobility impact variations when a circulation speed reduction was simulated. This evaluation reduces maximum traffic speed by 22% (from 90 to 70 km/h) and 44% (from 90 to 50 km/h) in VCI. It is expected that a reduction in maximum circulation speed, would lead VCI to be less attractive and consequently more journeys would be done on roads outside VCI and more pollutant emission would be generated.

To a decrease of the circulation speed to 70km/h, the individual transport would predictably have an increase of about 16% on the CO_2 emission levels on PMA, while the public transport and

freight traffic would get an increase of 3.5% and 7%, respectively. These differences between individual and public transport are due to the major representation of the first one and due to the fact that on VCI the urban public transport traffic is not significant. Still to the first scenario and to a decrease of the speed circulation to 50 km/h, the individual transport would have an increase of about 23% on the CO_2 emission levels, while the public and freight transport would achieve an increase of 11% and 14%, respectively. The increase on CO_2 emission levels is much higher to the 50km/h scenario because with this condition it becomes less relevant to use VCI instead of another road, once the circulation limits gave it a less attractive character.

The CO_2 emissions variations are basically proportional to the fuel consumption changes, so the previous analysis is also valid for fuel consumption. The other pollutants would also have increasing average values (from the 50 and the 70 km/h scenarios) for the individual transport (CO 5%, PM 8% , NO_x 7%, VOC´s 8%) for the public transport (CO 3%, PM 8.4% , NO_x 4%, VOC´s 14%) and for the freight transport (CO 10%, PM 5% , NO_x 6%, VOC´s 13%). For both options (50km/h and 70 km/h) it is expected to occur an increase on travel and delay times for all traffic types. On delays it would have an increase of about 4% for a 70 km/h situation and of 20% for a 50 km/h scenario. The travel times would increase on average of 5% and 12%, respectively. This shows that the reduction of the circulation maximum speed in VCI would lead to negative environmental and mobility effects, for private traffic, public transport and freight transport.

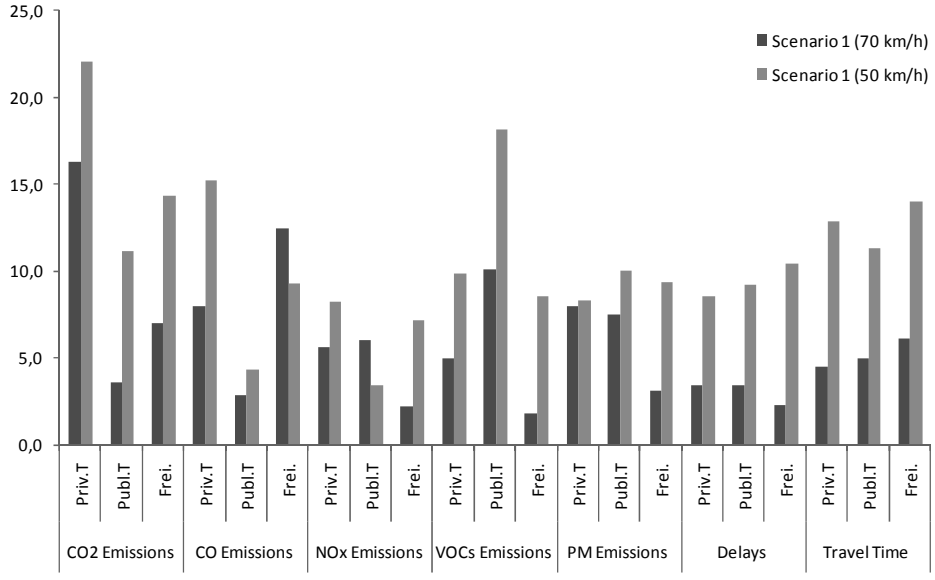

Figure 7. Scenario 1 results for 70 and 50 km/h

Scenario 2 Creation of one dedicate lane in VCI for public transport and freight vehicles

This scenario aims to evaluate an initiative that can be implemented by local administrations in order to improve freight activities efficiency and intends to evaluate the effects of freight measures combined with public transport strategies in major traffic roads. These impacts will be measured

from the point of view of transporters and the remaining road users. It will be tested the effect of the creation of a dedicated lane in the first ring for public and freight transport (reducing thus one lane from the private car circulation).

With this solution predictably private transport would have an increase in fuel consumption (and CO_2 emissions) of about 14%. Public transport wouldn't feel significantly the effects of such measure, once there are only few lanes moving in VCI and freight transport would have decreases of about 24%. Similar variations would occur in what concerns CO_2 emissions. Delays and travel times would follow this tendency: private transport would have increases resulting from the reduction of one lane of circulation, public transport would hardly feel any change and freight traffic would feel improvements of about 6% (for all the road network and not only for VCI). In an overall evaluation this scenario would benefit much more the freight traffic of metropolitan area (not only within VCI circulation), it would slightly benefit freight transport and it would affect negatively private transport. In the long term the effects on public transport are expected to be more positive through potential transfers from private transport to public one.

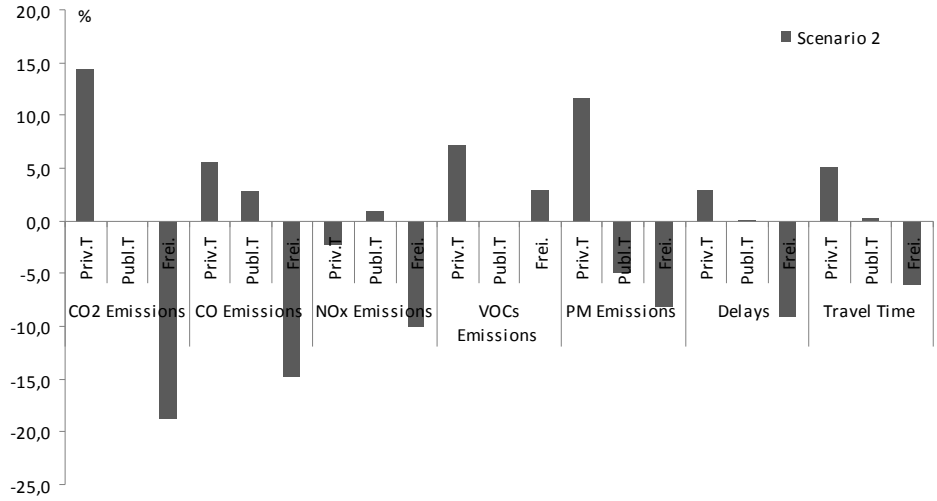

Figure 8. Scenario 2 results

Scenario 3 Implementation of a road pricing system to VCI - all traffic that cross VCI and distinguish private cars from freight vehicles in terms of fares

For the proposed cordon-based road pricing, this scenario shows improvements both in environmental and mobility terms. The reductions of CO_2 emissions and fuel consumption would be of almost 8% and the decrease on travel times and delay times of more than 14%. Other pollutant emissions also have improvements (CO 8%, PM 7%, NO_x 8%, VOC´s 9%) for all the traffic types inside and outside of the delimited road pricing area. From all the scenario analyzed on this paper this is the one who presents better overall results, for all types of traffic. However, it might be as well the scenario with more difficult implementation for all the analyzed stakeholders.

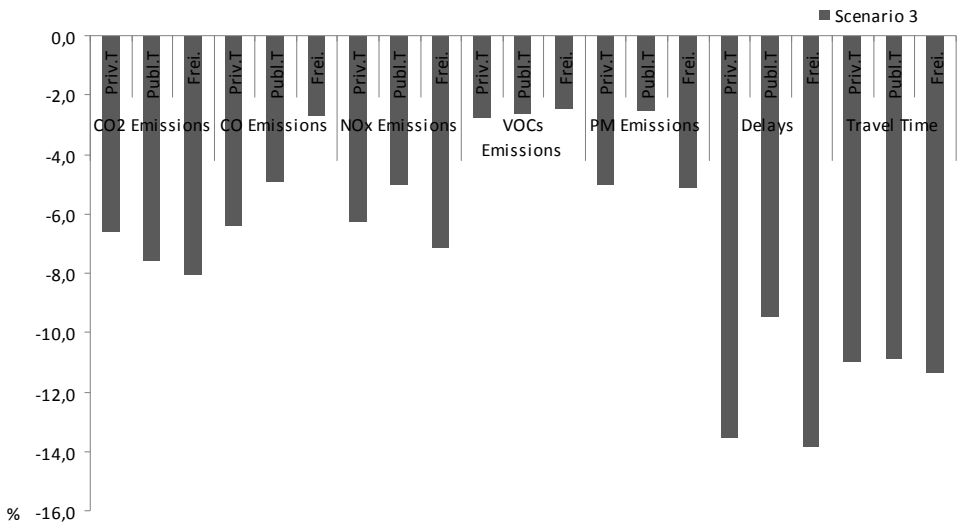

Figure 9. Scenario 3 results

6 Conclusions

There is a growing recognition that many traditional transport policy instruments are relatively blunt over a range that is politically acceptable and within tolerable budgetary limits in respect of delivering environmental outputs. At present, most of the focus of research in urban environmental quality (concerning transport initiatives) is on concepts and related significant indicators. Authors of this paper follow a more recent tendency on research that focus on clarifying the nature and measurement of environmental quality, on the relationship between environmental quality concepts, indicators, and the potential of the proposed evaluation methodologies. This paper shows that such applied research is an important support for decision-making. Transport modelling for impact assessment in urban road network for the Porto Metropolitan Area offers a new and broad potential for environmental assessment, prediction of future pattern changes on mobility, integrating land use, transport and environmental planning.

Results from this scientific exercise indicated that some analyzed transport policies can lead to social and environmental benefits and thus, increase the welfare of the society (like the road policy charging from scenario 3). Based on scientific literature review and on the results obtained with this theoretical work, authors found the common basis to support such positive potential benefits to be the consideration of the effects on the main stakeholders and an attempt to treat freight transport in a different way from private transport. Different types of traffic should be analyzed considering its intrinsic characteristics and respective actors' interests so that implemented measures will be more effective for the territory, transport and environmental planning.

References

INE (2001) Inquérito à Mobilidade da população residente 2000. Instituto Nacional de Estatística.

INRO Consultants Inc (1989) EMME/2 User's Manual.

Meyer, J., Kain, J. and M. Wohl (1965) *The Urban Transportation Problem*. Harvard University Press, Cambridge, Massachusetts, 245 - 267.

Nam, D. and J. Lee (2003) "Dedicated lane strategies for urban mobility" *Journal of the Eastern Asia Society for Transportation Studies* **5,** 1718-1733.

Nijkamp, P. and N. Castels (2001) "Transboundary environmental problems in the European Union: Lessons for air pollution policies" *Journal of Environmental Law and Policy* **4,** 501-517.

Ntziachristos, L. and Z. Samaras (2000) COPERT IV: Computer Programme to Calculate Emissions from Road Transport – Methodology and Emission Factors, European Environment Agency.

Ortúzar S. J. D. and L. G. Willumsen (1994) *Modelling transport*, Wiley, Chichester.

Acknowledgements

We would like to acknowledge our colleague Vera Palma (FEUP) for her valuable input and comments on the software operations.

A multi-objective approach to road network planning

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Road network planning is a subject of research being pursued at the Department of Civil Engineering of the University of Coimbra since the mid-90s. The first years devoted to the subject were dedicated to the development of models for maximizing accessibility to urban centers. These early models were solved with local search and simulated annealing algorithms. Progressively, new objectives have been introduced into the models, including robustness and equity. Also, new solution methods have been tested, including variable neighborhood search and enhanced genetic algorithms. At present, a sophisticated multi-objective approach to road network planning is available. The approach considers multi-level roads and elastic travel demand, and is consistent with the Highway Capacity Manual planning framework. In this paper we describe the work already made to develop the approach, compare it with the work currently being carried out in leading research centers of the world, and identify directions for further investigation. The type of results that can be obtained from the application of the approach is illustrated for the road network of Poland.

Keywords: road network; multi-objective optimization; equity; robustness; Highway Capacity Manual

1 Introduction

Modern economies are highly dependent upon transportation systems. As an important component of the transportation system, road networks play a vital role for the sustainability of these economies. While for most developed countries the main concern is the improvement of their already good interurban road networks, this is certainly not the case with countries like China, India, Brazil, and most Eastern European countries. The high economic growth rates that have characterized these countries in recent years will be difficult to maintain without a strong development of their road networks. Given the major social implications and massive financial outlays involved in the renovation of road networks, the decisions to be made by transportation authorities with regard to the construction of new roads and the upgrading of existing roads need to be carefully planned.

In this article, we present a multi-objective optimization approach to long-term interurban road network planning. It summarizes the main achievements of the research on the subject being carried out at the Department of Civil Engineering of the University of Coimbra since the mid-90s. The approach is intended at helping policy-makers (transportation authorities) in their strategic reflections regarding the long-term (say, 20 years) evolution of a national or regional network. In addition to the efficiency objectives dealt with in the vast majority of the literature where the subject is addressed, the approach presented in this article takes into account robustness and equity objectives. Indeed, from road network improvements, transportation authorities want (or should want) more than just better accessibility or faster speed in current, everyday situations. They also require road network improvements to enhance the way abnormal traffic peaks and unexpected disruptive events are coped with. Moreover, transportation authorities want the accessibility and speed benefits derived from the improvement of road networks to be fairly distributed across the

different parts of a country or a region, because excessively uneven welfare gains are not consistent with sustainable development principles.

The article is organized as follows. In the following section, we provide a brief overview of the literature on optimization-based road network planning models. Next, we describe the essential features of the proposed planning approach. Then, we present the model upon which the approach is based and supply information on the algorithm developed to solve it. Afterward, we illustrate the type of results that can be obtained through the approach for a case study involving the main road network of Poland. In the final section, we make some concluding remarks and point out directions for future research.

2 Literature overview

Over the last thirty years, significant research efforts have been devoted to optimization-based road network planning (or design) models.

The overwhelming majority of these efforts were oriented towards two models: the discrete road network design (DRND) model and, especially, the continuous network design (CRND) model. The former focus on the addition of new links to a road network, whereas the latter concentrates on the (continuous) expansion of capacity of existing links. A related model that appears in the literature is the mixed road network design (MRND) model, which is a combination of the DRND model with the CRND model. Among the best-known articles where these models are dealt with one may quote LeBlanc (1975) and Boyce and Janson (1980) regarding the DRND model, and Abdulaal and LeBlanc (1979), LeBlanc and Boyce (1986), Suwansirikul et al. (1987), and Friesz et al. (1992) regarding the CRND model. For a relatively recent review of this literature, see Yang and Bell (1998).

The models referred to above can be classified in respect to three main issues: travel demand; traffic assignment; and planning objective. Travel demand – that is, the O/D matrix – is, in many cases, assumed to be known in advance (inelastic). This certainly is a poor assumption because, at least in the long-term, it is rather unlikely that the addition of new links and/or the improvement of existing links will not induce new trips and will not change the distribution of existing trips. Traffic assignment is typically made according to the user-equilibrium principle: “traffic arranges itself in such a way that no individual trip maker can reduce his path costs by switching routes” (Wardrop, 1952). However, some early studies, as well as studies dealing with rural road networks, use the “all-or-nothing” principle, according to which trips are assigned to the shortest-route. Planning objectives vary widely. The most frequent are efficiency objectives: travel time minimization and user cost minimization for a given budget, investment cost minimization for a given travel demand, and user benefit maximization (as measured by the consumer surplus). Of these objectives, the latter is the only one consistent with elastic traffic demand because travel time and user cost can be made smaller by inducing less traffic. Other important objectives that have been dealt with in previous studies include robustness (Lo and Tung 2003, Chootinan et al. 2005) and equity (Meng and Yang 2002, and Chen and Yang 2004). A number of articles address multi-objective road network design models. The first one reported in the literature is due to Friesz and Harker (1983). More recently, Friesz et al. (1993) and Tzeng and Tsaur (1997) contemplated user

costs and construction costs as simultaneous minimization objectives (the former also took into account the minimization of travel distance and the minimization of property expropriation). Ukkusuri et al. 2007 consider a robustness objective in addition to an efficiency objective (travel time minimization), Feng and Wu (2003) considered horizontal and vertical equity objectives, and Cantarella and Vitetta (2006) considered environmental objectives (minimization of CO emissions).

Despite being extremely appealing from a theoretical standpoint, no one of the RND models referred to above explicitly addresses a very important issue of real-world road network planning: the multi-level, discrete nature of capacity expansion. Indeed, capacity increases considerably when some road is upgraded (or replaced with a better road, or complemented with a new road). When a two-lane road is too congested and is upgraded to a four-lane road, its capacity increases to more than the double. This kind of issue has rarely been handled through optimization-based road network planning models. The few examples of multi-level models we are aware of are Janson et al. (1991), Solanki et al. (1998), and Antunes et al. (2003). The model described in Solanki et al. (1998) is the simplest of the three. It applies to a rural road network when the objective is to minimize impedance (travel time), assuming travel demand to be known in advance. Traffic is assigned to the network according to the "all-or-nothing" principle. The model introduced in Janson et al. (1991) is also based on an impedance objective (shipping costs), but traffic is assigned to the network according to the user-equilibrium principle. The model applies to previously selected routes and several planning periods. The procedure for selecting the routes, which are typically composed of a large number of links, is not specified. One of the two versions of the model assumes travel demand to be elastic, but only with regard to trip distribution (which is estimated through a constrained gravity model). Induction of traffic is not taken into account. The model presented in Antunes et al. (2003) comprises accessibility and equity objectives, and assumes travel demand to be elastic with regard to both trip distribution and traffic induction. Traffic is assigned to the network through an iterative "all-or-nothing" approach that takes into account the capacity of roads of different levels.

Despite the research efforts already made, it is necessary to acknowledge here that their practical implications have been quite low. We believe that one of the reasons for this to happen is because the existing optimization-based road network planning models do not fit properly into the planning framework adopted in the Highway Capacity Manual (TRB 2000). This manual, published by the United States Transportation Research Board is an important reference for highway engineers working in Departments of Transportation all over the world. In our opinion, planning solutions which are consistent with the HCM framework will, in principle, be more easily accepted by practitioners and more likely to be adopted in real-world studies.

3 Planning approach

The approach to long-term interurban road network planning proposed in this paper is based on the following main principles:

- Planning decisions regard the construction of new road links of given types (levels) or the upgrading of existing road links to a better type (higher level).
- Efficiency, robustness, and equity objectives are simultaneously taken into account.

- Environmental concerns may limit the set of road types that can be assigned to links included (or to be built) in environmentally-sensitive areas.
- Total expenditure involved in the planning decisions must not exceed the available budget.
- Travel demand is elastic with road network changes.
- Planning decisions are consistent with the road planning methodology adopted in the Highway Capacity Manual.

The implementation of these principles can be made through an iterative process consisting of six steps in each interation. First, we generate a set of solutions for the improvement of the road network consistent with environmental concerns and budgetary constraints. Each solution specifies the links to build or upgrade, and the road types to assign to these links. For generating solutions, one may resort either to local or population (including evolutionary) search procedures, or to a combination of both.

Second, we estimate the expected origin-destination matrix corresponding to the improved network. The expected origin-destination matrix is computed through the application of an unconstrained gravity model calibrated for the 30th highest hourly traffic volume (TRB, 2000). For a long-range approach as the one proposed in this paper, forecasting driver paths choices through extrapolation from present route choices can lead to misleading results. Thus, we decided to calculate the impedance function with the generalized travel cost corresponding to the least-cost path between the origin and the destination, even though drivers do not always exhibit rational choices when choosing their routes. In this manner, trips are estimated by quantifying the propensity of a driver to travel, assuming that this propensity depends on the travel cost for the average driver and solutions are evaluated according to the network driving conditions offered for an ideal scenario in which all drivers follow the paths which minimize their travel costs. The (generalized) travel cost is computed through a function combining travel distance and travel time, assuming drivers can travel at the maximum service speed (MSS) defined for the road types of the links included in their routes. The MSS of a road type is the maximum speed consistent with the level of service (LOS) to be guaranteed for a road of that type. LOS is a quality measure of the operational conditions of a traffic facility (TRB, 2000).

Third, we assign the O/D matrix to the improved road network, estimate the traffic flows for all links, and verify whether these flows are consistent or not with the LOS required for the links. Among other alternatives, LOS can be assessed through the ratio between the estimated traffic flow and the maximum service flow for each link. Solutions with links where estimated traffic flows exceed maximum service flows are unfeasible, and are penalized with a penalty proportional to their “distance” to feasibility.

Fourth, we assess the solutions with regard to efficiency, robustness, and equity objectives. Examples of alternative (or complementary) ways of formulation these objectives are:

- Efficiency: maximization of the accessibility of urban centers (as defined by Keeble et al., 1982); maximization of the average speed for the road network; and minimization of a weighted distance to national, state, and regional capitals.

– Robustness: maximization of the reserve capacity of the network; maximization of the evacuation capacity of cities; and minimization of the vulnerability of the network to the failure of isolated links (D'Este and Taylor, 2003).

– Equity: maximization of accessibility (or other efficiency measure) for the urban centers with the lowest accessibility; minimization of the standard deviation of the accessibility to urban centers; and maximization of the Gini Index of accessibility (Marsh and Schilling, 1994).

Fifth, we perform a multi-objective evaluation of the solutions using the well-know weighting method (Cohon, 2004). According to this method, the overall value of a solution is calculated applying weights representing the relative importance of the objectives to the normalized values of the solutions for each objective. Solution values need to be normalized because the degree of achievement of the objectives is assessed in different units and/or different scales of measure.

Sixth, we compare the solutions assessed in this iteration with the best solution obtained in previous iterations – the incumbent solution. If any one of the new solutions is better than the previous best, it becomes the incumbent solution and a new iteration is performed. If not, after a given number of non-improving iterations, the iteration process is stopped.

4 Optimization model

In order to accomplish the planning approach described in the previous section, it is necessary to solve an optimization model in each iteration. The formulation of this model is as follows:

$$\max V = w_Z \times \frac{Z(\boldsymbol{y}) - Z_0}{Z_B - Z_0} + w_R \times \frac{R(\boldsymbol{y}) - R_0}{R_B - R_0} + w_E \times \frac{E(\boldsymbol{y}) - E_0}{E_B - E_0} \tag{1}$$

subject to

$$\sum_{m \in \boldsymbol{M}_l} y_{lm} = 1, \ \forall l \in \boldsymbol{L} \tag{2}$$

$$T_l(\boldsymbol{y}) \leq \sum_{m \in \boldsymbol{M}_l} T_{\max_m} \times y_{lm}, \ \forall l \in \boldsymbol{L} \tag{3}$$

$$\sum_{l \in L} \sum_{m \in M_l} e_{lm} \times y_{lm} \leq b \tag{4}$$

$$T_l \geq 0, \ y_{lm} \in \{0,1\}, \ \forall l \in \boldsymbol{L}, m \in \boldsymbol{M}_l \tag{5}$$

where (in order of appearance): V is the normalized value of a solution; w_Z , w_R, and w_E are the weights attached to efficiency, robustness, and equity objectives; Z, R, and E are the values of a solution in terms of each objective; Z_B, R_B, and E_B are the best values obtained for each objective in previous iterations; Z_0, R_0, and E_0 are the worst values obtained for each objective in previous iterations; $\boldsymbol{M}_l$ is the set of possible road types for link l; $\boldsymbol{y} = \{y_{lm}\}$ is a matrix of binary variables equal to one if link l is set at road type m and equal to zero otherwise; $\boldsymbol{L}$ is the set of links; T_l is the estimated traffic flow in link l; $T_{max\,\mathrm{m}}$ is the maximum service flow for a link of road type m; e_{lm} is the expenditure required to set link l at road type m; and b is the budget.

The objective-function (1) of this combinatorial non-linear optimization model represents the maximization of the normalized value of the road network planning solution. This solution is obtained through the application of weights (also called “priorities”) to the normalized values of the solutions for the three objectives under consideration. In this case, normalization is made considering the range of variation of solutions, but other normalization procedures could be used. The values of the solutions for the three objectives, as well as the normalized values, depend on the decisions made with regard to road types (which are represented with variables ***y***). Constraints (2) are used to guarantee that each link will be set at one, and only one, road type. For some links, it may be undesirable to choose some road types because of environmental reasons. This is the reason why the set of road types ($\boldsymbol{M}_l$) is indexed in the link. Constraints (3) are included to ensure that the traffic flow estimated for each link, which depends on the decisions made with regard to road types for all links, will not exceed the maximum service flow consistent with the road type chosen for the link. Traffic flows on links are determined by assigning O/D traffic flows calculated with an unconstrained gravity model to the network assuming trips to be made through least-cost routes. Constraints (4) are used to guarantee that the budget available for improving the road network will not be exceeded. Expression (5) defines the domain for the decision variables.

5 Model solving

The optimization model described in the previous section is extremely difficult to solve to exact optimality. Except for small-size instances, it must be handled through heuristic methods. If carefully developed, modern heuristics can be very efficient at finding optimum or near-optimum solutions to difficult optimization models. A class of modern heuristics methods that has been especially successful when dealing with engineering models – including several transportation engineering models – is genetic algorithms (Michalewicz, 1996). For solving our model, we developed a hybrid genetic algorithm combining the standard selection, crossover, and mutation procedures of a standard genetic algorithm with various types of local improvement procedures performed throughout the search process. Upon careful calibration the algorithm was able to provide good quality solutions to a representative sample of partly-random problems within acceptable computing time (e.g., problems with 15, 55, and 110 links were respectively solved in 4, 255, and 2,810 seconds, on average, on an Intel Dual Core T2500 microprocessor running at 2.0 GHz). Details on the algorithm design, the calibration procedure, and the algorithm performance can be found in Santos et al. (2005).

6 Case study

The results that may be obtained through the application of the approach presented in this paper are illustrated in this section for the main road network of Poland. In the year 2000, this network had a total length of 11,358 km (5,894 km of slow two-lane roads, 4,992 km of fast two-lane roads, and 472 km of two-lane freeways). The network is currently undergoing a significant transformation following the integration of Poland in the European Union.

For the application of the approach, the network was represented with 86 nodes (49 Polish traffic generation centers, 30 intersections, and 7 foreign traffic generation centers representing the

neighboring countries) and 164 links (147 internal and 17 external). A scheme of the network is depicted in Figure 10. In this figure, links in grey represent slow two-lane highways, links in magenta represent fast two-lane highways, and links in red represent four-lane freeways. The traffic generation centers are represented with circles with diameter proportional to their population.

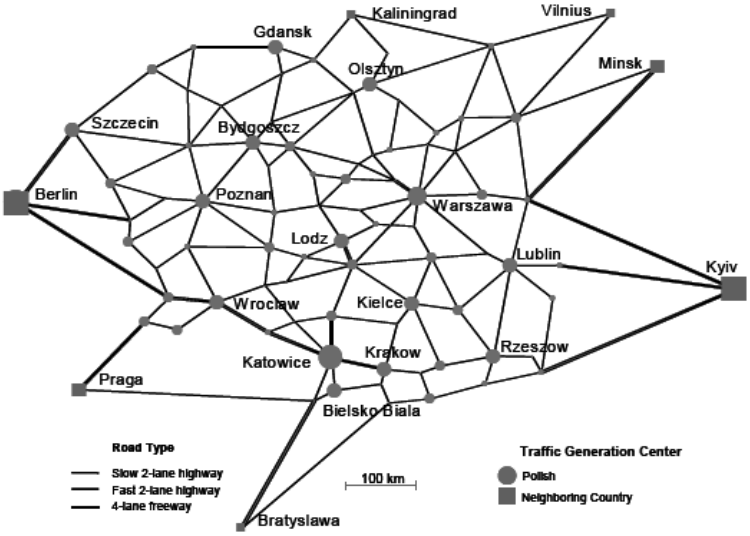

Figure 10. Road network of Poland

The application consisted in determining the best assignment of 8,712 monetary units (which represent 25% of the budget required to upgrade all links to a six-lane freeway) to the upgrading of the existing road network. The design characteristics of road types are presented in Table 8. The relative unit costs for road upgrading are presented in Table 9. These costs apply to roads built in flat land. For roads built in hilly and mountainous ground, unit costs were increased by 30 and 60 percent, respectively.

All computations were made using OptRoad, a user-friendly program developed by the authors (Santos et al., 2006).

Table 8. Design characteristics for the different road types

Road type	Free-flow speed [km/h]	Capacity [pcu/h/lane]	Level of service	Maximum service flow [pcu/h/lane]	Maximum service speed [km/h]
Slow two-lane highway	70	1700	E	1428	55
Fast two-lane highway	90	2100	C	1428	90
Four-lane freeway	120	2400	B	1320	120
Six-lane freeway	120	2400	B	1320	120

Table 9. Relative unit costs for road upgrading

From	To		
	Fast two-lane highway	Four-lane freeway	Six-lane freeway
Slow two-lane highway	1.5	2.5	3
Fast two-lane highway	-	2	2.5
Four-lane freeway	-	-	1

6.1 Results for a single efficiency objective

We first considered only an efficiency objective. Specifically, the objective was to maximize the weighted average accessibility of the Polish traffic generation centers. The accessibility of a center was defined as (proportional) to the spatial interaction between the center and all other centers (Keeble et al., 1982). The expression used to calculate (weighted) average accessibility was:

$$Z(\mathbf{y}) = \sum_{j \in \mathbf{N_P}} A_j \times \frac{P_j}{P}, \quad \text{with } A_j = \sum_{k \in \mathbf{N} \setminus j} \frac{P_k}{C_{jk}(\mathbf{y})^{\beta}}$$

where: $\mathbf{N}$ is the set of traffic generation centers; $\mathbf{N}_P$ is the set of Polish traffic generation centers; P_j is the population of center j; P is the total population; A_j is the accessibility of center j; C_{jk} is the (generalized) cost of traveling between centers j and k; and β is a calibration parameter. For the present study, it was used a value of β equal to 1.1.

The best solution obtained for this objective is depicted in Figure (a). In comparison to the network of 2000, the total length of four-lane freeways would increase from 472 kilometers to 3,067 kilometers, whereas the total length of fast two-lane highways would decrease from 4,992 to 4,528 kilometers. Three links of six-lane freeways, with a total length of 213 kilometers, would be included in the network, along the least-cost path between Warszawa and Katowice, the largest traffic generation centers.

6.2 Impact of adding a robustness objective

We then added a robustness objective to the efficiency objective, giving equal weights (50/100) to both objectives. The robustness objective was to maximize the weighted reserve capacity of the network. The reserve capacity of a link was defined as the traffic flow that the link can still accommodate within the LOS required for its road type. The expression used to calculate the (weighted) reserve capacity of the network was:

$$R(\mathbf{y}) = \frac{\sum_{l \in \mathbf{L}} \left(T_{\max_l} - T_l\right)^{\alpha} \times T_l \times L_l}{\sum_{l \in \mathbf{L}} T_l \times L_l}$$

where: T_{max_l} is the maximum service flow for link l; α is a weighting parameter; and L_l is the length of link l. Parameter α is introduced to reflect the importance attached to the reserve capacity in

each link. Values of α higher than one lead to solutions where the reserve capacity is concentrated in a small number of links, whereas values lower than one lead to solutions where the reserve capacity for each link is relatively small but more evenly distributed across the network. In this study, a value of α equal to 0.5 was used.

The best solution obtained for the two objectives is depicted in Figure 11. The freeway network would now be composed of 345 kilometers of six-lane freeways and 2,814 of four-lane freeways. The six six-lane freeway roads would be the roads with higher estimated traffic volume. For all these roads, the initial estimated traffic volume is higher than 2,300 passenger-cars units per hour and an increase of the reserve capacity would only be possible with roads of this type.

6.3 Impact of adding an equity objective

We next replaced the robustness objective with an equity objective. The equity objective was contemplated through limiting the computation of accessibility to the 20-percent Polish traffic generation centers with the lower accessibilities (note that the less centers are considered, the more emphasis is given to equity). The expression used to calculate equity was

$$E(\mathbf{y}) = \sum_{j \in \mathbf{N}_{\mathbf{P}20}} P_j \times A_j$$

where: $\boldsymbol{N}_{P_{20}}$ is the set of 20-percent Polish traffic generation centers with the lower accessibility.

The best solution obtained for the efficiency and equity objectives is depicted in Figure 2(c). The freeway network would now be composed by a 2,727 kilometer of four-lane freeways and 290 kilometers of six-lane freeways. This solution is achieved by improving the links serving smaller traffic generation centers, such as Bydgoszcz, Gdansk, and Olsztyn, which were not improved in the previous solutions. In addition, some roads next to the Polish border would be improved to four-lane freeways creating a freeway connection between Poznan and Kiev. Also, in the south of Poland, there would be a freeway connection between Berlin and Kiev via Katowice. In opposition to the previous solutions, in this case the length of the fast two-lane highways would be larger than in the network of 2000 (more 96 kilometers).

6.4 Results for efficiency, robustness, and equity objectives

We then included the three objectives together, assigning equal weights (33.3/100) to the objectives. The best solution obtained for the efficiency, robustness, and equity objectives is depicted in Figure 11(d). The freeway network would now be composed of 230 kilometers of six-lane freeways and 2,783 kilometers of four-lane freeways. This solution is a compromise solution between the previous solutions, with more six-lane freeways than the solution obtained when only the efficiency objective was considered and with some smaller cities, as Gdansk, connected to close nodes by freeway. In this solution, a four-lane freeway connection between Warszawa and the north border is added to the previous freeway border connections.

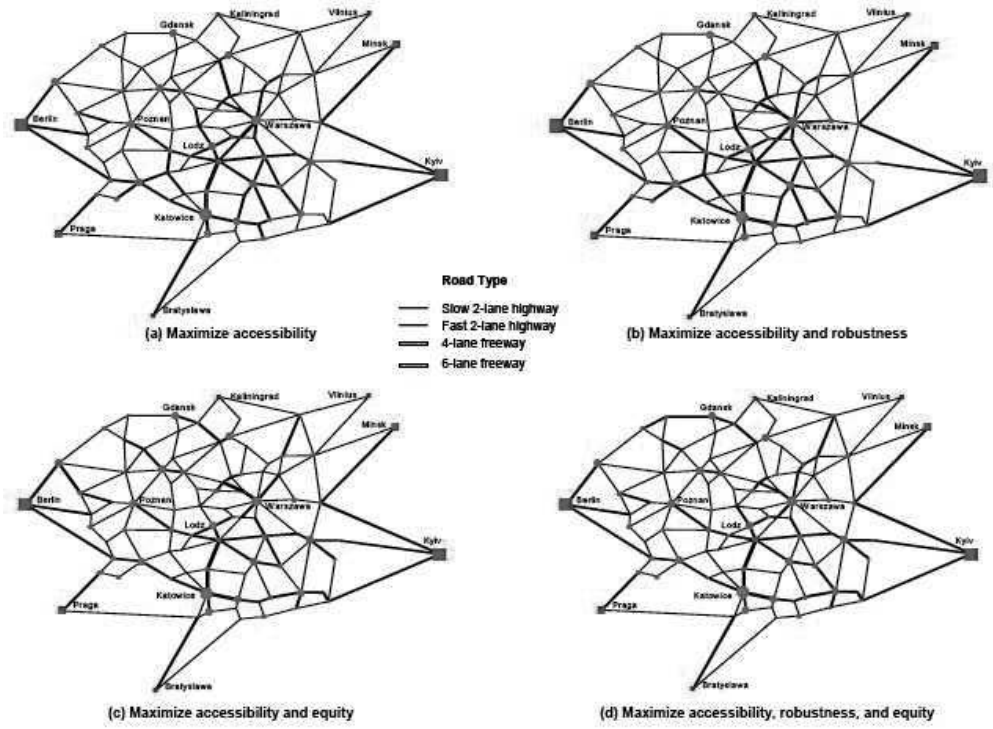

Figure 11. Best solution for the different objectives

6.5 Comparison of results

The impact of the improvement of the network upon the different assessment measures – accessibility, reserve capacity, and accessibility of the 20 percent centers with the lower accessibilities – for the different combination of objectives is summarized in Table 10.

Table 10. Impact of the improvement of the road network

Assessment measure	Initial network	Objective							
		Efficiency		Efficiency and robustness		Efficiency and equity		Efficiency, robustness, and equity	
	Value	Value	Variation	Value	Variation	Value	Variation	Value	Variation
Accessibility	1,442	1,588	10,1%	1,587	10,1%	1,571	8,9%	1,574	9,2%
Reserve capacity	-77,722	31,483	-----	32,787	-----	29,340	-----	29,840	-----
Accessibility of the 20% centers with the lower accessibilities	10,120	10,930	8,0%	10,920	7,9%	11,330	12,0%	11,320	11,9%

With regard to the initial network, accessibility would improve by 10.1 percent if only the efficiency objective was taken into account. This value would decrease if robustness or equity objectives were added. The inclusion of robustness would involve a slight deterioration of

accessibility in 0.06 percent, but the reserve capacity would increase in 4.1 percent. The value for the reserve capacity measure would increase by 110.509 units, from -77.722 (i.e., initially there is a lack of capacity) to 32.787 units. The inclusion of equity would have much more significant implications. Indeed, accessibility would only increase 8.9 percent (instead of 10.1). In compensation, the accessibility of the 20-percent Polish traffic generation centres with the lower accessibilities would increase 12.0 percent, whereas it would increase only 8.0 percent if equity objectives were not considered. For the solution obtained when the three objectives were included, accessibility would increase 9.2 percent, the value for the reserve capacity measure would increase 107.562 units, and the accessibility of the 20-percent Polish traffic generation centres with lower accessibilities would increase 11.9 percent.

A similarity between the solutions obtained considering the equity objective can be found. In fact, although all the four solutions would involve a decrease of highway length and an increase freeway length, for the solutions including the equity objective the length of fast two-lane highways would increase – 1.9 percent for the solution obtained with the efficiency objective and 2.9 percent for the solution with the two other objectives. In the same way, it would be for these same two solutions that the reduction of slow two-lane highways kilometer would be larger than 44 percent while for the other two solutions the decrease of the slow two-lane highways extension would be smaller than 40 percent. For the four solutions, the length of freeways would exceed 3,000 kilometers. Nonetheless, it would be again for the solutions considering equity that we would have the lower freeway length, with a difference of about 260 kilometers for the solution obtained considering only the efficiency objective and 140 for the solution obtained considering also the robustness objective.

With respect to network costs, all solutions made use of almost the entire budget. Thus, small differences exist between the costs of the four solutions presented. Indeed, the cost varies from the 8,711.5 monetary units involved in the solution obtained with efficiency and robustness objectives to the 8,695.0 monetary units needed for the solution obtained when only the efficiency is considered.

Table 11. Extension of the different types of road

Road type	Initial network	Objectives							
		Efficiency		Efficiency and robustness		Efficiency and equity		Efficiency, robustness and equity	
	km	km	Variation	km	Variation	km	Variation	km	Variation
Slow two-lane highways	5894	3550	-39,8%	3608	-38,8%	3253	-44,8%	3209	-45,6%
Fast two-lane highways	4992	4528	-9,3%	4591	-8,0%	5088	1,9%	5136	2,9%
Four-lane freeways	472	3067	549,8%	2814	496,2%	2727	477,8%	2783	489,6%
Six-lane freeways	0	213	-----	345	-----	290	-----	230	-----

7 Conclusion

In this paper, we presented a multi-objective approach to long-term interurban road network planning. The approach considers robustness and equity objectives in addition to the traditional efficiency objective. Other important features of the approach are: traffic flows are assumed to follow least-cost routes; travel demand is assumed to be elastic, to reflect the fact that traffic flows will predictably react to road network changes; and planning decisions are consistent with the road planning methodology adopted in the Highway Capacity Manual.

The application of the approach is illustrated for a case study involving the main road network of Poland. This case study was included to clarify the type of results that can be expected when the proposed approach is used. It was also included to clarify the implications for road network planning of taking efficiency, robustness, and equity objectives simultaneously into account.

Although the practical applicability of the approach was demonstrated for a case study, we recognize that improvements are still possible. For example, the inclusion of the rail network in addition to the road network would introduce a new and important dimension in the planning approach. Furthermore, conscious that the long-term interurban road network planning approach proposed in this paper will often involve a long period of time (say, twenty or more years), it would be useful to determine the best schedule for the improvements to be made. These improvements will be dealt with in the near future.

References

Abdulaal M, LeBlanc LJ (1979) “Continuous equilibrium network design models” *Transportation Research B* **13**(1) 19-32.

Antunes A, Seco A, Pinto N. (2003) “An accessibility-maximization approach to road network planning” *Computer-Aided Civil and Infrastructure Engineering* **18**(3) 224-240.

Boyce DE, Janson BN (1980) “A discrete transportation network design problem with combined trip distribution and assignment” *Transportation Research B* **14**(1-2) 147-154.

Cantarella GE, Vitetta A (2006) “The multi-criteria road network design problem in an urban area” *Transportation* **33**(6) 567-588

Chen A, Yang C (2004) “Stochastic transportation network design problem with spatial equity constraint” *Transportation Research Record* **1882** 97-104

Chootinan P, Wong SC, Chen A (2005) “A reliability-based network design problem” *Journal of Advanced Transportation* **39**(3) 247-270.

Cohon JL (2004) *Multiobjective Programming and Planning*, Academic Press, New York.

D'Este GM, Taylor MAP (2003) “Network vulnerability: an approach to reliability analysis at the level of national strategic transport networks” in MGH Bell, Y Iida (eds) *The Network Reliability of Transport*, Pergamon, Oxford: 23-44.

Feng CM, Wu JYJ (2003) “Highway investment planning model for equity issues” *Journal of Urban Planning and Development* **129**(3) 161-176.

Friesz TL, Harker PT (1983) Multi-objective design of transportation networks - the case of spatial price equilibrium. Lect Notes in Econ and Math Syst 209:86-93

Friesz TL, Cho H-J, Mehta NJ, Tobin RL, Anandalingam G (1992) “Simulated annealing approach to the network design problem with variational inequality constraints” *Transportation Science* **26**(1) 18-26

Friesz, TL, Anandalingam G, Mehta NJ, Nam K, Shah SJ, Tobin RL (1993) "The multiobjective equilibrium network design problem revisited: a simulated annealing approach" *European Journal of Operational Research* **65**(1) 44-57.

Janson BN, Buckels LS, Peterson BE (1991) "Network design programming of United-States highway improvements" *Journal of Transportation Engineering* **117**(4) 457-478.

Keeble D, Owens PL, Thompson C (1982) "Regional accessibility and economic-potential in the European-Community" *Regional Studies* **16**(6) 419-431.

LeBlanc LJ, Boyce DE (1986) "A bilevel programming algorithm for exact solution of the network design problem with user-optimal flows" *Transportation Research B* **20**(3) 259-265

LeBlanc LJ (1975) "Algorithm for the discrete network design problem" *Transportation Science* **9**(3) 183-199.

Lo HK, Tung YK (2003) "Network with degradable links: capacity analysis and design" *Transportation Research B* **37**(4) 345-363.

Marsh MT, Schilling DA (1994) "Equity measurement in facility location analysis - a review and framework" *European Journal of Operational Research* **74**(1) 1-17.

Meng Q, Yang H (2002) "Benefit distribution and equity in road network design" *Transportation Research B* **36**(1), 19-35.

Michalewicz Z (1996) *Genetic Algorithms + Data Structures = Evolution Programs*, Springer-Verlag, Berlin.

Santos B, Antunes A, Miller E (2005) "Solving an accessibility-maximization road network design model: A comparison of heuristics", *16th Mini-EURO Conference on Advanced OR and AI Methods in Transportation*, Poznan.

Santos B, Antunes A, Miller E (2006) "OptRoad: a computer program for interurban road network planning" *Joint International Conference on Computing and Decision Making in Civil and Building Engineering*, Montreal.

Solanki RS, Gorti JK, Southworth F (1998) "Using decomposition in large-scale highway network design with a quasi-optimization heuristic" *Transportation Research B* **32**(2) 127-140.

Suwansirikul C, Friesz TL, Tobin RL (1987) "Equilibrium decomposed optimization - a heuristic for the continuous equilibrium network design problem" *Transportation Science* **21**(4) 254-263.

TRB (2000) *Highway Capacity Manual*, Transportation Research Board, Washington DC.

Tzeng GH, Tsaur SH (1997) "Application of multiple criteria decision making for network improvement" *Journal of Advanced Transportation* **31**(1) 49-74

Ukkusuri SV, Mathew TV, Waller ST (2007) "Robust transportation network design under demand uncertainty" *Computer-Aided Civil and Infrastructure Engineering* **22**(1) 6-18.

Wardrop JG (1952) "Some theoretical aspects of road traffic research" Proceedings of the Institution of Civil Engineers Part II **1** 325-362.

Yang H., Bell MGH (1998) "Models and algorithms for road network design: a review and some new developments" *Transport Reviews* **18**(3) 257-278.

Acknowledgements

The participation of Bruno Santos in the study reported in this article has been supported by Fundação para a Ciência e Tecnologia through grant SFRH/BD/16407/2004.

Innovation in transport modes and services in urban areas and their potential to fight congestion

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In the fight against congestion in urban areas, repeated appeals have been made by public authorities for car drivers to shift to public transport. This has found little success in most cases, as those drivers have made long-term decisions (namely housing location, schools of their children and even work / leisure lifestyle) which were based on the assumption of regular use of their private car and would imply very high adaptation costs in case of a shift to public transport, given the need for multiple transfers and limitations of the operating times with good frequency of service. The purpose of this project is to research to what extent new services and transport modes - largely based on existing vehicles but with different organization models and much stronger use of real time information - can be attractive enough to the former car driver. These could include collective taxis, real time dispatch of passengers and regular buses, one-way car rentals, park-and-ride systems with a tutored delivery of children to their schools, variable price congestion pricing, etc. The expectation is that a combination of these new solutions, combined with the right price signals, could attract an interesting proportion of solo drivers into formulas of higher efficiency in the use of road space, so providing good congestion relief. The project is currently in the empirical research phase, with the preparation of stated choice experiments, being administered through the Web and through interviewers, by phone and in person.

Keywords: innovation, transport modes, urban congestion

1 Introduction

Despite continuous and repeated appeals made by public authorities for car drivers to shift to public transport, the levels of urban congestion and car use have been amounting in last decades. The reasons for this lack of success are several and include among others the fact that drivers tend to make long term decisions regarding house location and other anchors of daily life (working place, schools of their children and other facilities visited on a daily basis) and also leisure and lifestyle preferences. These decisions are made based on the assumption of regular car use. Also other factors like the increasing complexity of task allocation and sharing in household leads people towards higher levels of car use (Clerk and Vries, 2000).

Increasing public transport supply levels in order to offer these drivers with enough convenient services would imply very high adaptation costs, given the need for multiple transfers and limitations of the operating times with good frequency of service.

Thus, one of the objectives of this project is to research to what extent new services and transport modes can be attractive enough to the former car driver. These services are intended to be largely based on existing vehicles but with different organization models and much stronger use of real time information, thus making an intense use of information technologies.

The modes and services included comprise the following:

Shared taxis - This is a regular taxi or a taxi with call-centre dispatch where the client is asked if he/she would be willing to share the ride with potential customers who are in the way to his/her destination or close by. The acceptance of this possibility grants the customer with a discount. In case another client or clients (until vehicle capacity is reached) whose destination is

close by a certain travel time to the first client´s destination, boards the shared taxi, the fare collected from each client should be a function of distance and time for each of clients´ fares and automatically calculated by the taximeter.

Express minibus - A regular minibus with few stops at both origin and destination. This regular and pre-programed schedule (as opposed to the shared taxi concept) collects always the same clients that happen to live close by and work at a rather convenient place for collective pick-up within a close ride. The route is the same everyday of the week.

Real-time dispatch of passengers and buses - A passenger that needs to arrive to a certain destination, has an electronic way of sending its coordinates and need and, with a beep on his mobile, he gets the information back on where, what route, what transfers and how long will his trip take to arrive to his destination. The client can immediately accept the trip and reserve its own seat and, in turn, the driver of that specific vehicle will be informed that this passenger will board on a certain stop

Park&Ride with children drop-out and pick-up by professional tutors – This is a service where the client may not only leave the car and board a public transport, but also have of other services available such as children drop-out and pick up lead by professional tutors. This is a service targeted for parents who usually use their cars on commuting trips because they have to drop their children at school or kindergarten.

One way rental – This is a service where a fleet of electric cars will be available for rental. These vehicles will be available throughout the city at closely spaced intervals and could be picked in one place and left in another one

Other alternatives such as carpool, congestion pricing / urban tolls and more restrictive parking policies are also considered within the frame of this project.

One expects that these new services and solutions, combined with the right price signals, could attract an interesting group of solo drivers, thus contributing to a reduction of congestion and car use levels.

This project is currently in the empirical research phase. Three Focus Groups were made with the aim of helping to design a stated choice experiment. This stated choice is at the moment having its questionnaire being defined in order to start its implementation, first with a pilot survey and then based on its results made some minor adjustments and launch the final survey.

This paper is organized in the following way. First a brief literature review is presented and then the Focus Groups results are presented and discussed. The literature review focuses on the definitions of captive versus choice users of modes and also on the definitions of automobile dependence. Then a brief description about needs attitudes and perceptions towards transport is made. Within this section different aspects affecting explaining attraction or repulsion towards different modes of transportation are presented.

2 Literature review

2.1 Captives and choice riders

Users of public transport and of private car can be classified in two different types: captives and choice riders (Krizek and El-Geneidy, 2007).

Captive users of one or other mode are the ones which rely almost exclusively on one transportation mode and are very unwilling or unable to change modes of transportation. This due to several different reasons, on the side of public transport, captives are usually considered as people “who do not have a private vehicle available or cannot drive” (Krizek and El-Geneidy, 2007), for example, don´t possess a drivers license. The car captives are usually people who sense that the car is only alternative available (for example because there is no public transport service connecting their trip ends, due to scheduling limitations and need to carry large objects, among others) (Beimborn et al, 2003). People who usually have access to car or parking space provided by their employer could be also considered as car captives.

Other interesting definition is the automobile dependence, which is very often presented as a synonym of high levels of car use per capita and land use patterns that limit other transport alternatives (Litman and Laube, 2002).

Zhang (2002) advances one alternative definition of automobile dependence which is anchored on a disaggregated perspective and based on a utility maximization framework. This means that for automobile dependent individuals the car is the only choice in their choice set.

Automobile dependence could exist due to different factors, either external or idiosyncratic aspects (Zhang, 2002):

- Car using costs related with the available income;
- There is no other alternative for the trips commonly undertaken (commuting trips, for example);
- Family commitments (need to drive relatives to other places, kindergarten for example);
- Insufficient knowledge about other transport alternatives (sometimes believing in the inexistence of alternatives);
- Negative (mis)perception of service quality, safety and reliability of other modes, thus excluding them from their group of available alternatives;
- Social status, which means that alternatives believed as inferior and demeanors of one’s social status are excluded;
- Attitudinal aspects, people who simply enjoy driving.

2.2 Needs attitudes and perceptions about transport

Winters et al (2001) has established a transportation hierarchy of needs based on the Hierarchy of Needs presented by Maslow in 1943. Maslow, stated that human behavior could be understood and explained by the process in which needs are satisfied (Perone et al, 2005).

This hierarchy comprised several specific needs which include:

- Physiological needs – They are the lowest level of the hierarchy and comprise all the needs necessary for human subsistence (oxygen for breading, food, water, sleep, etc).

When these needs are not satisfied humans experiment physical discomfort, so they are on top of priorities;

- Safety needs – They are in the second lowest level and include the necessity of keeping oneself out of danger, thus living in a secure environment is a top priority when physiological needs are met;
- Belongingness needs – After all the previous needs are met humans focus their attention on the needs related with social interactions, which can include the sense of belonging and acceptance from others and the avoidance of solitude or being alienated from society
- Esteem needs – these type of needs which rank second in Marlow's hierarchy include self-respect and achievement (considered as internal esteem needs) and attaining a high social status, good reputation and positive recognition (external esteem needs);
- Self actualization needs – When all the other needs are fulfilled humans are motivated to seek things less palpable like truth, knowledge, wisdom and justice.

The five levels proposed by Winters et al (2001) were

- Safety and security which include personal safety and security, familiarity with route mode and destination;
- Time which is related with the trip´s efficiency in terms of time
- Societal acceptance which is related with personal and society attitudes towards the modes of transportation;
- Cost, related with fixed and variable costs of transportation;
- Comfort and Convenience which is related with the travel experience in terms of comfort, reliability and access.

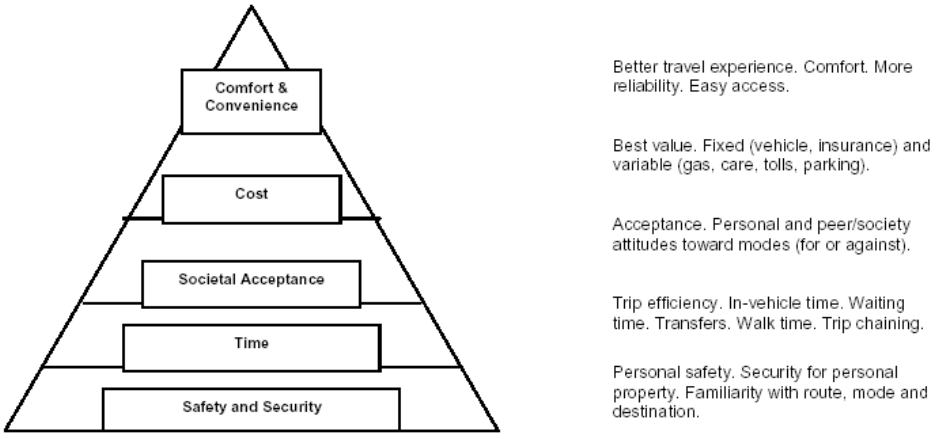

Figure 12. Transportation hierarchy of needs, based on Maslow (Source: Perone et al, 2005)

In the field of psychology it has become clear that Maslow was correct in stating that some needs take precedence over others, although it is not clear how this hierarchy motivates behavior in the exact same manner as Maslow has stated (Perone et al, 2005).

Based on Maslow´s theory but also on Alderfer´s Existence, Relatedness and Growth Theory of Needs (ERG) Perone et al (2005) proposed a Transportation Hierarchy of Levels. In

Alderfer´s theory, which had the advantage of being able to be empirically tested, the three levels could be related to the ones defined by Maslow:

- Existence which comprise the two first levels of Maslow theory – physiological and safety needs, describes the general human concern with material existence;
- Relatedness, which is related with the human desire for having and maintaining interpersonal relationships. This level encompasses Maslow´s belongingness and esteem needs, thus being a more general category;
- Growth this term describes the innate desire for personal development and encompasses self actualization as defined by Maslow

Perone et al (2005) use the same three levels defined by Alderfer but contextualizes them within the transport sector:

Growth - The attributes found in the Growth category are luxury amenities and altruistic behaviors involving transportation:

- Aesthetic amenities
- Cost
- Convenience
- More altruistic reasons for using a certain mode
- Promoting alternative modes to help social justice

Relatedness -. Relatedness was categorized into the following:

- Reciprocity, consistency, social proof, authority, and liking
- If mode choice is accepted by important others
- Belongingness while using a certain transportation mode (Seethaler & Rose, 2003).

Existence level of transportation needs:

- Concern about victimization during travel
- Being able to have comfortable accommodations./shelter from the elements
- Relative safety of roadway and facilities by mode
- Ease of way finding/navigation in the system
- Ease of use of transit system, bike facilities, pedestrian facilities, or roadway

Perone et al (2005) discusses which persuasion principle is most effective in changing transit behavior. Principles that originate from lower level in the hierarchy of needs, would have a greater effect on changing transit behavior. The latter statement is, unfortunately, not yet proven or disproven.

2.3 Aversion and Attraction Factors

Zhou et al (2004) undertook a market analysis of transit user in the San Mateo County Transit District aimed at understanding customer attitudes and perceptions and create market segments that reflect and account for traveler attitudes. This work recognizes and quantifies the impact of socio-economic characteristics, service attributes, and communication channels on the formation of travelers' perceptions and ultimately on their choice of mode and the demand for transit. A factor analysis step was performed and resulted in eight attitudinal factors:

- Factor One Privacy and Comfort. This reflects respondents' preference for privacy;

- Factor Two corresponds to travelers' Productive Use of Time. This factor reflects travelers' desire to make productive use of their time during the travel, even if they have to change their mode of travel. These statements reflect the priorities of travelers who are usually in a hurry when they make a trip;
- Factor Three represents Safety and Familiarity. It includes important statements regarding concerns for safety during travel. This factor also includes statements indicating the degree of familiarity with public transit system;
- Factor Four is a dimension reflecting respondents' statements regarding Time and Flexibility. This factor reflects the desire of travelers' to make a variety of trips during the day and their desire to spend as little time as possible when traveling;
- Factor Five corresponds to attitudes that are grouped under the Easy-going and Environmentally Friendly group of statements;
- Factor Six is a dimension that shows travelers' Value of Time;
- Factor Seven is about Reliability and Control. People have different preferences and expectations for travel reliability, and different feelings towards being in control;
- Factor Eight shows travelers' Fixed Schedule Constraints. This factor reflects schedule concerns.

These factors were used to create the market segments and can be related to the socioeconomic data in the census. The followed approach helped to identify market segments that could be targeted by different improvements of transit service.

Krizek and El Geneidy (2007) studied the habits and preferences of transit users and non users in the Twin Cities Metropolitan Area. Using a factor analysis they uncovered eight factors describing users of public transport attitudes and perceptions, related with the following aspects:

- Drivers attitude, derived from measures assessing transit drivers attitude;
- Customer service, derived from measures describing services available for transit customers;
- Type of transit service, related with service hours, park and ride facilities, number of services and payment methods;
- Reliability and confidence in the service;
- Household income and value of time, related with measures of income, car availability and evaluations of transfer times;
- Cleanliness and comfort;
- Safety perception;
- Personal characteristics, related with age and the how long the respondent uses the bus service.

To the car users a similar procedure was used which uncovered the following eleven factors:

- Aspects related with safety and comfort;
- Aspects and issues related with transit drivers attitudes;
- Amenities levels of service and fulfillment of special requests;
- Commuting characteristics(distance, travel time, distance to nearest bus stop, etc);
- Reliability;

- Location and type of transit service;
- Travel cost, related with the parking and transit costs;
- Children, related with the need to transport children to school or kindergarten;
- Travel time, comparing bus travel time with other modes;
- Personal characteristics, related with social status aspects.

Both of these groups where then segmented (using cluster analysis) in groups of captives and people who could choose between modes, and these two groups segmented in regular and irregular commuters, and the differences between them where highlighted, allowing the discovery of trends that could attract more users for public transport.

Hine and Scott (2000), used several Focus Groups and in-depth interviews techniques of both public transport users and non users in Scotland to examine the effects of interchange on mode choice. Their results pointed to problems of reliability related with bus services, lack of information and also lack of perceived security.

Regarding interchanges, the need for coordination between operators, namely for connections and ticketing, was considered of vital importance. The need to plan in advance a transit trip with interchanges is seen as a major deterrent for car users. Reliability, comfort and the need to cope with unforeseen problems were other deterrents for car users. For them the car was strongly associated with flexibility and convenience, being that the transit characteristics were generally the antonyms of those used to describe the car.

An explorative analysis was undertaken by Steg (2005) and aimed at examining dimensions underlying the attractiveness of positive aspects related to car use revealed that respondents make a clear distinction between instrumental motives for car use on the one hand, and symbolic and affective motives on the other. This study validates the significance of non-instrumental factors. Thus we shall, briefly, present these two types of motives below: Instrumental Versus Non-instrumental - Symbolic and Affective

- Instrumental Motives are defined as the convenience or inconvenience caused by car use. Example: speed, flexibility, safety. Aspects influencing travel behavior within this type of motive could be related to such adjectives: cheap, comfortable, easy, environmentally friendly or fast.
- Non-instrumental – Symbolic Motives refer to the fact that people can express themselves and their social position by means of (the use of) their car, they can compare their (use of the) car with others and to social norms. Aspects influencing behavior within this type of motive could be related to power, social status or self-esteem.
- Non-instrumental – Affective Motives refer to emotions evoked by driving and which in turn can be categorizes in two dimensions: pleasure and arousal. Aspects influencing behavior within this type of motive could be related to sensations, feeling of power or superiority[6]

Symbolic and affective aspects significantly contribute to the positive utility of driving (Mokhtarian and Salomon, 2001). Attitudinal surveys such as the one presented by Handy et al (2004) suggest that a notable share of driving is by choice rather than by necessity. The former

[6] Three scales were used for both categories: 1) pleasure: angry versus happy; unsatisfied versus satisfied; annoyance versus pleasure. 2) Arousal: tense versus relaxed; hurried versus peaceful; aroused versus calm.

includes reasons for driving separating intentional and unintentional ones. The reasons given as a conscious choice are: value of driving in itself, value of activities while driving and variety seeking. The unintentional reasons are divided into two categories:

- Lack of conscious thought, which includes habit and poor planning;
- Unconscious influence, which includes misperceptions and lack of information.

3 Methodology and results

3.1 Methodology description

The approach used in this study was based on a Focus Group which is part of a larger data collection scheme including a web administered survey (is questionnaire is being finalized and awaits a pilot phase, prior to its administration) which includes one group of questions describing actual travel behavior, a stated preference experience and a group of attitudinal questions.

This first qualitative research technique was used with three complementary objectives. The first one was to find aspects of public transport, car and the new alternative services that could act as attraction or repulsion factors. The second objective was to identify attributes characterizing the new services that could be used in a stated preference experience aimed at estimating demand levels for them. The third and last objective was to identify potential attitudinal aspects that should be included in the web survey.

The Focus group phase included three group interviews, each with eight people[7], aimed at people with car available and distributed in the following way:

FG 1 – residents in Lisbon and its suburbs well served by public transport, age group between 18 and 35 years old;

FG 2- residents in suburbs inadequately served by public transport, age group between 25 and 45 years old;

FG 3 - residents in Lisbon and its suburbs well served by public transport, age group of 40 years old and over.

3.2 Focus Group results

3.2.1 Opinions and attitudes about current modes of transport

Ten of the respondents stated that they use the car every day in their commutes; five use public transport and six use both (using the car to take them to a rail or metro station). Two of the respondents, depending on their daily schedules and activities use the car or public transport.

The main reasons stated by the respondents for their common commuting mode choices were: safety, comfort, travel time, costs, transit pass flexibility, hygiene, conditions of public transport and practical aspects.

When questioned about the factors that they evaluate negatively in public transport the answers revolved around the following aspects:

[7] In the third focus group only seven people were present.

- Public transport is usually very crowded during peak hours, there are not enough services during these periods;
- In some areas there are no public transport services available;
- Low and inadequate frequency during periods outside peak periods, especially at night. Lack of punctuality;
- Lack of information about schedules and system breaks. There are also problems related with the information´s quality, it's no totally clear and sometimes is erroneous, for example the expected arrival times presented in bus stops;
- Lack of coordination between different public transport modes, especially in terms of schedule coordination;
- Lack of comfort and hygiene. Particularly for people travelling with babies or little children the public transport is seen as particularly uncomfortable;
- Unsafe particularly trains and buses;
- The number of bus lanes is seen as insufficient and buses suffer a lot from abusive use of them by drivers. The levels of enforcement are low;
- Public transport is expensive, especially for infrequent users. When two or more people do the same trip the car tend to be a more economic alternative.

The positive aspects of public transport reported by the respondents were:

- For the bus economical and fast, if there are bus lanes available;
- For the tram: economical fast in routes where there are specific lanes available, environmental friendly
- For the Metro very fast and effective, comfortable (except at rush hour), economical and environmental friendly
- For the train fast, comfortable (except at rush hour), economical and environmental friendly

The taxi is seen as being expensive and as last resource. The other problems associated with this mode are the lack of courtesy by the drivers and the fact that lots of taxis are in poor shape. On the positive side the taxi is seen as convenient, practical, fast, comfortable and safe.

The evaluation related to the car presented positive aspects related with a sense of privacy, security, convenience, liberty and autonomy. The car was also considered as offering a direct trip without the need of interchanges.

The negative aspects related with the car were its high cost of use, congestion, parking difficulties and the cost of parking.

Generally non users of public transport tended to evaluate it in a more negative way and didn´t had a clear notion about the public transport services existent. In one of the group interviews this led sometimes to some car user giving examples of trips that he/she would use public transport was available and being contradicted by one of public transport users showing examples of public transport services (mainly buses and tram) that served both trip ends.

Respondents were also asked about which kind of measures would make them use public transport more often instead of the car and possible solutions for the transport problems within the Lisbon Metropolitan Area. Regarding the first question the answers were: having a more ubiquitous

metro network, better interfaces, more and better information about schedules, more bus lanes and higher frequencies during longer periods (periods outside the main demand peaks). Possible solutions for the transport problems within the Lisbon Metropolitan Area included, besides the ones referred before, better coordination among different public modes, more parking near interfaces, extending public transport service to areas with poor accessibility, better interfaces within the metro network, more tram lines and introducing other light rail projects, collective transport services for companies, special services (based on taxis) at the neighborhood level to pick and drop children at school and fomenting the use of non motorized modes, particularly bicycles.

It is interesting to note that most of the measures proposed fall in two categories which could be properly called increasing public transport supply and performance and increasing intermodality. Few answers could be interpreted as a will to introduce new and innovative transport systems. We could not know however exactly why people responded in this fashion. Could it be because some of the measures presented are the ones that are constantly presented to them in the media and politicians talk about? Or it is because people really see them as the solutions for their transport problems? Also measures that recently have been subject to much attention by the media like urban tolls or congestion charging were completely forgotten.

One other important point is that the evaluation about the different modes was in some ways very similar to other evaluations perceptions and views about public transport.

3.2.2 Alternatives evaluation

The collective taxis was the first of the new solutions evaluated. People´s spontaneous receptivity to this solution revolved around the fact that preoccupations about privacy and security might be a big disadvantage for this solution, although most of the respondents showed themselves receptive to this solution. It´s advantages were the price, being more environmentally friendly. The system was also seen as a good option for providing transportation to activities usually undertaken in periods were public transport is not frequent and the car is a less than optimal solution (for example ‚going out at night). Its disadvantages' were the increase in travel time, decrease in travel time reliability, security issues (mainly associated to women), and the fact that the price might not be sufficient low to compensate for the lack of performance when compared to normal taxis.

The spontaneous receptivity to express minivans was mainly conditioned to the service schedule and functioning periods. The perceived advantages were the fact that this system could solve the problems associated with the different multimodal transit passes and its comfort, when compared with traditional buses. The disadvantages were its lack of flexibility to serve people with more complex travel patterns and possible costs associated with the service.

Carpool was seen by the respondents as an alternative that most of them would use only as a last resource. Respondents also stated that this system is not culturally adapted to the Portuguese although some of them saw it as some kind of inevitability. Carpool main advantages, as seen by the respondents, were the costs associated with it and the fact that could be more environmentally friendly. Its main downsides were the loss of independence and autonomy and the possibility of conflicts (and the need to manage them).

Real time dispatch of passengers had a very appealing aspect which was the provision of better information for passengers, although the possibility to change travel times within a certain limit was met with skepticism and negatively evaluated. The positive aspect related with this alternative was its convenience, but the service should be well publicized and bus stops could also have the same information available for bus users. Its disadvantages were mainly related with its implementation and the skepticism to which this alternative was met.

The park and ride with children depot was also met with skepticism, the majority of respondents evaluate it in a negative way, mainly due to lack of confidence issues. This alternative advantages were mainly the ones associated with park and ride, for people who don't mind leaving their children with others. The main downsides were perceived lack of security for children, lack of confidence in children´s tutors and drivers and problems associated with having children with different ages together.

The implementation of a more restrict parking policy and enforcement was seen as an effective way to dissuade people of using their cars so often but parking spaces near public transport interfaces should augmented and free of charge. Also respondents stated that the number of parks should be higher.

The implementation of congestion charging or urban tolls were met with some kind of mixed feelings. In principle people agree with the measure but their approval is conditioned to type of use given to the money collected by the system and the necessity to provide some kind of support to the ones that have an absolute need to use their cars. Generally respondents stated that it would be preferable to have financial incentives to not bring the car within the city limits.

Regarding the provision information respondents pointed to the fact that reliability and precision is an important issue and that information should be better in terms of providing data about intermodal options.

4 Conclusions and future developments

The present paper describes undergoing work about the feasibility of introducing new transport services targeted mainly to drivers. This project is in its empirical research phase, with the preparation of a stated choice experiment. In order to have more in depth information about attributes of each one of the alternatives presented three Focus Groups were made. Its objectives, besides the one mentioned before, were also to collect information about attitudes and perceptions about the current transport alternatives and problems experienced by the respondents.

Generally people's perceptions about the different modes advantages and downsides were similar to the ones found in the literature review.

Most of the measures proposed by respondents in order to solve mobility problems within the Lisbon Metropolitan Area fall in two categories which could be called increasing public transport supply and performance and increasing intermodality levels. Few answers could be interpreted as a will to introduce new and innovative transport systems. Also measures that recently have been subject to much attention by the media like urban tolls or congestion charging were completely forgotten

Some of the new alternatives proposed were met with some skepticism; those were real time dispatch of passengers and buses, park and ride with children drop-out and pick-up by professional tutors, carpool and congestion charging/urban tolls. The reasons for these reactions could be related with cultural issues (park and ride and park and ride), the need to define exception regimes and other complementary or substitute measures (urban tolls) and feasibility aspects (real time dispatch).

The results from these Focus Groups helped in the attributes definition for the alternatives presented in the stated preference exercise, but also in giving more precision to the description of each alternative (properly highlighting some aspects that were either incorrectly perceived during or missed in the Focus Group). These results also helped in the definition of attitudinal questions to be present in the SP survey which is completing its designing phase

References

Beimborn, Edward A. et al (2003), Accessibility, Connectivity, and Capacity. Impacts on Transit Choice, Transportation Research Record: Journal of the Transportation Research Board, No. 1835, pp. 1–9.

Clerq, Frank le e Vries, Jaap S. de (2000), Public Transport and the Compact City,Transportation Research Record nº 1735, pp 3-9.

Handy, S., et al. (2005), Driving by choice or necessity?, Transportation Research A **39**(2-3), pp 183-203.

Hine, J and Scott, J. (2000) Seamless, accessible travel: users' views of the public transport journey and interchange, Transport Policy 7, pp 217-226.

Krizek, Kevin and El-Geneidy, Ahmed (2007), Segmenting Preferences and habits of transit Users and Non-Users, Journal of Public Transportation, vol 10, nº 3, pp 71-94.

Litman, Todd and Laube, Felix (2002), Automobile dependence and economic development, Victoria Transport Policy Institute, http://www.vtpi.org/ecodev.pdf, accessed in May 2008.

Mokhtarian, P. L. and Salomon, I. (2001), How derived is the demand for travel? Some conceptual and measurement considerations, Transportation Research A, **35**(8): 695-719.

Perone, J. S., et al. (2005), Assessing hierarchy of needs in levels of service, NCTR 527-08; FDOT BD 549-1 Transportation Research Board (TRB), Nacional Research Council.

Steg, Linda (2005), Car use: lust and must. Instrumental, symbolic and affective motives for car use, Transportation Research A **39**(2-3), pp 147-162.

Winters, PL; et al. (2001). Assessing Level of Service Equally Across Modes. A report for the Florida Department of Transportation and NCTR, Contract BC353RPWO#15. 1-53.

Zhang, Ming (2002), Conditions and effectiveness of Land Use as a Mobility Tool, Massachusetts Institute of Technology, Phd Thesis.

Zhou, Yushuang et al (2003), Transit District Customers in San Mateo County, California. Who, Why, Where and How, Transportation Research Record: Journal of the Transportation Research Board,No. 1887, pp. 183–192.

Part 3. Urban Planning Policies

Introduction to Urban Planning Policies

Strategic planning for metropolitan regions between planning theory and practice

Klaus R. Kunzmann

In recent years metropolitan regions have found new interest among the community of planners across Europe. Under neo-liberal politics, their cities have become the preferred target of urban researchers, planners, policy advisors and politicians. As centres of creativity, consumption, and economic strength, metropolitan regions in Europe are seen as territories, where innovation and knowledge is produced, where new creative industries flourish, where young and qualified citizens like to live, and where new life styles are experimented. These are, as the proponents of the "metropolitan fever" argue, the "ingredients" of success of a future oriented metropolitan city in Europe in times of globalization. Consequently, regional policies aim at promoting initiatives and projects, which raise the competitiveness of metropolitan regions. This is being done in Germany, as in Scandinavia, France, Spain or Portugal.

In order to achieve the overall objective of competitiveness, the international image of the core of the metropolitan region, the historical city centre is used to attract qualified labour, investment and events. The core is marketed as the European city and supported by open or hidden state-led gentrification strategies. The reality of the remaining 90 percent of the metropolitan region (the spatial development within metropolitan region) is that large suburbanized townscapes of the metropolitan are very much neglected. These are left to private developers who meet the demand of those, who are driven out to the suburbs by market forces, or prefer semi-rural lifestyles at the edge of the city. Apart from some historical islands with local cultural identities, the much-acclaimed European city is, as a rule, a fuzzy mosaic of residential, industrial and recreational land uses, reflecting thousands of weakly co-ordinated decisions on zoning, infrastructure development, or local economic initiatives, which in turn are framed by building permits and investment decisions of the public sector.

Though planners claim that they carefully guide development processes in the metropolitan region and create the just city, the sustainable city, the zero emission city, the 'cosmopolis', the compact city, the knowledge city or the creative city, in reality, they do not have much power to achieve their professional or academic ambitions. The limits of planning are obvious. Social justice may be a legitimate paradigm for planners, though they may overestimate their role in achieving social justice by spatial planning. Many planners, though certainly not on purpose, do rather add to social injustice in day-to-day planning, when taking decisions on locations and infrastructure development. "We need to face the inevitability of inequality and urban decay in a globalized regime of flexible accumulation and capital circulation, while understanding the specificities in the decline and restructuring of Oporto as a European city" write Ricardo Cardoso and Isabel Breda-Vázquez in their contribution to this volume. This is probably a very realistic position, though it leaves open, what planning can and should contribute to maintain or even improve human life spaces in a metropolitan region, an ethic goal planners are not supposed to give up.

Planners have hardly any influence on social or economic policies, not on tax systems, which guide decisions of households and enterprises, nor do they have much power to moderate political jealousies between suburban local governments, competing for investors and tax payers. Quite often the value systems of planners and of citizens, differ considerably. Thus planners may just have a modest moderating role, once they are encouraged, authorized and educated to act as moderators, or they withdraw to an outside position as critical observers and commentators of what they read, and see, and hear and feel. One cannot overlook that the gap between (Anglo-American dominated) planning theory and European planning practice is continuously widening. To theorize on the shortcomings of urban development and regeneration in European metro-regions is one thing, the pro-active involvement in planning for change in metro-regions is another thing. To bridge the two positions is a challenge, to which planning research, planning practice and planning education, have to respond. The recent financial crisis may raise the demand for applied research to provide appropriate empirical evidence for better strategic planning in metropolitan regions under new economic and financial conditions.

Despite many well-argued predictions, new information and communication technologies have rather contributed to a further concentration of economic development in metropolitan regions. Though, in theory, ICTs would allow to carry out work wherever one likes to be, reality shows that face-to-face contacts cannot be replaced by electronic and virtual communication. Reurbanization trends clearly show that living in the city is preferred to suburban or country lifestyles, by younger generations as well as by senior citizens. For individuals and households, ICTs are just a means to improve access to information and to accelerate communication. In contrast, it seems that ICTs can improve professional planning practice. It seems that in Portugal the majority of planners feel that municipal councils have benefitted from the introduction of ICTs. They have improved access to basic information; have made mapping easier, and facilitated spatial monitoring. The paper by Miguel Branco-Teixeira and Isabel Breda-Vázquez, who carried out an impressive survey of ICT use in local governments in Portugal, will disappoint those, who expect that ICTs will enhance public participation processes. However, it may be too early to bury the potential of ICTs for public participation. Once, the new technologies are used by the whole electorate and not just by the younger generation, new developments may take place, though in the end planners may not be happy with excessive electronic involvement. At least it will make their professional life not easier.

There are many labels for what Álvaro Domingues explores in his essay and calls extensive urbanisation. The Italians call it *città diffusa*, Germans use Thomas Sieverts term *Zwischenstadt*. In England, Deyan Sudjic has labelled it the '100 miles city', and Stephan Graham 'splintering urbanism'. John Friedmann termed it the 'urban field' and Ed Soja 'expolis'. They all refer to the continuously expanding metropolitan territory, a challenge for which planners seem to have no convincing response. They plead for strong metro-authorities which have the power over the many parochial local governments, pursuing their own egoistic development path, or they give up such e ambitious comprehensive top-down approaches and rather focus on single catalytic projects, which set physical marks in the metropolitan space. These marks will then be islands with light towers of consumption in the sea of hypersuburbia. Time will show, whether strategic approaches to overcome local parochialism like the Portuguese ECT inspired by the French SCOT, will be the

right instruments to address hyperurbanization. In the end it will depend on enlightened planners and courageous politicians, whether they can develop, enforce and implement convincing visions for balanced development in a metropolitan region.

Undoubtedly the global financial crisis of 2008/2009 will further acerbate spatial and social disparities in metropolitan regions. Most probably construction for private and social housing will slow down as a consequence of an ailing demand for land and property. The crisis has clearly signalled that neo-liberal economic policies are not any longer the recipe for global economic wealth, and that there is a role of the public sector (on behalf of the tax payers) to cushion the regional economic and social implications of the speculative global financial system. Though the international banking system and large industrial corporations may be saved by joint European action, public budgets available for social cohesion at all tiers of planning and decision-making will certainly not increase, and means to explore and experiment new public-private approaches will not be available in the years to come. In contrast, more confidence will be granted to the public sector, as long as he demonstrates professional competence. Planners in the public sector may benefit from this turn, if they can convincingly communicate their local social, ecological and aesthetical concerns and spatial strategies.

The lusophone discourse on metropolitan development and on the dialectics of planning theory and planning practice is worthwhile to follow-up, even though it sometimes focuses too much on theories of post modernity and seems to neglect experience and development in other European planning cultures. It gives another view of metropolitan developments. Planners in other countries should be encouraged to study the refreshing thoughts, which are well presented in this section of the book.

Planning tensions towards a new urban paradigm: social justice and the regeneration of Portuguese cities

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As an activity concerned with transformative action, planning gains depth and texture in the tensions developed both with and within its sphere of intervention. Ranging from the deep social to the purely rhetorical, such tensions are dynamically as well as degenerately reproduced through planning theory and practice. One of the most productive tensions in theoretical debates concerning social justice and the city has been laid out by the parallel conceptual paths taken by political economists and postmodernists, and critically reconfigured in recent times as an argumentative tension between the vision of the *just city* and the road *towards cosmopolis*. This paper aims to depict and balance the lineaments of this tension by focusing on the formulation of the just city as an urban society allowing for human flourishing. By way of illustrating its pertinence and help rescuing its progressive potential in the Portuguese context, it delineates some issues for future evaluation of urban regeneration initiatives in Porto. Straining critically the main features of such initiatives along this new urban paradigm, our transcending objective is to help breeding fruitful socio-political tensions as a means to achieve social justice in Portuguese cities.

Keywords: planning theory, social justice, just city, cosmopolis, regeneration

1 Introduction

Tensions of all sorts permeate both private and public spheres of everyday life. For decades, the entire planet has been trapped in a profound ideological tension, just like now religious tensions are impinged on the lives of many throughout the world. Whole societies have changed on the basis of deep social, economic and cultural tensions, just like now our common future should change due to environmental ones.

As an activity concerned with transformative action, planning gains depth and texture in the tensions developed both with and within its sphere of intervention. They replicate and are replicated by wider states of tension (like the above) and range from the deep social to the purely rhetorical. Moreover, they are dynamically as well as degenerately reproduced through planning theory and practice. One of the most productive of these tensions in theoretical debates concerning social justice and the city has been laid out in the parallel conceptual paths taken by political economists and postmodernists, and critically reconfigured in recent times as an argumentative tension between the vision of the *just city* and the road *towards cosmopolis* (see Cardoso and Breda Vázquez, 2007).

Our transcending objective as researchers is to help rescuing the progressive potential of such fundamental tension in the context of spatial planning and urban policy making in Portugal, while breeding fruitful socio-political tensions as a means to effectively achieve social justice in its cities. In this paper, the specific aim is to contribute to re-equilibrate the existing theoretical balance in that very same tension, while connecting empirically with issues for further research in the specific field of urban regeneration. We intend to continue studying these issues and will use inner

Porto's case to evaluate urban regeneration policy at the national level, particularly the role played by Urban Rehabilitation Societies (SRUs). More specifically, we plan to analyze the intended revitalization of Bolhão municipal market against the framework laid out in this paper. For this reason, this paper makes some initial empirical connections with the reality at play as a means to illustrate the theoretical argument, show its pertinence in the Portuguese context and circumscribe the core content of further research.

2 The pertinence of a two-dimensional theory of justice

Debates on social justice in contemporary societies take form in the critical tension between economy and culture in the context of global capitalism. Two dominant forms of injustice can be identified (see Fraser and Honneth, 2003). On one side injustice refers to a lack of resources and wealth due to economic inequality. On the other, it implies lack of cultural recognition for what is one's identity. These correspond respectively to two types of claims for social justice which were first made explicitly spatial by David Harvey and Iris Marion Young: claims for redistribution, in which the goal is for spatial and socio-political configurations bestowing a more just distribution of benefits and burdens (Harvey, 1973); and claims for recognition, where the goal takes the form of a difference-friendly urbanity open to unassimilated otherness (Young, 1990). In the lusophone academic literature they fit together with Sousa Santos' project to "reinvent social emancipation" while finding paths for both non-capitalist production (Sousa Santos, 2003) and cultural cosmopolitanism (Sousa Santos, 2004).

Given such critical landscape, our project for planning follows Fraser's political-philosophical mission in running across its shaping tension. She argues that its portrayal as an opposition of mutually exclusive alternatives constitutes a false antitheses. The fact is that real-world axes of subordination and corresponding social divisions affect "groups [that] suffer both from maldistribution and misrecognition *in forms where neither of these injustices is an indirect effect of the other, but where both are primary and co-original*" (Fraser, 2003: 19, emphasis in original). They are always "two-dimensional", which for Fraser means that "[only] by looking to integrative approaches that unite redistribution and recognition can we meet the requirements of justice for all" (Fraser, 2003: 94).

To this follows a fundamental task of devising a two-dimensional theory of justice that aims at programmatic and transformative political strategies of social egalitarian redistribution as well as recognition of difference. Like Fraser, we pursue it by attempting to devise an overarching dualist framework for planning theory and practice that encompasses both sides of the identified argumentative tension without reducing either of them to the other, or reinforcing the present-day dissociation of class and identity politics. The fundamental drive behind this attempt is the possibility of making dynamic use of the societal tension between economy and culture in order to delineate a comprehensive conceptual alternative to the utilitarian standard still dominating contemporary planning endeavours (Fainstein, 2008).

3 Planning as a utilitarian, rationalizing (and neoliberal) project

"Utilitarianism's kinship to planning lies in its basis in rationality" (Fainstein, 2008: 2). In fact, notwithstanding existing alternatives, the original understanding of planning as a technical apparatus aspiring at value-free objectivity to intervene in the territory remains pervasively dominant. The public interest is no longer monolithically understood, neither the state is seen as the only possible holder of that apparatus, but the interest of the whole living under a particular state jurisdiction is taken as the aggregate of its individual interests (Fainstein, 2008). Somehow, planning continues to be seen as capable of determining the relationship between means and ends in order to choose the right set of actions, but its appropriateness is now celebrated as the maximization of the total sum of individual benefit in a city under "the rule of markets" (Brenner et al 2005).

This aggregative methodology, as Fainstein puts it, persists on leaving planning susceptible to anti-utilitarian attacks on its "blindness to distributive outcomes, and its failure to require democratic procedures" (Fainstein, 2008: 2) and subsequently calls for an alternative dualist approach like the one we are attempting to put forward. Most importantly, bringing this widespread methodology into play seems to be crucial for deepening our understanding of planning in Portugal. Not only because of the "remaining significance of scientific rationalism in shaping mainstream planning" (Cardoso and Breda Vázquez, 2007: 397) in this country, but also due to the increase of "neoliberal policy experiments, institutional innovations and political-ideological projects" (Brenner et al 2005: 15) undertaken under the label of urban regeneration/revitalization (Queirós, 2007).

Borrowing Fainstein's reading of urban redevelopment programs to produce a preliminary understanding of Bolhão Market's case, overall individual benefit is assumed to be maximized by redeveloping the market as a 'dynamic catalyst to regenerate and reinvigorate'[8] downtown. Following the neoliberal craze, the diversification and modernization of spaces and the introduction of new urban functions (such as new commercial activities, recreational/cultural spaces and housing) aim to broaden public/consumer access to the market and its surroundings. It does not matter, however, if some people will see their livelihoods and lifestyles displaced in the process. As it guarantees the revitalization of the market in a way that benefits other people to increase the total sum of satisfaction, the intervention is deemed to be crucial.

From the utilitarian viewpoint, it does not matter how this sum is distributed. Paraphrasing Fainstein, as long as total satisfaction increases, it is unimportant that the material gains of redeveloping the market are directed to specific individuals (the developers seem to be the most immediate winners in Bolhão) while public benefits (like economic growth or public space improvements) are diffuse (Fainstein, 2008: 2).

Utilitarians also overlook the importance of deliberative recognition in decision-making. As long as maximization of benefits is guaranteed, it is unimportant how the relationship between means and ends is determined, and whose opinions and needs are recognized in determining the corresponding policy instruments (like SRU's masterplan). At most, democracy means the dispute of alternatives "within the marketplace of ideas" (Fainstein, 2008: 3) and competitive bidding (undertaken by the municipal council and SRU).

[8] Taken from the promoter's (TCN) website (http://www.tcnpp.com).

Unmistakably, each of these two major utilitarian planning disregards corresponds to one side of the alternative dualist project for the discipline we whish to develop. In fact, they are the core of its critical positioning in relation to mainstream planning and constitute the contextualized motive for presenting social justice as a normative two-dimensional principle for planning theory and practice, task to which we devote the remainder of this paper.

4 Dynamizing tensions for an alternative planning future

The comprehensive framework that constitutes our project mimics Fraser's general theory of justice in a loosely fashion by focusing on a fundamental argumentative tension in critical planning theory. This follows the dualist understanding (as Fraser would call it) best encapsulated by the parallel arguments of political economist and postmodernist approaches to planning theory and practice. Encompassing both redistribution and recognition, it challenges injustice by putting together two equally parallel urban utopias: Fainstein's (2008, forthcoming) *just city* and Sandercock's (1998, 2006) *cosmopolis*. Making use of Fraser's categories, the resulting framework can be summed up by looking at the parallel ways in which subordination, sufferers and remedies are conceptualized (see also Cardoso and Breda-Vázquez, 2007).

4.1 The form of subordination

Coming from the 1970s Marxist tradition of urban analysis, political economist approaches to planning focus on economic class subordination, or injustices rooted in the deep-rooted economic structures of urban societies. On the other hand and incorporating the profound transformations in the means of experiencing space and time that happened in the late 1980s, postmodernist approaches to planning target different forms of cultural status subordination, or injustices rooted in the socially ingrained cultural patterns of urban life.

4.2 Who suffers?

For the political economists the victims of injustice are defined by the economic relations of production shaping class structures in the urban realm. Therefore, they are systematically denied means and opportunities to access urban resources on an equal basis with others. By the same token, postmodernists understand those victims to be shaped by the cultural relations of recognition contributing for status hierarchies at the urban level. They are, in that sense, continuously denied the institutional conditions to be recognized as full, participating partners in urban interactions.

4.3 Planning remedies for injustice

From a political economist perspective the main remedy for injustice is envisioning economic restructuring. Focusing on transformative planning outcomes (instead of end-state outcomes), the ideal of the just city explicitly outlines a prospective urban setting where, in the context of structurally unequal capitalist societies, material equality and life chances are guaranteed. On the postmodernist side, the chief remedy implies cultural or symbolic change. Focusing on transformative planning processes (instead of merely affirmative ones), the ideal of cosmopolis as

an intercultural political community where city life as openness to unassimilated otherness implies an empowering civic culture of dialogue and negotiation.

Given their transformative lineaments, these approaches are both politically and theoretically constrained by the reality at stake. The tension we wish to make productive accepts capitalism as an unsurpassable fact of contemporary cities given that both urban ideals employ a notion of "non-reformist reform" (Fraser, 2003) that is grounded on the present possibilities for change. Leaving seeds for deep-rotted change, the dynamism of this tension is, in Fraser's terminology, transformative rather than affirmative[9].

But the present political context has also had an important effect on this tension's theoretical balance. The authoritarian tendencies of 'really existing socialism', the post-Fordist surge of neoliberalism and the rise of pluralist identity politics all "have conspired to decenter, if not to extinguish, claims for egalitarian redistribution" (Fraser, 2003: 8). In fact, within contemporary planning theory, claims for recognition through democratic deliberation tend to predominate. As Fainstein puts it, "the discussion is purely political rather than political-economic" (Fainstein 2008: 3) and therefore prevents a substance-led evaluation of structural economic inequalities and the way in which they produce and reproduce existing power relations. In the case of Portugal, this is evident when not only when we look at the way in which social and economic aspects have been gradually overlooked in urban revitalization strategies (Balsas, 2007; Breda Vázquez, 2005), but also when we appreciate in the increasing importance of governance change in academic, as well as in technical and political discourses (Cardoso and Breda Vázquez, 2008).

In this context, focusing on outcomes and content is an urgent task for planning theory. Like Fraser, we believe it is a mistake to conclude that the idea of deep economic restructuring should be dropped: "In today's neoliberal climate especially, it is important to retain the general idea of economic transformation, even if we are currently uncertain of its precise institutional content" (Fraser, 2003: 75). In what concerns our framework, this means that a focus on its economic side is pressing. Even if we generally obey to Fraser's perspectival reconstitution of economy and culture as interplaying analytical categories, we consider such focus to be crucial for reasserting redistribution claims in contemporary planning theory and applying the dynamics that our project strives for. This is not same as saying that the present emphasis on dialogical recognition must be thoroughly replaced, neither that planning processes in Portugal do not require urgent attention. What we are doing instead is to proceed strategically against the particularly unbalanced circumstances characterizing contemporary planning theory by putting emphasis on the material formulation of the just city and enable the identified tension to be productive.

5 Towards a definition of the just city

Before attempting to put together a material formulation of the just city, one should assert that it was through affirmative approaches to economic restructuring that planning theorists and geographers first conceptualized social justice in the city. Drawing on Rawlsian anti-utilitarianism,

[9] On the postmodern side, not focused below, this means this means *transforming wholesale patterns of representation, interpretation and communication in ways that would change everyone's social identity* instead of merely *upwardly revaluing disrespected identities and the cultural products of maligned groups* or *recognizing and positively valorizing cultural diversity* (Fraser, 2003).

they developed a liberal notion of justice as fairness[10] for the division and allocation of spatial benefits and burdens (Holloway, 1998). This was the normative ideal that was informing welfare states in the post-war period and led massive end-state relocation of services and resources from "have" to "have not" regions (Bromberg et al, 2007). Applied to Cartesian bidimensional patterns of access to urban functions, the logic was to provide each and different area of a city region with a level of services that was proportional to the total needs of its population and therefore equalised across space (Davies, 1968). Moreover and reinforcing the connection previously made between rational and neoliberal approaches to planning, some have argued (Fainstein, 2001; Harloe, 2001) that this search for a positive correlation between needs and standards has a contemporary equivalent in the fetish connections made between competitiveness and social cohesion to provide planning with a somewhat reinvented liberal formulation of the urban question and its solution. Portuguese planning is somewhere trapped between these two faces of the same coin: on one hand it relies on spatial distributions of urban functions and densities to solve problems of injustice, while on the other takes for granted the tacit synergies of contemporary social democracies in delineating urban policy.

But these affirmative ideals of territorial justice or spatial cohesion leave the underlying mechanisms of maldistribution in place. They are different forms of a "spatial reformism [that] transforms *allocational structures* into *distributional* problems and so suggests *distributional solutions* to *structural conditions"* (Lee in Hamnett 1979: 257 in Holloway 1998: 88, Hamnett emphasis). A transformative strategy, on the other hand, deals directly with the deep structural dynamics of spatial development and the production of the capitalist city. Here, production is distribution and therefore justice implies altering the capitalist market structure within which income and wealth are generated and distributed (Harvey, 1973).

As it was said above, the ideal of the just city employs a notion of non-reformist reform that is predominantly transformative. Its focus is on the substance of planning and its material outcomes in terms of peoples' life chances. In the tradition of the political economy critique, this implies an ideal that is foundationally opposite to any "schemes that enhance capital accumulation to the detriment of ordinary citizens" (Fainstein 1996: 21). The contemporary struggle, then, is for political arrangements that challenge the abuses of urban neoliberalism and make the economy work in benefit of the poor instead of promoting real estate and business interests. The dilemma, of course, is that the just city approach must go together with an unavoidable capitalist reality (Holgersen, 2008). This calls for a "dialectical urbanism" (Merrifield, 2002) requiring a deep understanding on how different scales and societal spheres are antagonistically related to restore class power (Harvey, 2006), and a coherent specification of an alternative utopian vision of urban life that confronts it and works as a standpoint to be used by the dominated classes (Fainstein, 2006; Harvey, 2000; Holgersen, 2008).

In the specific field of urban regeneration, this requires not only a thorough understanding of the fundamental dynamics in urban decay, but also knowledgeable sensitivity over governmental

[10] Based on two principles of justice: 1) [principle of liberty] that everyone has the same right to have equal basic liberties within a total system that ensures liberty for all, and 2) that social and economic inequalities should arranged to benefit the least advantaged among us [the difference principle, subsidiary to the first] (Rawls 1999, Campbell et al 2006: 242).

responses to it. Therefore, an initial research effort for the case of Porto must follow Neves Alves (2007) and Queirós (2007) in critically depicting city's interconnected processes of functional devolution, physical degradation and social vulnerability against the overarching dynamic that sustains them. In this respect, we need to face the inevitability of inequality and urban decay in a globalized regime of flexible accumulation and capital circulation, while understanding its specificities in the decline and restructuring of Porto as a European city (Andersen, 2002; Le Galès, 2002). In what concerns the role played by the state in its current revitalization dynamics, it is fundamental to frame them against "the ways in which gentrification has evolved as a competitive urban strategy" (Smith, 2002: 446). This will necessarily lead us to denounce recent urban regeneration efforts as attempts at state-led gentrification in Porto's city center (Neves Alves, 2007; Queirós, 2007). In sum, an alternative vision for Porto's urban reality must emanate from a clear understanding of disinvestment and reinvestment mechanisms and its implications in terms of class conflicts.

In the present context, the most pressing theoretical challenge is to articulate the ethical content of such an alternative vision in a way that is both coherent and possible. To this end, Nussbaum's (2000: 34) "defense of universal values" goes together with Sen's (2001: xviii) focus on "enhancing and guaranteeing the substantive freedoms of individuals" in providing a range of human capabilities as an outcome evaluating metric that sets a minimal standard below which justice is sacrificed (Fainstein, 2008). Through such approach, it is not only possible but pressing to establish a threshold level of what people are actually able to do and be, a basic social minimum beneath which human functioning is not possible (Nussbaum, 2000). The ideal of the just city is then conceived by Fainstein (2008) as a set of universally applicable norms allowing for human flourishing at the urban level. In the context of neoliberal urbanization, those norms will necessarily provide for an alternative social production of space that planners must incessantly defend against the escalating tide of "developers and politicians who make economic competitiveness the highest priority and give little or no considerations to questions of justice" (Fainstein, 2008: 15). In terms of our intended case study, this will entail us to specifying universal norms for urban regeneration and municipal market revitalization in view of Porto's trajectories of decay and revanchism.

6 Conclusion

The transcending objective of our project is to help breeding socio-political tensions that are fruitful and contribute decisively for the achievement of social justice in the city in Portugal and elsewhere. For that we rely on the productive (and reproductive) character of a fundamental tension in planning theory to build a comprehensive framework throughout which alternative practices to contemporary utilitarian ones are to develop. Its dynamism, however, depends on a balanced relationship between its constitutive parallel arguments. To this follows an urgent task to reassert the definition of the just city. It is for this task we wish to contribute for with our forthcoming analysis of regeneration initiatives in inner Porto.

References

Andersen H (2002) "Excluded places: the deprivation between segregation, urban decay and deprived neighborhoods", *Housing, Theory and Society* **19** 153-169

Balsas C (2007) "City centre revitalization in Portugal: a study of Lisbon and Porto", *Journal of Urban Design* **12**(2) 231 - 259.

Breda Vázquez I (2005) "A reabilitação do património edificado no contexto da regeneração urbana", *2º Seminário "A intervenção no património: práticas de conservação e reabilitação"*, Porto.

Brenner N, Peck J, Theodore N (2005) "Neoliberal urbanism: cities and the rule of markets", *DEMOLOGOS Working Paper,* University of Newcastle, Newcastle.

Bromberg A, Morrow G, Pfeiffer D (2007) "Editorial note: why spatial justice?", *Critical Planning* **14** 1-4

Campbell H, Marshall R (2006) "Towards justice in planning: a reappraisal", *European Planning Studies* **14**(2) 239-252.

Cardoso R, Breda Vázquez (2007) "Social justice as a guide to planning theory and practice: analyzing the Portuguese planning system", *International Journal of Urban and Regional Research* **31**(2): 384-400.

Cardoso R, Breda Vázquez (2008) "The Institutionalization of Just Decision-Making: Analyzing Planning Practice in Portugal", *submitted*.

Davies B (1968) *Social Needs and Resources in Local Services*, Michael Joseph, London.

Sousa Santos B *ed* (2003) *Produzir para viver: Os caminhos da produção não capitalista*, Afrontamento, Porto.

Sousa Santos B *ed* (2004) *Reconhecer para libertar: Os caminhos do cosmopolitismo cultural*, Afrontamento, Porto.

Fainstein S (1996) "Justice, politics, and the creation of urban space" in A Merrifield and E Swyngedouw (eds) *The urbanization of injustice*, Lawrence and Wishart, London.

Fainstein S (2001) "Competitiveness, cohesion, and governance: their implications for social justice" *International Journal of Urban and Regional Research* **25**(4) 884-888.

Fainstein S (2008) "Spatial justice and planning", *International Conference on "Justice et Injustice Spatiales"*, Nanterre.

Fainstein S (forthcoming) "Planning and the just city" in P Marcuse et al (eds) *Searching for the Just City*, Routledge, London.

Fraser N (2003) "Social justice in the age of identity politics: redistribution, recognition, and participation" in N Fraser N, A Honneth (eds) *Redistribution or recognition? a political-philosophical exchange*, Verso, London: 7-109.

Fraser N, Honneth A (2003) *Redistribution or recognition? a political-philosophical exchange*, Verso, London.

Harloe M (2001) "Social justice and the city: the new 'liberal formulation'" *International Journal of Urban and Regional Research* **25**(4) 889-896.

Holgersen S (2008) *Class conflicts and planning: a case study of contemporary development at Kings Cross in London*, VDM Verlag, Saarbrücken.

Holloway S (1998) "Geographies of justice: preschool-childcare provision and the conceptualisation of social justice" *Environment and Planning C: Government and Policy* **16**(1) 85-104.

Harvey D (1973) *Social justice and the city*, Edward Arnold, London.

Harvey D (2000) *Spaces of hope*, Edinburgh University Press, Edinburgh.

Harvey D (2006) "Neo-liberalism as creative destruction", *Geografiska Annaler, Series B: Human Geography* **88**(2) 145-158.

Le Galès P (2002) *European cities: social conflicts and governance*, Oxford University Press, Oxford.

Merrifield A (2002) *Dialectical urbanism: social struggles in the capitalist city*, Monthly Review Press, New York.

Neves Alves S (2007) "Narratives of urban decay, urban culture and gentrification in Porto", *Dissertation submitted in partial fulfillment of the requirements for the degree of MSc in Cities, Space and Society*, London, London School of Economics.

Nussbaum M (2000) *Women and human development: the capabilities approach*, University Press, New York and Cambridge.

Queirós J (2007) “The role of culture in urban regeneration policies: research notes drawn from Porto’s case”, *First International Conference of Young Urban Researchers*, Lisbon.

Rawls J (1999) *A theory of justice*, Oxford University Press, Oxford.

Sandercock L (1998) *Towards cosmopolis: planning for multicultural cities*, John Wiley, Chichester.

Sandercock L (2006) “Cosmopolitan urbanism: a love song to our mongrel cities” in J Binnie et al (eds) *Cosmopolitan urbanism*, Routledge, London: 37-52.

Sen A (2001) *Development as freedom*, Oxford University Press, Oxford.

Smith N (2002) "New globalism, new urbanism: gentrification as global urban strategy" *Antipode* **34**(3) 427-450.

Young I (1990) *Justice and the politics of difference*, Princeton University Press, Princeton.

Evaluation of ICT in Territorial Planning: the Perception of Planners

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This paper is centered on the relationship between new information and communication technologies (ICT) and spatial planning, particularly in what concerns the valorization of ICT in planning objectives and practices. Assuming that is desirable to achieve a deeper understanding of ICT in planning in face of the importance of the so-called network society and of the changing nature of the discipline, this paper focuses on an evaluation of planners sensibilities towards the power of ICT. Drawing evidence from a national survey conducted in order to measure planner's perception of the role of ICT in spatial planning processes, the paper addresses two interrelated sets of questions: How do planners conceptualize the mobilization of ICT resources in spatial planning and municipal planning practice? In what sense can ICT represent a useful tool for both actors' interaction and planning changes? The paper suggests that planners culture has a significant role on the perceived nature of the relationship between planning and ICT and remains an essential issue for fostering the use of ICT in face of new planning discourses on capacity-building and empowerment.

Keywords: information and communication technologies; spatial planning; e-planning; evaluation; interactivity

1 Introduction

Although ICT have been used by municipal councils as an aid in spatial planning for quite some time, little information is available relative to the impact of their use and to their current position within municipalities. The work of Pitkin (2001), Larsen (2003), Evans-Cowley and Conroy (2006) and, more generally, in relation to Portugal, de Santos and Amaral (2000, 2003a and 2003b) and Santos et al (2005) are laudable exceptions.

A questionnaire relating to the attitudes of planners, entitled "Territorial Planning and Information and Communication Technologies"[11], was drawn up for the purpose of understanding the role of ICT in the spatial planning that was taking place within Portuguese municipalities. A survey was carried out using this questionnaire, aimed at those in charge of planning within the 278 municipalities that cover the whole of continental Portugal.

Planners of municipal councils occupy a privileged position in this initial stage of ICT implementation, given that they possess a profound knowledge of the development of ICT in municipal councils and its relationship to territorial planning. This country-wide survey of individuals will therefore allow us to better understand some of the questions and assumptions associated with the area of ICT which have not yet been made clear or officially defined due to the fact that this area is so new. It is especially in relation to the professional experience of planners in this field that it is possible to become aware of the degree to which ICT are suited to carrying out the planning

[11] Although ICT are understood to encompass a wide range of technologies, this survey focuses specifically on computers, and especially on use of the Internet.

tasks required by municipal councils. In other words, it is possible to evaluate their level of development relative to so-called “e-planning” (Larsen, 2003; James et al., 2004).

The analysis that follows is based on the results of that survey, and aims to investigate the opinion of planners on the impact of ICT in activities of territorial planning. It seeks to obtain answers to the following questions:

- How do planners value the use of ICT in the different stages of the planning process? How also do they value the use of ICT in relation to the traditional methodologies used for creating territorial plans at a local level?
- What capacity do ICT have of generating change in the planning practices at a local level? How are these changes related to “e-planning”?

2 Planners participation in the survey

This survey was developed in the Territorial and Environmental Planning Department of the Faculty of Engineering of the University of Porto, and received support from the Office for Research and Planning of the Ministry for Cities, Regional Planning and the Environment. It was sent by post and e-mail to all municipalities of continental Portugal on 18 June 2004, with the deadline for receiving the completed questionnaires being set for the end of October 2004.

A ‘pre-questionnaire’ to the survey was initially drawn up and distributed to a number of planners. This was done in order to rigorously test the clarity and pertinence of the questions. The outcome of this test was extremely fruitful, with the various suggestions that were collected permitting the improvement of some of the questions, and the introduction of others.

Planners from 243 municipalities replied to the survey (87.4% of the total in continental Portugal), with the distribution throughout the country shown in Figure 1, with a total of 447 replies by planners being received, a number that ensured the reliability of the sample studied[12].

The majority of the sample obtained consists of questionnaires answered by younger planners, with 55.6% under the age of 35, 36.1% between 36 and 50, and the remaining 8.3% over 50.

In relation to the educational level of the planners surveyed, 4.0% have secondary-education only, 81.2% have a university degree, 5.6% have post-graduate studies and 3.8% have masters. A further 2.0% of the planners surveyed were holders of diplomas in technical studies.

It can therefore be seen that the average profile of planners surveyed basically consists of managers with higher levels of education, under the age of 35. It must also be pointed out that there are practically no planners older than 50 years of age holding post-graduate or masters qualifications (Table 12).

[12] The high quantity of statistical data obtained for analysis is of note: more than 4000 pages of questions including some tens of thousands of answers.

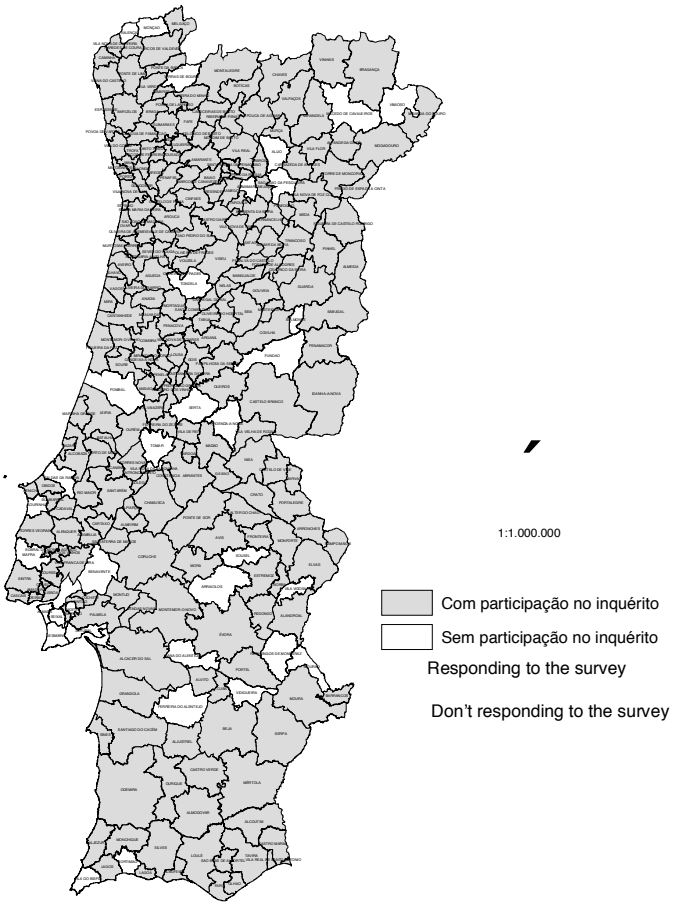

Figure 13. Local Authorities that responded to the survey

Table 12. Relationship between age and education level of respondents

	Under 35 years old (%)	36 to 49 years old (%)	Over and 50 years old (%)	Didn't answer (%)
Secondary	1,8	2,2	-	-
Technical Course	1,6	0,2	0,2	-
Graduate/Bach.	44,8	27,6	7,2	1,6
Post - Graduate	2,5	2,7	0,4	-
Master	2,5	1,3	-	

Universe: Total of Respondents (447)

Figure 14 shows the geographical distribution of the planners who sent in replies to the questionnaire, with their educational level taken into consideration.

It is possible to see from the chart that the planners with the highest levels of education belong predominantly to those municipalities situated in the north and along the coast of Portugal,

with the planners with fewer qualifications belonging predominantly to those in the centre and south of the country.

The data collected also allowed the planners who took part in this survey to be classified according to their profession, falling into two large groups.

One group consists of the senior managers responsible for making decisions on strategy and of the concrete measures to be taken in the areas of urban and spatial planning. Included here are heads of department, heads of section and other council executives.

The other main group consists of the specialized personnel who essentially carry out the day-to-day work involved in this area, and includes members of council staff at various levels.

It can be seen that out of the entire sample of council staff who responded to the survey, 29.5% are senior managers and 67.3% specialized personnel. It is important to note that these figures correspond to approximately 0.44 senior managers for each specialized member of staff, demonstrating the interest shown by senior managers in this survey. The survey was able to sound the opinion of a considerable quantity of senior managers within the municipalities of mainland Portugal, constituting a significant sample, and one that reveals the current and future situation relative to urban and spatial planning within councils, inside that huge field in which ICT find themselves.

As would be expected, the average age of the senior managers is much higher than that of the specialized personnel, falling mainly within the 36 to 49 age group, with the specialized personnel being mostly under 35 years of age (Table 13).

Despite there being notable differences between the two groups in relation to average age, the specialized personnel and the senior managers possess similar levels of education. An exception is in relation to masters and post-graduate degrees, in which the values for senior managers are slightly higher, at 1% above the figures for specialized personnel. In this context, and as may have been assumed by the data previously presented, the majority of specialized personnel and senior managers (more than 82%) hold a university degree or a bachelor.

Table 13. Professionals categories, according to age and education level

	Specialized personnel (%)	**Senior managers (%)**
Age		
Under 35 (inclusive)	73,4	13,6
36 to 49	23,9	62,9
Over 50 (inclusive)	1,7	23,5
Didn't answer	1,0	0,0
Level of education		
Secoundary school	4,7	3,0
Technical course	2,3	1,5
Degree /Bachelor	82,1	82,6
Post-Graduation	5,3	6,8
Master	3,7	4,5
Didn't answer	2,0	1,5

Universe: Total of Respondents (447)

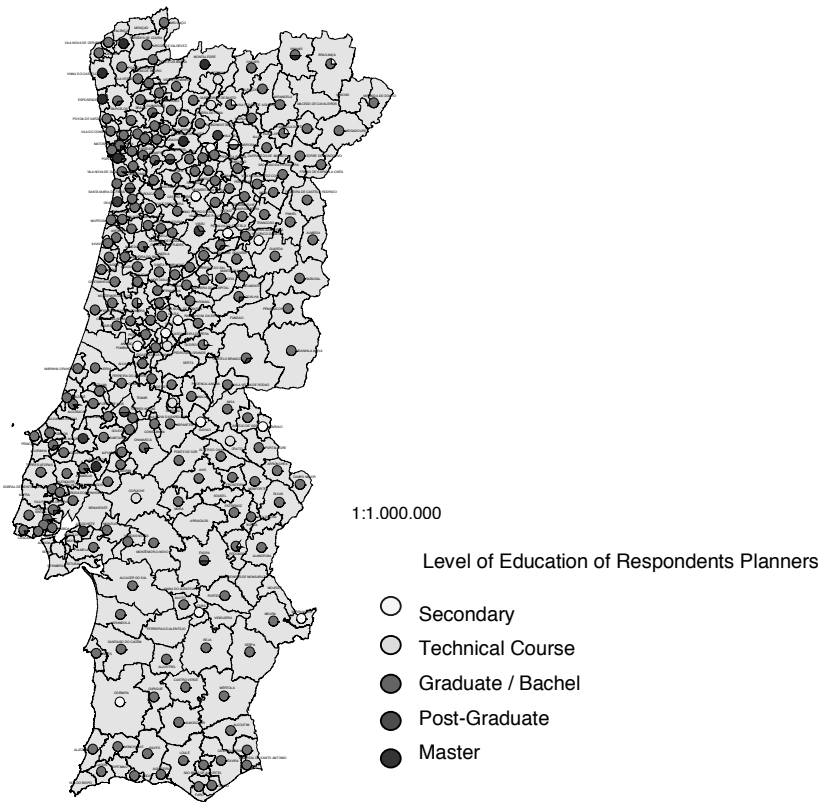

Figure 14. Level of education of respondents, by municipalities

3 The ICT valuation in the stages of planning process

ICT are currently becoming increasingly integrated into the work of spatial planning, a process which is occurring with ease. As recognized by Nedovic-Budic (2000), due to the huge potential that they represent, ICT may be used throughout the entire planning process, from the collection and analysis of information, the creation of diagnostic studies, and communication between the various entities, to preparation and presentation of plans as well as the implementation and management of policies and measures.

The use of ICT during the planning process, however, must be based on the clear understanding of their potential as well as the problems arising from their use. In relation to this point, both Larsen (2003) and Drewe (2003), draw attention to the emergence of a variety of problems that may occur when ICT are developed for usage in local planning. Although Drewe (2003) highlights the benefits of using ICT in planning, he also stresses that these beneficial uses must only be adopted with caution, pointing to three main problems: difficulty and inequality of access by the public to the information technologies developed, low public motivation to participate in planning activities, and the lack of knowledge of planners in the area of ICT. Larsen (2003), an unconditional enthusiast of the incorporation of ICT within municipal activities, agrees with the

problems identified by Drewe (2003), adding some extra problems of his own: the scanty knowledge relating to ICT that the public has; the difficulty in selecting the information that is suitable for public presentation; the possibility of the inclusion of undesirable or incorrect opinions; the loss of respect for the decision-making process; and the lack of planners at a local level capable of implementing and utilizing ICT in the planning process.

Due to the multiple uses to which ICT may be put, identifying and evaluating their role throughout the different stages of the planning process is not a simple matter. In reality, as a result of the intrinsic characteristics of ICT and the demands specific to each stage of the planning process, the 'usability' of ICT produces different results at each of the various stages that make up the procedure as a whole.

The next step, therefore, must be to assess the manner in which council officers evaluate the role of ICT in the planning process. Six stages which are usually considered to make up a planning process were analysed separately in the survey for this purpose: Territorial Diagnosis, Drawing up of Proposals, Creation of Plans and Programmes, Decision-Making, Implementation and Monitoring.

As can be seen in Figure 15, between 75 and 90% of planners believe that the role of ICT is "very significant" or "significant" at all stages of the planning process. It may be noted that this large majority of council officers who value the role of ICT in the different stages of the planning process share this conviction with a large number of authors (Raut, 2001; Morphet, 2003; Larsen, 2003; Brkovic, 2004; Talvitie, 2004; Ryser, 2004), for whom ICT are extremely relevant to the planning process, which will only increase in the near future.

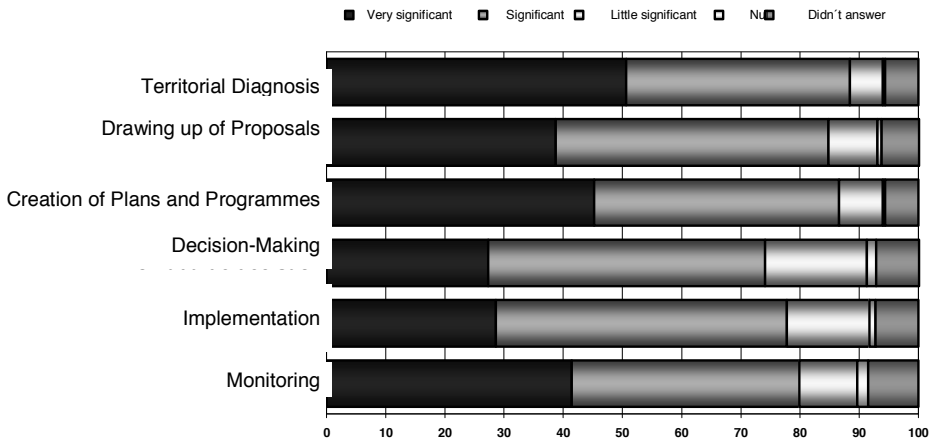

Figure 15. Enhancing ICT role in planning process stages

When Figure 15 is analysed in more detail, however, and only those answers made by council officers who considered the role of ICT in the different stages of the planning process to be "very significant" are valuated, it can be seen that it is basically in relation to the stages of Territorial Diagnosis and Creation of Plans and Programmes that the role of ICT stands out.

In contrast to this, the stages of the planning process that registered the lowest values are Decision-Making and Implementation, in which the percentage of replies considering the role of ICT to be “very significant” was less than 30%.

When the sociofunctional profile of the planners is looked at over all six of the stages, some interesting data comes up which must be mentioned (see Table 14):

- In relation to age of the planners**,** it can be observed that with increased age of the planner comes a slight decrease in the value that they attribute to the role of ICT in the stages that make up the planning process.
- In relation to levels of training of the planners surveyed, it can be seen that those planners with the highest levels of training are also the ones who attribute the greatest value to the role of ICT in the planning process. It must be highlighted that, amongst the planners who hold masters degrees, approximately 46% consider the role of ICT “very significant” and around 37% consider it to be “significant”.
- Differences in the valuation of ICT by the planners that took part in the survey when looked at by profession do not stand out, although the specialized employees attribute more importance than do senior managers to the role of ICT in the planning process.

Table 14. Enhancing ICT role of in planning process stages according to age, level of education and professional category of planners

	High Significance (%)	Significant (%)	Low Significance (%)	Null (%)	Didn’t answer (%)
Age					
Under 35	42,9	42,8	9,4	0,7	4,2
36 to 49	35,8	44,2	11,0	1,7	7,3
50 ad over	29,2	44,4	14,4	0,5	11,5
Level of education					
Secondary school	36,1	**42,6**	13,9	1,9	5,5
Technical course	37,0	**53,7**	9,3	-	-
Degree/Bachelor	39,0	**43,9**	10,1	1,0	6,0
Post-Graduation	**42,7**	40,7	14,0	2,0	0,6
Master	**46,1**	37,3	9,8	-	6,8
Professional Category					
Specialized personnel	**41,2**	**43,1**	**9,2**	**0,6**	**5,9**
Senior managers	**35,3**	**44,8**	**12,6**	**2,0**	**5,3**

Universe: Total de Respondents (447)

In summary, the data obtained as a result of this survey demonstrates that planners in charge of territorial planning within municipal councils attribute significant value to the role of ICT at the various stages of the planning process, especially in relation to Territorial Diagnosis, Drawing-Up of Proposals and Creation of Plans and Programmes.

It must also be noted that age and educational level also affect the manner in which ICT are valuated, with younger, more educated planners in particular placing a greater importance on the role of ICT in the planning process.

4 The influence of ICT on the traditional methods of creating municipal territorial plans

Once the opinions of the planners in relation to the importance of ICT throughout the planning process had been established, the reasons which led to those planners having such a clear opinion on this matter were investigated.

Planning officers within municipal councils were therefore questioned as to how the development of ICT may influence the traditional methods of creating territorial plans at a municipal level.

The questions asked were not intended to cover every one of the aspects associated with the development of ICT which may affect the creation of town plans, but rather the most important aspects only. These were specifically targeted, and many of these aspects have already been the subject of special attention in the academic world (Miller, 2000; Drewe, 2003; Larsen, 2003; van der Berg, 2003; Brkovic, 2004).

It can be noted that, as put forward by Larsen (2003), Talvitie (2004), Ryser (2004) and Evans-Cowley and Conroy (2006), the idea is growing that ICT can promote significant changes in land usage and form, with repercussions at a level of municipal territorial planning.

For Meer and Windew (2003), ICT possess all the ingredients for innovation and change, and so it must come as no surprise to find that they bring about huge functional and organic transformations within the urban fabric (physical, social and economic).

It is therefore important to know whether the development of ICT is threatening to many of the territorial premises established over time related to the creation of instruments of territorial management, as put forward by Jonas (2001), Talvitie (2004) and Tsouderos et al. (2004). It may be observed, for instance, that in modern, network structured society, the daily experience lived by its citizens crosses any existing administrative or territorial boundaries (Ascher, 2001), a fact that has growing relevance for the creation of plans.

The survey basically seeks to evaluate whether planning officers have the same perception as Jayo (2002), insofar as that author considers that ICT provoke changes to the structure of occupancy and use of land, which then causes alterations to the natural and constructed environment.

In practical terms, analysis of the influence of the development of ICT on traditional methods of creating municipal town planning, was carried out with two levels of influence being taken into consideration: a) *direct influence*, which arises from the characteristics of ICT that objectively affect the creation of plans; b) *induced influence*, arising from the impact that ICT have on the territory and which, in turn, are reflected in the creation of plans.

In relation to *direct influence*, the planners were asked four questions relating to the manner in which the traditional methodologies of creating town and territorial plans are able to deal with the real-time integration of information within plans; the need for a fast response when faced with requests and opportunities; the encouragement of interactivity with people and companies; and the involvement of the populace in the plans.

In general terms, and as shown in Figure 16, it has been shown that planning professionals are of the perception that the contribution of ICT in town planning can be considerable. In fact, according to planners, the development of ICT can significantly influence traditional methodologies

of municipal territorial planning by making it possible to integrate information into the plans in real time (86%) and by requiring quick answers to requests and changes (69%).

This being the case, it seems that there is a substantial majority of planners who believe that ICT improve the access available to citizens in relation to information and communication, thereby creating conditions that enable faster planning decisions, with these planners also exerting pressure towards making this a reality.

It can be seen from the survey that around 60% of the participants also highlight the influence of ICT in planning on stimulating interactivity amongst people and companies, with ICT making it possible for both groups and individuals to interact and collaborate with planners in search of better planning solutions. It must be pointed out, however, that for more than half of the planners who took part in the survey, the interactivity made possible by the use of ICT does not encourage a greater level of involvement by the public in planning decisions. This is an extremely curious piece of information, as it puts in doubt one of the advantages, highlighted time after time by a variety of authors (amongst others, Sikiaridi and Vogelaar, 2000; Müller et al., 2002; Larsen, 2003; Ryser, 2004; Curweel et al., 2005), relating to the fact that ICT constitute an instrument for the improvement in the level of public participation in town planning, bringing, in this way, the general public closer to the process of public management[13].

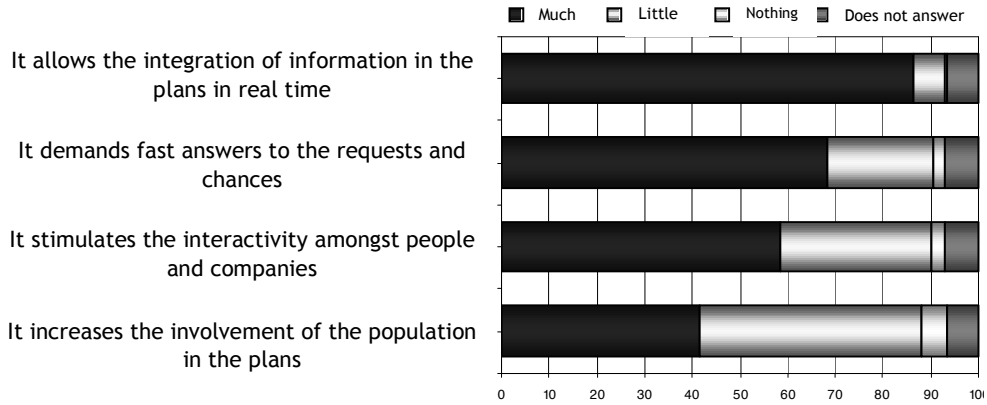

Figure 16. Direct influence of ICT development in traditional methods of preparing the municipal plans of planning

In relation to *induced influence* (Figure 17), the planning professionals were asked five questions, by which it was hoped to evaluate the impact of ICT development in relation to land and its respective effect on the creation of town plans. Questions, therefore, related to criteria of the location of activities; the organization of the territory into networks and flows; alterations in spatial organization; the devaluation of geographical administrative boundaries, and the importance of the applicable statutes and regulations governing land use.

These questions were basically aimed at evaluating the characteristics on which the traditional methodologies of plan creation were based, examples of which are: land use, zoning,

[13] It must be remembered that these results are in agreement with the conclusions reached by the survey carried out by the University of Aveiro (DGOTDU, 2007), which highlighted weak participation via the internet, as well as the predominantly one-sided character of the communication that took place with the general public.

and the administrative division of land, to see if they remained relevant or whether the development of ICT in the meantime have led to the emergence of new realities which need to be taken into account by making changes in the aforementioned methodologies.

Now, according to the planners, as may be seen in Figure 17, the impact of the development of ICT on land and, consequently, the induced influence on traditional methodologies for the creation of municipal territorial plans is, generally, relatively small.

This is an interesting part of the survey, due to the fact that it allows us to identify the perception of planners on the repercussions of the development of ICT in the area of town planning, both in relation to function (land use), as well as to spatial organization.

According to the planners, the induced influence of ICT on territory relates, fundamentally, to the fact that they favour the organization of territory in networks and flows (79%). This aspect is probably related to the influence that ICT may exert in terms of location of activities. In relation to this, around half of the officers surveyed recognize the contribution of ICT to the increase in the criteria of location of activities.

As can still be seen in Figure 18, however, the majority of planners are convinced that the development of ICT has had little or no effect on the creation of plans, due to the significant alterations in spatial organization (50%), the devaluation of geographical administrative boundaries (70%) and, above all, due to the diminishing of the importance of the rules governing land use (85%). In other words, it may be concluded that the planners surveyed understand that the impact of the development of ICT on territory is not sufficient to induce large changes in the creation of municipal territorial plans.

As a result of the manner in which municipal planners evaluate the direct influence and, particularly, the induced influence of the development of ICT on the traditional methodologies of creating municipal territorial plans, it is understood that approximately three quarters of the planners surveyed are of the opinion that the development of ICT does not imply the need for the updating of planning regulations and legislation (Figure 6), thereby demonstrating an opinion contrary to that put forward by Moon (2002), Milovanovic (2003), Ryser (2004) and Talvitie (2004).

It must be noted that, as put forward by Milovanovic (2003) and Ryser (2004), the updating of current planning regulations and legislation would be carried out for the purpose of creating a system of planning that is more open and flexible, capable of responding in real time to the requests and opportunities that constantly emerge within society. The task in hand is, essentially, that of promoting a planning process that is increasingly participative and interactive, permitting more flexibility in management of the planning process in order to promote and encourage its development and growth.

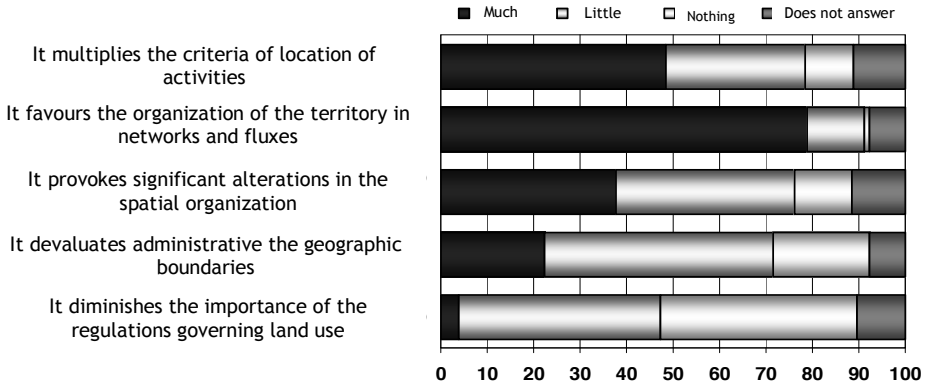

Figure 17. Induced influence of ICT development on traditional methodologies for the creation of municipal territorial plans

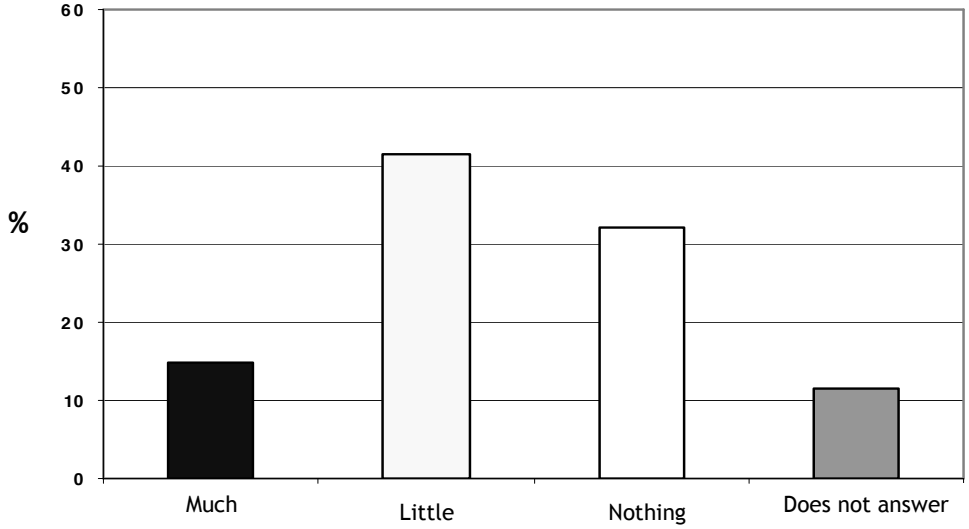

Figure 18. ICT influence in outdated urban laws and regulations of the municipal plans planning

It would, in this context, be interesting to mention a similar study carried out by Talvitie (2004) in Finland, in order to understand the disparity of opinion between planning professionals in Portugal and those of one of the most developed countries in the world in the field of ICT. In the Talvitie (2004) study, it is noted that relative to this point, around 75% of the Finnish planners surveyed considered that the presence of ICT demands the updating of planning-related legislation and principles, meaning that Finnish planners hold precisely the opposite opinion to that expressed by Portuguese planners.

5 Measures for change in planning practice

Implementation of ICT in the planning processes within municipal councils generates important benefits and opportunities, allowing a strong climate of change in relation to planning practice to arise within the organization (Larsen, 2003; Ryser, 2004). Santos and Amaral (2003a) are of much the same opinion, according to their study on e-government at a local level in Portugal in which they consider ICT to be an instrument that will allow transformations to take place within Portuguese municipal councils.

As mentioned by Larsen (2003), the level of development of ICT within municipalities and the manner in which municipal planners put them to use is fundamental, as they determine the intensity of the changes in planning practice at a local level.

In order for significant change to be achieved upon the introduction of ICT into a municipality's town planning system, the technology has to be actually integrated within the system, a task which is frequently found to be rather difficult. The incorporation and mastering of planning-related technology is, even today, effectively a problem and a challenge for those in charge of territorial planning systems, especially at a municipal level (Nedovic-Budic, 2000).

This process generally requires a huge organizational transformation and restructuring to take place within municipal councils, so as to create new organizational methods, processes, procedures, skills and responsibilities, all activities in which the human factor is very often a decisive factor.

For Santos and Amaral (2003a), adoption of ICT can revolutionize the relationship between residents, companies and the council at a local level, especially in relation to the development of new forms for the transferral, sharing and analysis of information and of new ways of making services available, as well as in relation to new management concepts and the improvement of administrative services.

Note that, as is universally accepted, councils are in reality confronted with an immense quantity of information, and with a huge number of requests, for which they need management processes that are fast and efficient. In fact, as pointed out by Snellen and Van de Donk (1998) and by Schedler and Proeller (2000), intelligent use of ICT allows the emergence of new paradigms in council management, creating opportunities for administrative modernization and for the renovation of governance. For these authors, the adoption of digital systems permits substantial gains in terms of access to information, a faster response time and greater proximity to citizens.

Raut (2001) especially highlights the role played by ICT in the coordination of work within different bodies or departments, thereby contributing to improved movement of information and a more complete understanding between the areas of administrative management and spatial planning.

Whilst reiterating the value of new technologies as an instrumental resource, Ryser (2004), simultaneously proposes that by stimulating participation and involvement in public management and administration, ICT have launched a new era in the relationship of governors with their citizens. This opinion is one held by many other authors (Mitchell, 1999; Larsen, 2003; van den Berg, 2003; Castells, 2004), who point out the role that ICTs may play in improving territorial development and participation. Dyson (1998) and Clift (2002) in particular conclude that ICT permit transparency and

a greater level of democratization in relation to the processes and decisions that directly affect people's lives.

It is not possible, however, to forget that authors such as Schudson (1992), Etzioni (1992) and Issac-Hendry and Barnes (2000), have doubts in relation to the advantages of the uses of ICT for 'plugging the gaps' in the democratic process. According to Milavanovic (2003), participation via ICT must never be considered as a substitute or rejection of the practices and paradigms currently in use. On the contrary, it must rather be considered as a valuable complement to the traditional, classical methods of public participation. Agreeing with Milavanovic, Warren-Kretzschmar et al. (2005), they stress that the coherent union between both classical and emerging means of communication, which includes the press, the internet and interactive communication, ensures greater possibilities of success in relation to the involvement of citizens in the planning process.

Milavanovic (2003) further states that ICT constitute a new instrument and an efficient method for improving the level of public participation and knowledge in the planning process, but they are not the solution for the democratization of the process itself. In defence of his position, the author points above all to the inequality of access to ICT, and to the manipulation of its contents.

Faced with growing financial difficulties and the need to attract investments, municipal councils are now acting as catalysts, basing their efforts on the implementation of new planning practices that offer more guidance, flexibility and innovation. They do this in order to maximize their available resources and to respond more efficiently to the challenges that they have to face when dealing with contemporary territorial issues (Jayo, 2002; Ryser, 2004).

The possibility of making full use of the opportunities of development only becomes truly possible in relation to the degree to which the planning process stops being rigid and hierarchical, and moves to being a system that is definitively interactive. It is the development of interactive planning that will enable territorial planning to become truly flexible, able to respond in real time to the uncertainties of territorial evolution, as well as at the same speed (van der Berg, 2003). It has in fact been pointed out by Jayo (2002) that thanks to the current performance of ICT, the development of interactive planning has started to become reality.

Communication and cooperation between all those involved in this process has thus become a necessity, and it is the role of municipal councils to organize and stimulate the relationship between the parties involved. Now, as argued by Voss et al. (2003), on developing the "e-cooperation" planning concept, ICT have in fact developed new methods of participation and cooperation at both an intra and inter-organizational level. Amongst these, the contribution made by ICT to the encouragement of networks of inter-municipal cooperation stands out, due to the fact that ICT are able to make use of complementary and interdependent situations, enabling the maximum usage of resources and activities between municipalities.

It can therefore be stated that the consolidation of ICT and of e-planning is allowing the theses defended by authors such as Sandercock (2000), Watson (2002), van den Berg (2003) or Healey, (2005, 2006), on the existence of expressive changes in territorial planning, to come true.

Given this situation, identification of the main changes that are taking place within planning practice resulting from the introduction of ICT is absolutely central to the understanding of the current situation in territorial planning. What is basically at stake here is determination of how far

these changes are able to consolidate the evolution of territorial planning itself, and in relation to this, determining up to which point they might represent a challenge to planners.

This being the case, the next step must be to evaluate how municipal planners view the transformations in their professional activities as a consequence of adopting ICT. In order to understand what these changes actually consist of, the question was approached from two main perspectives, the first – *the instrumental perspective* – relates to the changes relative to the production of elements and administrative management, and the second – *the promotional perspective* – relates to the ability of ICT to stimulate participation in and the promotion of development.

In concrete terms, the two perspectives bring together twelve of the criteria established in the survey, distributed evenly over four fields, as follows:

Instrumental perspective:

Production of Elements – Use of new tools (SIG, CAD, SPSS, etc.), Creation and making available of information.

Administrative Management – Internal administrative management and organization, Debeaurocratization, Speed of processes.

Promotional perspective:

Participation – Communication with the population, Involvement of the population, Democratization of processes.

Promotion of Development – Establishment of inter-municipal cooperation networks, Flexibility of planning instruments, Taking up of opportunities for development, Quality of planning processes.

Relative to the first point – the instrumental perspective of the planning process – as shown in Figure 19, it can be seen that a majority of planners consider that improvements or great improvements have been made as a result of the introduction of ICT in planning, in relation to all the criteria. Although all the results are positive, however, the evaluation made by planners in relation to the different criteria varies significantly.

The data presented in Figure 19 effectively demonstrates that it is mainly in relation to the production of elements that the planners understand the improvements to be more significant. It must be noted that, in the two criteria included here, a very high percentage of those surveyed (around 90%) think that improvements or great improvements have been seen. Of particular interest is the fact that more than 55% of planners consider that the use of new tools (SIG, CAD, SPSS, etc.) correspond to great improvements in the practice of territorial management.

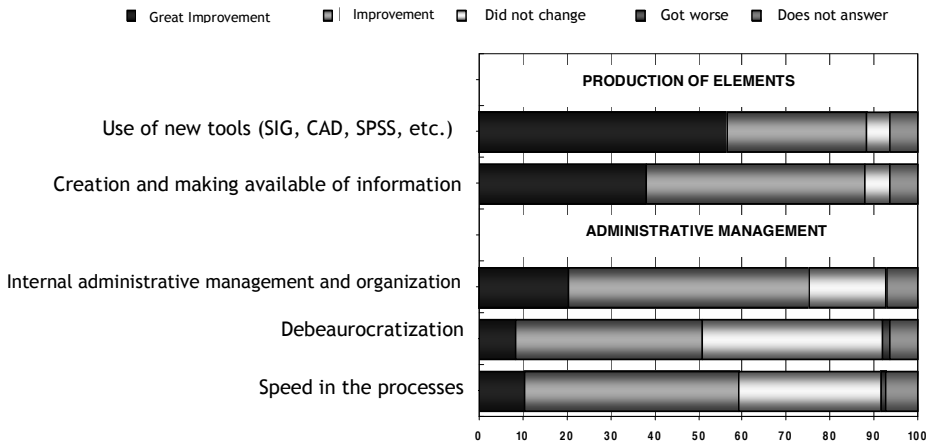

Figure 19. Changes in the Instrumental perspective of planning due to the introduction of ICT

In relation to the criteria of Administrative Management, there is a favourable opinion amongst the majority regarding the introduction of ICT in planning, although it is less expressive. The percentage of planners who consider that great improvements have been seen in this area is quite low, at around 10% in relation to speed of processes and debeaurocratization. It is also interesting to note that in relation to this point, more than 40% of planners surveyed think that nothing has changed in terms of current beaurocracy within municipal councils.

Turning now to the changes associated with the second perspective – that of the promotion of planning – it can be seen that, in accordance with Figure 20, the opinion of planning professionals varies considerably in relation to the different criteria. It may especially be observed that in some criteria there is no clear tendency in relation to the opinion of the planners (Involvement of the Population and the Democratization of processes).

In general terms, when compared to the changes in the instrumental perspective, it can be concluded that the changes brought in by the introduction of ICT in the promotional perspective of planning are, in the opinion of those surveyed, significantly fewer. The percentage of planners who consider that the introduction of ICT in planning brought with it no improvements is now expressive, with the percentage stating that great improvements have taken place also being greatly reduced.
To be precise, in relation to Participation, it is only in the Communication with the population field that there is a clear majority of planners who feel that they have witnessed improvements. It is in relation to Democratization of processes and, especially, Involvement of the population that a high percentage of planners stated that planning practice has not undergone any changes.

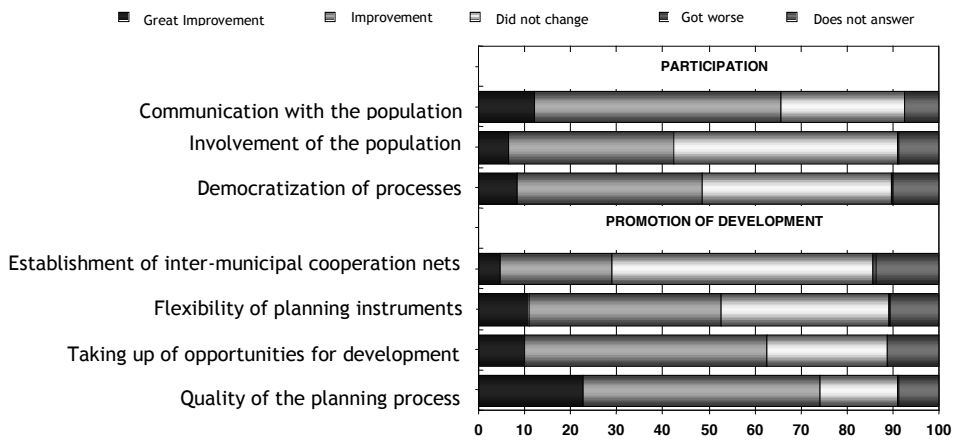

Figure 20. Changes in Promotional perspective of planning due to the introduction of ICT

In relation to the criteria included in Promotion of Development, with the exception of Quality of Planning Processes, the planners had many doubts relative to the changes brought about by ICT. It must be mentioned here that around 60% of the planners surveyed felt that the introduction of ICT did not permit improvements to be made in relation to Establishment of Inter-Municipal Cooperation Networks. This piece of data arising from the survey is especially interesting due to the fact that as previously mentioned, a large part of the potential relating to use of ICT is precisely to do with the facilitation of communication and interactivity (Larsen, 2003; Milavanovic, 2003; Castells, 2004; Ryser, 2004).

In relation to Flexibility of Planning Instruments and to Taking Up of Opportunities for Development, significant changes were not registered, according to the planners. Note that, as shown in Figure 8, the percentage of planners who feel that great improvements have been made in these two areas is close to 10%, and may be compared with the percentage of planners who felt that nothing had changed, a group three times that size.

6 Conclusions

In an article written in 1992, Manuel Castells, author of the "Information Society" trilogy and of the "Internet Galaxy", on studying the impact of the technological revolution, asked himself "*The world has changed: can planning change?".*

It was with this question (Castells 1992) in mind, that this article attempts to understand the changes that are occurring in territorial planning within Portuguese municipal councils as a result of the introduction of ICT.

The opinion of planners working for municipal councils relative to the role of ICT in the various stages that make up a process of territorial planning was therefore required as an important first step. The results obtained in the survey show quite clearly that the role of ICT is greatly valued at all stages of the planning process, especially by younger and more highly educated planners.

Although planners understand the high-level of potential that ICT offer to the planning process, in practice they think that use of ICT obtains results essentially when used as a back-up

tool. They also felt that in general terms ICT had delivered less than expected, at least to date, within their respective municipal councils. When directly questioned on the influence of ICT on the traditional methodologies for creating municipal plans, the planners had a great many reservations.

Planners perceive that the influence of ICT on plan creation can essentially be best used for the *integration of information in real time and by the ability to respond rapidly to requests and opportunities, which may also facilitate interactivity and the organization of territory in networks and flows*.

It was, however, noted with some surprise that the majority of planners consider that the interactivity resulting from the implementation of ICT has not led to an increase in the involvement of the population in plan creation, thereby negating one of the main advantages attributed to ICT by authors such as Raut (2001), Milavanovic (2003), Larsen (2003) and Ryser (2004), an advantage that resides precisely in the increase in the level of public participation in the process of creating land and territorial management plans.

Planners are also convinced that the physical impacts induced by ICT, such as alterations in spatial organization of territory, the devaluation of geographical administrative boundaries and the diminishing of the importance of the system under which land use is governed will also have a smaller-than-expected impact on municipal land and territorial planning.

Portuguese planners do not, in fact, appear to be in agreement with the theses defended by Jonas (2001), Tsouderos et al. (2004) and Talvitie (2004), in relation to the influence of ICT on many of the principles relating to territory established and adopted over decades in the area of planning. It is therefore no surprise to find that ICT are seen by local government overall as instruments of production and the making public of plans, and less as strategic elements for municipal development.

Given this situation, it can be concluded that municipal planners believe that the influence of ICT is, in terms of land and territorial planning, relatively small, and it is therefore understood that a large majority of planners *report that they do not see the need to update current legislation and regulations relating to town and territorial planning***.**

This opinion offered by planners is rather disturbing, as regulations and legislation relating to Portuguese spatial planning are based on principles that are predominantly restrictive and statistical (Costa Lobo, 2001), and not very appropriate to the promotion of participation and interactivity in the planning process, nor to encouraging territorial development. This opinion is also disturbing when compared to that existing in other European countries. The perception of the planning professionals working within Portuguese municipal councils relative to the role of ICT is, in fact, far removed from the opinion that predominates amongst similar professionals abroad, where ICT are currently the subject of strong investment, specifically in relation to the development of locally-relevant technological plans and to planning legislation and regulations of a specific nature (Müller et al. 2002; James et al., 2004; Ryser, 2004; Talvitie, 2004).

Given this situation, it has become of utmost importance to find out the extent to which ICT may be considered as forces for change in planning practice, taking into consideration the progressive development of this technology within municipal councils.

As pointed out by Meer and Windew (2003), it must be noted that ICT possess great potential for innovation and change, and are able to act as facilitators for enormous transformations within the organization and structure of municipal councils. The authors also affirm, however, that if ICT were to be used within municipal councils as just another means of carrying out pre-existing tasks, although possibly at greater speed, then the repercussions of their usage would be limited and not necessarily very different when compared to the other available tools.

In general terms, the results of the survey indicated that the majority of planners understand that ICT are effectively promoters of *positive change in planning practice at a local level*, even though they are particularly concentrated in the fields of the production of elements (cartography, data analysis, etc.) and of administrative management (internal organization, speeding up processes, etc.). The main benefits of the introduction of ICT in planning are therefore particularly related to improvements in territorial diagnosis and in the increased efficiency in time, cost and production of end results, attributes which are more directly related to the instrumental perspective of planning.

In relation to the changes in planning practice in areas that involve longer and more complex processes, such as the active encouragement of local inhabitants to participate in the planning process or in the promotion of territorial development, the planning professionals showed themselves to be less decisive, and in fact rather doubtful about the intensity and the effective worth of those changes.

In respect to public involvement and the democratization and legitimacy of the planning process, the planners are in fact are less likely to consider that improvements have been seen in planning quality, with a significant number of planners even arriving at the conclusion that the introduction of ICT has not made any contribution whatsoever towards changing the existing situation.

This being the case, it seems that according to the perception of the planners surveyed, the changes in planning practice brought about by ICT, as mentioned by Castells (1992), only really affect the instrumental perspective of planning, as their effects are still rather tenuous in relation to the strategic and promotional perspective of planning.

The conclusion was therefore reached that the planners have taken a rather critical stance in relation to the capacity of ICT *to encourage contexts of interaction in planning which will stimulate territorial development.*

Now, as highlighted by Drewe (2003) and by Camarda (2004), efforts made towards the intensification of interactivity in planning necessarily involve *a strong investment in the improvement of the levels of education and knowledge of all those involved in the field of ICT,* which includes the re-training of planning professionals. This requirement is of particular importance in relation to Portugal, where the “digital gap“ is of worrying proportions (MCTES, 2005). The low level of knowledge of the Portuguese population in the area of ICT is effectively associated with the weak level of technological development within Portuguese municipal councils, which in turn affects any possible greater interaction with the population. To this situation can be added the of lack of skills in the area of ICT shown by the majority of planning technicians working within municipal councils (Branco-Teixeira, 2008).

The survey enabled us to show that factors *of a generational and educational nature affect the manner in which planning professionals see the role of ICT in territorial planning within municipal councils*. It was seen that it is the younger planners and those with higher educational levels that see more potential in the application of ICT in planning, but that these officers are simultaneously the most critical in relation to the results achieved so far within municipal councils. These results are relevant, as they show the extent to which factors relating to *age and education* are important in their effect on the perception of planners, and point towards the necessity for the intensifying of training programmes for planners working in the field of ICT.

In short, the impact of ICT on activities of territorial planning within municipal councils can be considered to be globally positive, with the majority of planners stating that municipal councils have benefitted from their introduction.

There are, however, many 'gaps' to be found in the set of results presented in relation to the meeting of the requirements defined by Larsen (2003) for the achieving of e-planning, that is, the existance of digital plans based on a planning process that is itself also digital. If the difficulties in creating digital plans can in principle be overcome by the good instrumental performance of ICT, in relation to the implementation of digital planning however, in which the participation of citizens is of prime importance, the degree of difficulty is much greater and harder to overcome, as in fact harnessing the participation of citizens in the planning process by the use of ICT has not yet reached a significant level, and is difficult to encourage. The fact is that creating technological awareness and readiness within the population is a hard task, and one to be dealt with over the medium or long term, but which is nevertheless essential in order to achieve a greater level of involvement by citizens within the universe of ICT.

In other words, as indicated by the results of the survey, there is clearly some disbelief amongst planning professionals in relation to the capacity of ICT to generate, at least in the short term, intensive change in the planning practice of municipal councils.

References

Ascher F (2001) *Les nouveaux principes de l´urbanisme: La fin dês villes n´est pas à l´ordre du jour*, L' aube, Paris.

Branco-Teixei*ra (2008) A Integração das Infra-estruturas no Planeamento do Território: o Papel das TIC na Cultura do Planeador,* Tese de Doutoramento, FEUP.

Brkovic M (2004) "Planning in the Information Age: Opportunities and Challenges of E-Planning", CORP 2004 & GeoMultimedia, Viena:15-21.

Camarda D (2004) "Pianificazione ICT-Based e Gap Formativo: Alcune Note Introduttive", *Archivio di Studi Urbani e Regionali*, XXXV(80)145-162.

Castells M (1992) "The world has changed: can planning change?", Landscape and Urban Planning, 22, 73-78.

Castells M (2004) *A Galáxia Internet,* Fundação Calouste Gulbenkian, Lisboa.

Clift S (2002) *E-democracy: The Promise of the Future is a Reality Today*. Disponível em www. URL: http://www.publicus.net. [consultado a 9/2/2004]

Costa Lobo (2001) *Administração urbanística: evolução legal e a sua prática*, IST Press, Lisboa.

Curweel et al (2005) "Citizens´ expectations of information cities: implications for urban planning and designs", *Building Research & Information*, **33**(1) 55-66.

DGOTDU (2007) *Instrumentos de Gestão Territorial e Desenvolvimento das TIC*, UA/DGOTDU. Disponível em <www.dgotdu.pt/tic-ot/>. [consultado em 21/03/07].

Drewe P (2003) "In search of new concepts of physical and virtual space", *Cartas Urbanas*, Universidad de Las Palmas de Gran Canaria, 8, 138-155.

Dyson E (1998) *Release 2.1: A Design for Living in the Digital Age*, Penguin, London.

Etzioni A (1992) "Teledemocracy: the electronic town meeting", *Current*: 26-29.

Evans-Cowley J, Conroy, M (2006) "The growth of E-Government in Municipal Planning", *Journal of Urban Technology*, **13**(1) 81-107.

Healey P (2005) "Network Complexity and the Imaginative Power of Strategic Spatial Planning", in: Albrechts, L. e Mandelbaum, S. J. (ed.) (2005), *The Network Society: a New Context for Planning*, Routledge, New York: 146-160.

Healey P (2006) "Transforming Governance: Challenges of Institutional Adaptation and a New Politics of Space", *European Planning Studies*, **14**(3) 299-320.

Issac-Hendry K, Barnes C (2000) Information and Communications Technologies: Assessing public attitudes and local government, *Public Policy and Administration*, **15**(3) 20-31.

James P et al (2004) "Enhancing the Decision-making Process in Urban Spatial Planning Using Advanced ICT", University of Salford, ODPM. Disponível em: <http://www.odpm.gov.uk/stellent/groups/odpm_researchandstats/documents/downloadable/odpm_research_031062.pdf>. [consultado em 17/11/05].

Jayo A (2002) "The Role of Technologies of the Information and Communication in the Sustainable Planning", *The Sustainable City II: Urban Regeneration and Sustainability*, C.A. Brebbia, WIT PRESS, Southampton: 63-73.

Jonas O (2001) *Territoires Numériques*, Ministère de l'Equipement, Paris.

Larsen T (2003) *ICT in urban planning*. Disponível em <www.audrep.auc.dk/ publications/t-larsen.pdf>. [Consultado em 15/7/04].

MCTES (2005) *Ligar Portugal*.

Meer e Windew (2003) "E-governance in Cities: A Comparison of Urban Information and Communication Technology Policies", *Regional Studies*, **37**(4) 407-419.

Miller D (2000) "Designing na Agenda for Planning at the Start of a New Century – A view from the U.S.", *Cartas Urbanas*, DACT, Universidade PGC, **8**, 12-29.

Milovanovic D (2003) *Interactive Planning*, 39º Congresso da ISoCaRP, 2003.

Mitchell W (1999) *E-topia: Urban Life, Jim - But Not as We Know It*, MIT Press, Cambridge.

Morphet J (2003) E-government and planning: changing the relationship with the citizen, Planning Research Conference, Oxford Brookes University.

Müller et al (2002) *Intelcity Project: Updated Report on Regional End User Needs,* Intelcity, IST, Dresden.

Moon M (2002) "The Evolution of E-Government among Municipalities: Rhetoric or Reality?", *Public Administration Review*, **62**(4) 424-433.

Nedovic-Budic Z (2000) "Geographic Information Science Implications for Urban and Regional Planning", Urisa Journal, **12**(2) 81-93.

Pitkin B (2001) "A Historical Perspectiva of Technology and Planning", *Berkeley Planning Journal*, **15**, 32-55.

Raut S (2001) Implications of information technology on spatial planning in India, Comunicação apresentada ao Congresso anual da ISOCARP, 2001.

Ryser J (2004) "Can Planning Mediate Between Sustainable Communities and Digital Divide", CORP 2004 & GeoMultimedia04, Viena: 31-37.

Sandercock L (2000) "Negotiating Fear and Desire: The Future of Planning in Multicultural Societies", *Urban Forum*, **11**(2) 201-210.

Santos L, Amaral L (2000) "A Presença das Câmaras Municipais Portuguesas na Internet", Gávea, Universidade do Minho. Disponível em <www2.dsi.uminho.pt/gávea>. [consultado em 11/12/03].

Santos L, Amaral L (2003a) "O *e-government* local em Portugal – Estudo da presença das câmaras municipais portuguesas na *internet* em *2002"*, Gávea, Universidade do Minho, *Cadernos inter.face* do Grupo Algébrica, 14-86. Disponível em <www2.dsi.uminho.pt/gávea>. [consultado em 11/12/03].

Santos L, Amaral L (2003b) "Local *e-government*– Estudo da presença das câmaras municipais portuguesas na *internet* em *2002/parte 2)"*, Gávea, Universidade do Minho, *Cadernos inter.face* do Grupo Algébrica, 81, 32-41. Disponível em <www2.dsi.uminho.pt/gavea>. [consultado em 11/12/03].

Santos L et al (2005) *Avaliação da presença na Internet das câmaras municipais portuguesas em 2003*, UMIC, Lisboa.

Schedler K, Proeller I (2000) *New Public Management*, Haupt, Bern.

Schudson M (1992) "The limits of teledemocracy", *The American Prospect*, Fall: 41-45.

Sikiaridi E, Vogelaar F (2000) "The use of space in the information/communication age – processing the unplannable", Workshop Ruimtegebruik, 11/04/2000, Amsterdam.

Snellen I, Van De Donk (1998) *Public Administration in the Information Age*, IOPress, Amsterdam.

Talvitie J (2004) "Incorporating the Impact of ICT into Urban and Regional Planning", European Journal of Spatial Development, **10**. Disponível em <www.nordregio.se/EJSD/refereed10.pdf>. [consultado em 14/1/06].

Tsouderos J et al (2004) "The Information and Communication Technologies Impact in Urban Process", CORP 2004 & GeoMultimedia, Viena: 227-230.

Van den Berg M (2003) State of the Profession 2003, IsoCaRP World Congress 2003, Cairo, 2003.

Voss A et al (2003) "Supporting Communication Processes for Cooperation Planning and e-Government", CORP 2003, Viena: 333-337.

Warren-Kretzschmar B, Neumann A, Meiforth J (2005) "Interactive Landspace Planning – Results of a pilot study in Koenigslutter am Elm, Germany", CORP 2005 & GeoMultimedia05, Viena: 171-179.

Watson V (2002) "The Usefulness of Normative Planning Theories in the Context of Sub-Saharan Africa", *Planning Theory*, **1**(1) 27-52.

Extensive urbanisation **– a new scale for planning**

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Extensive urbanization – what are we speaking (or planning) about? Extensive urbanization characterizes most of the urban contemporary field. Contrary to the forms and dynamics of canonical cities, extensive urbanization is an unconfined geographical pattern, a kind of nebula, where all seems chaotic. In what concerns urban planning, we have two main problems: territorial and conceptual de-confination of the urban realm. Urban sprawl is always touched by negative stigmas. Sprawl is normally understood as some kind of perversion of the good city form or way of living (energetic and environmental crises have dramatized all those matters). Notwithstanding extensive urbanization is the most common way of the territorialization of society. The complex interaction between society and economy is deeply embedded on this urban fabric and is not supposed to change. Than we have a real problem for political action and evaluation on this reality. Policies for urban sprawl must consider "splintering urbanism" (Graham and Marvin, 2001). Society and policies are "centrifugal" as told us D. Innerarity. This means that political actions are de-synchronized by the slighting of State and Public Administration. More and more, policies are sectoral; old public responsibilities are privatised or concessioned; public realm is an obscure atmosphere linked with private interests (public virtues vs. private vicious); economics are globalised, etc. Diffused public/private institutions undermine the old clear descending chains of public decision and coordination. In what concerns territorial plans, the mismatch between the spatiality of the urban field and the institutional architecture (local/inter-municipal levels) doesn't fit the variable dynamics of the relational space.

Keywords: urban sprawl; extensive urbanisation; splintering urbanism; evaluation in planning.

1 Extensive urbanisation – framework

The urban phenomenon, within the polysemy that characterises it, is a dominant form of territorialisation of society. This territorialisation mobilises wider and wider, and intensively travelled spaces. The dramatic increase of mobility (physical and informational), allows forms of organization which before were very dependent on the physical proximity and agglomeration. The loss of certain territorial frictions – translated into space flows and relational space concepts – mobilises very diverse logics of territorialisation and the spacing of social organisation forms. The large territorial scale of extensive urbanisation is not just the representation of the urbanisation in "unconfined" territories. It is, mainly, a relevant geographical field to understand the multiple dimensions that structure the dynamics and processes, i. e., the territorial force field that acts upon the micro scale of the "places" and of their transformation. Hence, the large scale allows us to contextualise the micro interventions (urban projects, new urbanisations, the transformation of existing urbanisations, etc.), to understanding how they connect to the infrastructural and mobility systems, and to their biophysical systems and wider economical systems.

The Extensive Urbanisation question is placed between a vast amalgam of questions. It is difficult to know what is it about, how you should act upon, and what for. This statement seems paradoxical, bearing in mind the supposed existing consensus. Nevertheless, it is relatively easy to demonstrate that this consensus lies, in fact, on a group of questions which are invariably framed by two tendencies:

- An exaggerated generalisation, translated in the use of "meta-concepts", that because of their general and abstract character, create the illusion of containing the whole phenomenology, being even able to transform themselves into true hesitations (equality of contradictory

conclusions). The problem is that all the richness drawn from the poetics and the literary writing is converted, in the technical language and writing, into an extreme impoverishing and simplificated output. The attempt to produce a more objective and simplified discourse When you move to the objectivation of that simplification of the real – building and handling all the indicators construction arsenal and their statistical or cartographical manipulation- the impoverishing and reduction become even more mystifying because no one even discusses whether these indicators are adjusted to the study's object and its "scientific" construction or not. The illusion of a scientific character is as mystifying, as the uncontrolled handling of common sense, or even more so. Hiding behind rationality, the exercise of generalisation becomes an exercise of reduction: the contemporary theory of regional and urban planning, seems to be repeating the same forced invariance present in a "culturalist" trend in architecture and history, with the idea of a "city" as something trans-historical and geographical;

- An excessive polysemy which, through the discovery of supposed "norms" and "rationalities", describes different scales and contexts of urbanisation in the same way, and using the same causality and representation systems. Nevertheless, it's not the same to talk about the suburban sprawl of the USA; the emerging Ville (Chalas and Dubois-Taine, 1977); the Megalopolis (Ascher, 1995); the Citta Difusa (Indovina, 1990),etc. See the comparison between patterns and processes in South Europe in Indovina et al (2007).

As it is known, what we denominate as "the territory" is always the result of a continuous process of transformation of the "territorialisation" of society on territories, carrying inputs from the past on other transformations, which are successively reprocessed. Only a radical exercise of "patrimonialization/museumfication", as in many historical centres, is able to oppose to or decelerate the radicalism of this reprocessing. In the past, the national "localisms", regional or local, were very important to understand and regulate the society and the territory. Today, the overwhelming effect of globalisation is added to these localisms, and the results couldn't be more diverse and contrasting.

Even if there was a quantitative method to measure various degrees and formal models of extensive urbanisation, we couldn't say the same about California and São Paulo where everything is different and unevenly dispersed.

This presents a major challenge to regulation, in terms of objectives and strategies. Regulation lies upon a normative exercise, which is discussed in a democracy, and imposed in a dictatorship. Let's leave the second. In Russia, a number of cities "collapsed" with the fragmentation of the USSR. These cities were an expression of a totalizing rationality, of hyper codified technical models (industrial compounds, neighbourhoods, civic centres, etc.) and of very clear and shared social norms. Today, those cities are ruins and planning policies do not know where and how to focus on (Oswalt, 2006).

The question is that, today, in democratic countries, regulation is designed in a context of an ever growing fragility of the State (financial and political) and of a stronger pressure from the globalised economy. On the social level, technological transformations are taking place at a growing speed, as well as the forms of production, distribution and consumption. The diversity of life-styles accompanies that evolution. Individuals have higher degrees of mobility, both

geographically and socially. Hence, territories are unstable and more adverse to the forced stabilities provided by plans.

Coinciding with the Welfare State crisis, and with the economical neo-liberalism and globalisation, the ideologies of public participation and involvement began to create spaces within the void left by those who ruled and acted upon the territory, with the conviction and the political legitimacy provided by defence of the public interest. The neo-liberal and technocratic state, with less financial resources to invest, and caught between entrepreneurial designs of effectiveness and competitiveness and former social cohesion and assistance obligations, is now comprehended in a diffused form.

Somehow, participation provides a calming effect, creating the feeling that the citizen is important in the definition of priorities and objectives. This “down/top” or “grassroots” democracy is, however, far from being such a clear thing. One can think about how, nowadays, in highly mediatised societies, the mass media appropriate themselves of and manipulate the public affairs. Others denounce the “planning by decibels” as a manipulated form of legitimating certain social groups around more or less clear causes. Others denounce the “not in my backyard” as another form of organised participation for what you do not want and the strength to transfer it to other territories and societies. Community is an almost dysfunctional concept in a society that is everything but homogeneous, stable and value-led (characteristics of true communities). Participation seems to work, only in very generic causes (around generic questions or, most of the times,generic statements) and/or in very clear and confined local and social contexts. As written by David Harvey (Harvey, 2001) in the USA’s case, the concept of community is being generalised and worn out until it ranges a type of contractualization as the one that regulates the norms of acquaintanceship in a closed condominium or the statutes of a parent association in the most elitist and conservative schools.

Innerarity (2002) refers that today politics does not deal with the construction of consensus, but with the mediation of conflicts and interests, which is very different. Even in “technical” issues (energy, for example), the authority of technical knowledge is not enough to solve the social unconformities through which the neutralities of the technical knowledge inform and explain. In spatial planning, the Regional Science’s models and zoning of the modernist plans are almost already scientific archaeology matters.

We are easily deceived by generic purposes, such as sustainability or consensus, both general and false when dealing with issues such as the use of the mobile phone. The thing is that there are no issues outside society – including the ecological issues, which report to “nature” as something legitimate for itself. Given the general statements, each one will think about what his/her vehicle means (if he/she owns one), how much it means to him/her in terms of territorial and social mobility, and if a bad environmental conscience can be paid for (as in the polluter-payer principle) with an eco-fare or some ritual. Beyond the individual, the construction of the public sphere is of variable geometry and consensus.

As for the State, what is really happening is that it wants to regulate more and more what is no longer dependent on the state regulation itself (as would happen in the strong and economically prosperous social-democracies), and what it is not, most of the times, able to be regulated at a

State-nation scale. In terms of supra-state entities, from the EU to the global organisations, things are very different, according to what is regulated and what are the established consensus (carbon and free trade, provide very contradictory results, as it is known).

Talking about planning and planning evaluation in a context of planning crisis is not an easy task.

2 Extensive urbanisation – precision and concept representation

2.1 Territorial and urban unconfinement

The largest consensus on the diversity of contexts used to define extensive urbanisation is that it represents a different way of conceiving the dichotomy between city/country or urban/rural.

The representation (not necessarily the reality) of the city, traditionally corresponded to a confined form, with a precise shape and boundaries. Regardless of its territorial extension, this confinement immediately represented a previously defined context – whether it was for analysis or for intervention.

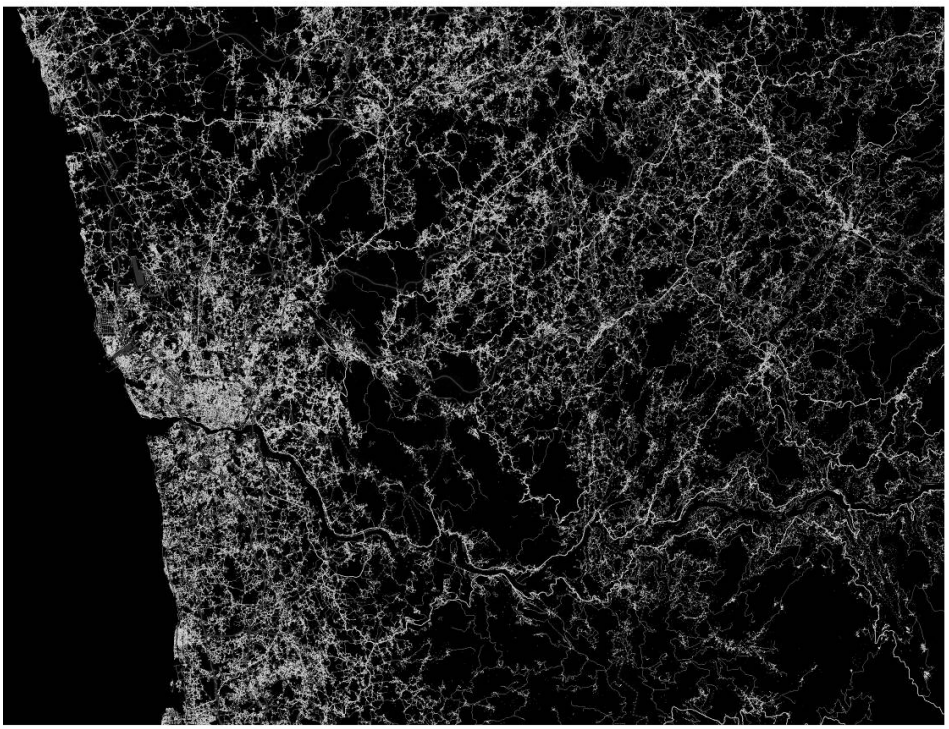

Figure 21. Cartography of the construction and roads in Portugal's Northwest

Frank Lloyd Wright's Broadacre City (1932) was the first model to intuit a city concept that was not based on its limits, but on its generating effects (for the most part, the automobile); something that was spontaneously produced, without a plan. When Patrick Geddes spoke about London in the beginning of the 20th century, he used a biological metaphor but not a City-Body

idea: the author referred to the unmeasured expansion of London as being a “reef”, an ecosystem, therefore deprived of a precision of body limits and with regulation processes that did not come from the functional articulation of the specialised organs, but from other much more complex principles that the authors of the Chicago School have studied later in their Urban Ecology. Another kind of reef was Gottman’s megalopolis (1961) that denominated the urban coalescence on the east coast of the USA. In his “Nonplace Urban Realm”, Melvin Weber clearly establishes what Françoise Choay will denominate the metamorphosis “from city to urban” (Weber, 1964). We were already far from the European idea of the “fortified” city.

Even if society and economy were neutral, the truth is that the automobile – let us not forget that the car is the root product of “Fordism”, as an economical model which associates production and mass consumption – changes everything regarding mobility, spatiality and temporality. For centuries mankind has lived restrained by distances and territorial friction. Functional intensity and complexity, and density and agglomeration, were necessary to produce the urban compact, and its most objective limits. In the 19th century, the railroads lead the suburban expansion through lines, and access points to those lines, although with a collective use and exploitation logic.

With the automobile (and the other motorised vehicles, such as the lorry) leaving behind a big part of the territorial friction, proximity or physical agglomeration are no longer required for the intensification of relationships and for material and non-material exchanges. The relational space is organised in networks and its spatiality is variable and has distinct geographies. For now, the automobile is the dominant vehicle and means of transportation that assures people a certain capacity of self-mobility, as the lorry does for goods (Bourdin, 2007). With a bigger or smaller oil crisis, or the banality of other energy resources and other vehicles and technologies of mobility, we should not believe that what was accomplished in terms of self-mobility will lead to a scenario.of a diminished mobility of goods, people and merchandise

As for agglomeration and proximity, the same can be said about the contiguity, that now alternates with the discontinuity and fragmentation. There has been a revolution on transports infrastructures. An industrial or services company is not totally wireless, but it isn’t also dependent, as in the *Fordist* model, on the exclusiveness of the “industrial areas” - with an exceptional infrastructure in relation to the surrounding territory. Space is not isotropic, but the truth is that the factors and infrastructures necessary for the organisation of production can be placed in very variable contexts as long as there is electricity, a motorway, telecommunications, access to harbours, etc. The low incidence of transport costs in the majority of goods and services explains the rest. As to the costs related to the daily movements of people (employment area, influence areas of collective equipment, etc.) there is another type of incidence of costs with an unequal impact according to salaries and income levels or life-styles.

An idea of urbanisation (which, after all, is almost anything nowadays) may involve hyper concentration as well as hyper dispersion – it’s useless to confront one with the other because they are normally functionally complementary. In the USA, the suburban sprawl stopped being organised around the CBD – Central Business District, and began to be organised according to the edge cities or edgeless cities. Infrastructures extension on the territory produces building forms and uses that

are directly connected with that infrastructure, without drawing a formal continuity (and without needing them) of what is called the city and Lynch (1960)'s "image of the city".

The networks that support self-mobility range from large capacity motorways to narrow paths. The logic that articulates the known "hydraulic" and "pipe" capacity mechanisms against the dimension and "viscosity" of the "flows", combines with the most erratic logics of percolation and dissipation. There cannot be a model that works with only one of these physical structures.

Figure 22. Viana do Castelo, A28 node (motorway)

In the Northwest of Portugal (see Figure 21) urbanisation and industrialisation did not followed the English industrialisation/urbanisation model, the dominant fordist model after World War II, or a kind of expansion such as the American sprawl. Authors such as Alberto Sampaio had already explained to us that the "gene" of disperse settlement exits since the "ruralisation" that followed the fall of the Roman Empire and the organisation of the parishes and convents of the earlier Middle Ages (Sampaio,). The territory has been populated in a disperse form for centuries, and cities were just a place to organise power, trade and social organisation. In the 19th century industrialisation took place, as Zachia says, "without fracture" (Fua and Zachia, 1983). With the strong post-war emigration, many persons have left the country but their relatives have stayed. New houses were built and the settlement pattern did not become more concentrated. With the late tertiary revolution (after Portugal joined the then called ECC), the subsequent functional concentration did not produced a similar population concentration. People could move around relatively easily and jobs and common functions were "just around the corner". Take the similar model of the so called Third Italy where the most banal dispersion patterns coexists with the most admirable Italian historical cities – increasingly turning into real theme parks.

It's becoming harder to understand why there is so much insistence on the city/country dichotomy, if that is not part of this "transgenic" territory mixing genes from diverse forms of urbanisation and from organisation of agricultural and industrial production and services (Domingues, 2008). Maybe this is due to the fact that the rural pattern itself is already too fragmented, and the first cause of the fragmentation of the rural settlement itself. Maybe it is because that dichotomy comes from very different contexts, such as the Mediterranean dry and extensive culture landscapes, or the imposed or community established regulation on the irrigation of fertile plains and vegetable gardens, that pushed sediments to the non-watered banks. Maybe it is because, after all, the rural world and its economies, societies, forms of production and landscapes have been very simplified; and because of the "promiscuity principle" (as geographers such as Orlando Ribeiro denominate the multicultural system of Minho); and because the *minifúndio* structure did not seem very rational when compared to the modern zoning models.

Today, when we observe photographs and maps as the ones included here (Figures 21, 22 and 23), we understand the articulation between two territorial logics:

The first one, inherited from the past, is the finest filigree of the territory that is covered by thousands of kilometres of roads and paths, supporting constructions and mobility patterns, that became very dense in the recent past (after World War II, when society and economy were going through great changes, but there was no new infrastructures, or plans to support them (Domingues, 2006). People would build their houses where there was road access, and the micro-property pattern has facilitated this self-building process.

The second is the motorway network, and its nodes, moving away from the old urban centres (cities and villages) and producing a different spatial pattern that resulted from velocity and accessibility logics - time become more important than space.

Figure 23. Paredes – A4 node (by Filipe Jorge)

Different temporal and spatial patterns coexist in the same territory and it would be odd if any urbanisation model resulted only from one of them. It is possible to live in a house that is built on an agricultural lot and has a factory or a shop on the ground-floor. Roads become street-roads, and functional agglomerations produced by jobs and other kinds of attractive functions appear in the old, urban centres, next to motorway nodes or along the road. Large infrastructures and exceptional functional agglomerations (harbours, airports, universities, shopping centres, business parks, advanced services...) follow concentration and agglomeration patterns, but what feeds them or depends on them, may be very disperse and at time-based distances.

2.2 Conceptual unconfinement

From this brief and impressionist description, we have perceived other kind of elimination of boundaries: concepts.

As Françoise Choay says the city's mutation to the "urban" was not accomplished by a simple extension of the city (to the periphery or suburbs); the "urban" deals with another spatial and social order characterised by centrifugation (and also neo-centralisation), extensiveness discontinuity and fragmentation (Choay, 2006).

There have not been less changes in the countryside. There are intensification and specialisation phenomena of an agriculture that became entrepreneurial, in the middle of "urban" constructions or separated from them. There are constructions without agricultural abandonment of the parcel supporting them (even with intensification of productivity, when the use of the land turns into a vegetable garden and orchard). Of course there is also "de-ruralisation" and agricultural abandonment of territories that were not urbanised *in situ*. Nevertheless, the anxiety towards the "urban explosion" does not lay there.

It is very simplifying to apply the hybrid concept of "re-urbanisation" to this double rural and urban transformation (it's not about crossing two "pure" and always identical entities from which results a third one), or the concept of "garden city" (that is a dated and known model to unite the best of the "countryside" and the "city" utopia and to create self-subsistent communities). What is happening here, it is a more complex process that is closer to transgenic biology. A territory may mix "genes" belonging to different universes and encodings. The results may be as disturbing as the results of a biological research. Ethical, moral or aesthetic perplexity won't be less as well.

Using a metaphor from another scientific context, this "hypertext territory" is organised according to relations, functioning, and production logics with very distinct meanings.

The percolation and capillarity referred to before, allow direct links from a narrow path to a motorway node without having to go through the hierarchy of 7V from Le Corbusier's famous graded system of circulation (as in the Chandigarh plan). That is not why the system is devoid of organisation or organisation principles (therefore, chaos); it is the organisation that is different from the one that was pictured before and several organisation principles probably coexist. A motorway node is a time and space distorting device and that, as in a physics black hole, possesses an enormous gravitational force. Therefore you cannot wait, as in the Central Places Theory, only for the central city-place to produce functional polarisations and agglomerations. There are more

situations that produce similar effects and where the accessibility and mobility are not as problematic and the network's connectivity is more favourable.

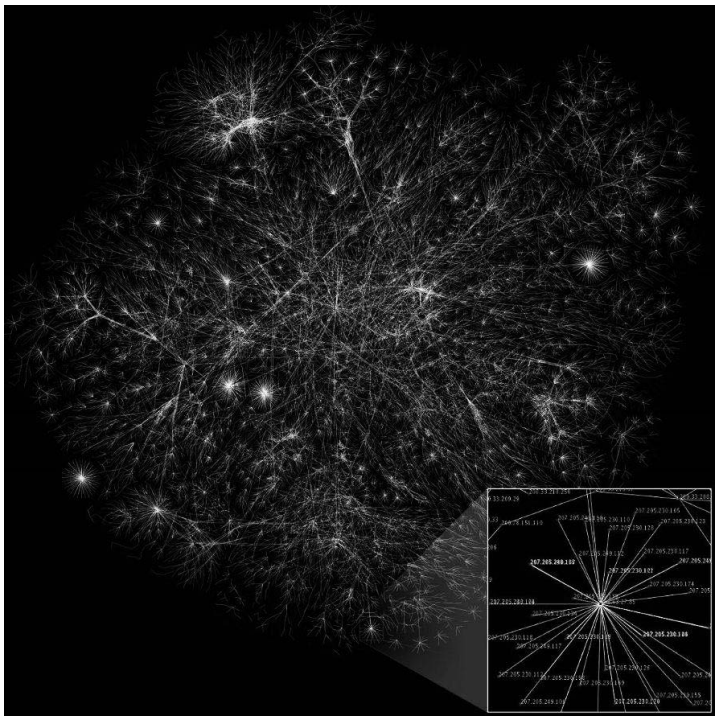

Figure 24. Cartography of a hyper-textual network in antolin.martinez.googlepages.com

One cannot expect space to be, at the same time, of a relational nature (and that doesn't mean the geography of places is over) and not suffer the consequences of it. Relational means it is structured by tensions and forces (as in a magnetic field), this may explain that what is physically near interacts more intensively, or the other way round. Just think of the question in strictly economical terms, and try cartography of the global production of goods and services' processes flow (Veltz, 2007). In the Fordist model the big factories processed almost anything from raw materials to the final products; today, a car in its final stage of assembly, integrates parts that are produced in the four corners of the world. It's useless to get realities and fictions from the informational world and the city of bits (Mitchell, 1995). The network society M. Castells (Castells, 2002) talks about, necessarily produces multiple and functionally linked territorialities and spatialities.

We then propose not to insist so much on the usage of the word "city"; let alone the city/countryside dichotomy; as well as the perception of the urban as a referential or unique model.

What we call "urban" is polysemic, multi-scalar, and solely responds to of the mainstream types of territorialisation.

The new lexicon we propose, including words and concepts such as "percolation", "hypertext" or "transgenic", must not be seen as another metaphorical burden to add to the existing one.

Percolation designates flow organisation processes and relations, taking advantage of the interwoven network of roads that traverse the territory, without a previous hierarchical scheme, and that are connected to large channels of arterial circulation; the flow and substance dissipation processes in a very ramified structure dendritic are rather different from those resulting from hydraulics knowledge applied to "pipe" systems.

Hypertext aims to understand the logics of enchaining-relation (creation of sense and meaning) that are produced from elementary territory organisation units (houses, factories, hospitals, agglomerations, etc. ...) and that do not necessarily follow the same strict and hierarchical relationships as those in, for example, the Central Places Theory. Hypertext differs from text because it is a structure that is organised differently from the usual plot of, for example, a romance in which the narration sequence, the construction of the characters, the division in chapters, etc., follows a linear and cumulative scheme. With the cybernetic instruments, the writing/reading of a hypertext may multiply the possible bifurcations enabling surfing from an information unit – or one of its elements (image, image bit or word) – to another. The process of "construction of meaning" follows, thus, from the start, very distinct and not too rigid paths. Could there be an urban plan like this?

Transgenic, in the sense of genetically modified organism, is used to overcome the hybrid and becoming hybrid conventional metaphors, obtained from the crossing of two distinct species. Transgenic does not come from crossing two organisms, but rather from recombining genetic material of two, or more, organisms. The "re-urbanisation" concept is an "hybrid" concept that, thus, has the supposed qualities of its progenitors, seen as conventional models of the rural and the urban. There's nothing falser. In the so-called re-urbanisation territories we can find many different urban patterns and processes. So, it's about using a very common resource in science - to transpose a theoretical and conceptual frame from a subject area to another, in an attempt to overcome obstruction and to make more objective the usual representation of urbanised territory regulation schemes. If we insist in the old concepts and theoretical frameworks, we may not understand what's going on and not be able to regulate what we want to regulate:

Figure 25. Paredes, Northwest of Portugal 2008 (author's photos)

Regulation and Regulation Parameters

Regulation always lays on a consensus, or a system of consensus acting in a totalising form: from the inquiry on reality, to the forms and instruments of action. Nothing more deceiving in a time of paradigm crisis and when consensus oscillate between being too precarious or too generic.

So, the error may be in the concepts that reveal reality and not in the supposedly erratic character with which this reality is denominated when it doesn't obey to a certain reference pattern. It is about a growing distance between society and territory objective forms, and the explosion of the subjectivity that regulates the daily life, and the result of actors' different actions and rationalities.

As a geographer, and not as a planner, I would say that rather than any polemics or best practices guide, we lack a clear paradigm. If we look at the literature on Extensive Urbanisation, we find a great consensus in terms of general recommendations for planning. The *Programa Nacional de Política de Ordenamento de Território*/PNPOT (National Spatial Planning Policy Program), a framework for regional and urban policy in Portugal, also includes them. Let's take a look at two of the most repeated: to refrain the disperse urbanisation and favour the densification; and to promote polycentrism.

At a first glance, these designations are very consensual. As soon as we move from general statements to practice and to its forms of regulation (that is, the policies) we are quickly confronted with a number of perplexities.

3.1 Refraining the disperse urbanisation

This statement can be literally understood as a simple recommendation to stop the urbanisation fronts, avoiding expanding urban perimeters and promoting new urbanisation areas. In a particular period of time, a GIS would allow us to evaluate the results, and to fulfil anxieties and technocratic illusions.

The first question has to do with territory and relates to the extensive, and more or less disperse, urbanisation we wish to "refrain". In regards to the disperse urbanisation cartography – as presented in Figure 21 – diagnosis is based on the large scale cartography.

What happens is that this scale is not the urban planning's scale, and, above all, it's not the urban regulation scale. The urban regulation is done at a municipal level. There are no regulating plans and normatives for land use at an inter-municipal level in Portugal, especially in large agglomerations. The extension of the National Agricultural Reserves and National Ecological Reserves (RAN – *Reserva Agrícola Nacional* and REN – *Reserva Ecológica Nacional*) is, in fact, delimitated at a municipal level during preparation or revision of Municipal Plans (PDMs - *Planos Directores Municipais*). It's not by chance that there is no map of the REN and RAN to compare to Figure 21.

These reserves are not "aureoles" around the city limits, as the green belts of the modernist plans were. When analysing a detailed cartography, we would see the numerous pieces in which it is divided and its overlapping relation with the "urban" territory.

PDMs are mainly based on zoning and their regulation compromises both the public and the private sector. The legal framework demands two territory categories – the urban and the non-urban – and the corresponding zoning proposals. In practical terms, extensive urbanisation results

from the addition of thousands of areas (perimeters) of a very unequal dimension, scattered in a very discontinuous form. The processes and dynamics that explain this fragmented cartography, derive both from proximity and contiguity logics, and relational logics of variable geography.

The next Figure is the cartography of an association criterion in urban contiguity zones, using an automatic cartography parameter that assumes as contiguity everything within a 50 meter range, measured from the vertices of each building (the colour is proportional to the density of the resident population in 2001). The image would be very similar to linking PDM's urban perimeters, signalling the alternation between intensive and extensive urbanisation.

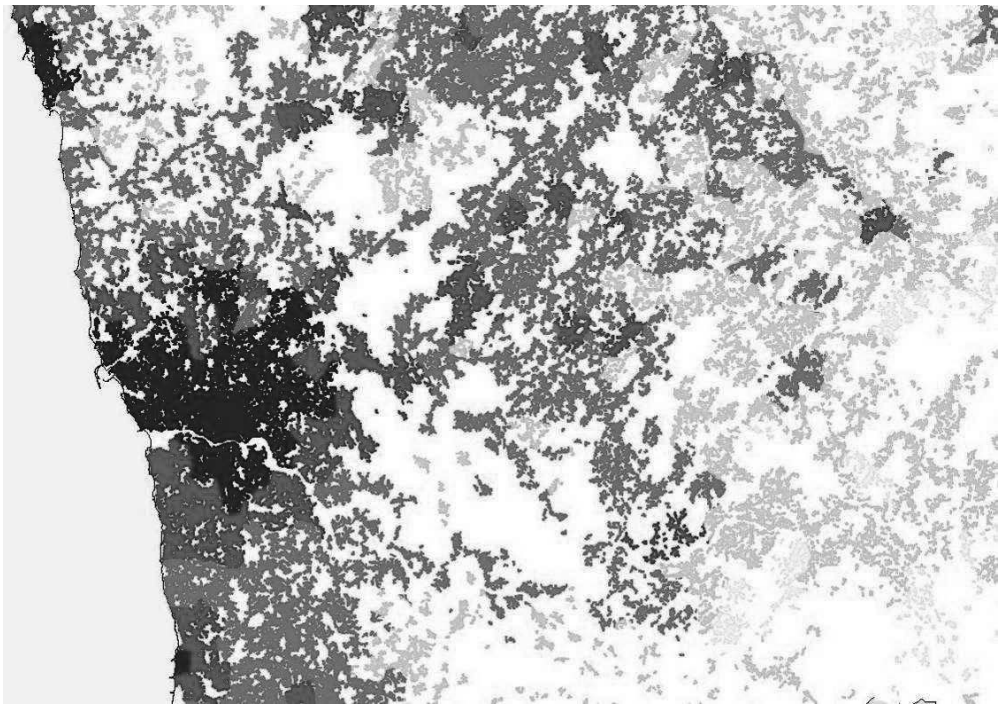

Figure 26. Urban contiguities in Portugal's Northwest (coalescence of the areas measured in a 25 m circle drawn from the buildings' vertices). Source CEAU/FAUP, 2008.

What we deduce from this is that it cannot be expected that Extensive Urbanisation regulation results from the addition of the of its countless parts of the territory's regulation, (more or less contiguous or fragmented). As it happens with the PDMs', it is also not true that that is achieved at a municipal level: by the logic of competition and inter-municipal diversity, a new urbanised areas contention dynamics in a city may be solved by the placement of the investments in neighbouring cities. When these investments are transformed into the creation of jobs and a source of municipal and national taxes, it's even more difficult to use a contention criterion for territory use and there's no lack of public policies incentives for the case. The extension and degree of infra-structuring of the territory and the compression of the distances/time produced by the motorway networks (multiplying the situations of equal accessibility), have diversified the opportunities and geographies for new localisations. An inhabitant, user or citizen (in fact, anyone

of us), will have different practices and speeches as to the evaluation of these opportunities and geographies.

Also we cannot also wait for the total sum of the policies and sector plans dependent on different rationalities and under the aegis of different department and ministeries to result in a high level of territorial articulation – that doesn't happen at a municipal level, let alone an inter-municipal level. It is enough to think that such structuring investments like motorways and their nodes, are not conceived nor decided with the same territorial organisation logics; or which competitiveness or job creation designs (of the Ministry of Economy), will naturally favour the setting of new companies in places with good accessibility and infrastructures (next to a motorway node, for example) that, will then put pressure onto other uses and new urbanisation fronts. If we add to this sector derivative the different "timings" of the planning and the actors' decisions, one can imagine the turbulence of the process.

Due to these conditions, there are several possible answers but they will be better enunciated if they are about the qualification of what is known as diffused urbanisation and not its containment. This statement doesn't mean that the existing urban perimeters should continue to be indefinitely expanded but, otherwise:

- that the expansion criterion must be carefully stated (by the infra-structural endowment criterion, or a better calibration of the questions of an effective bio-physics importance, for example) and evaluated, at least, in the within the council.
- that, more than the expansion of new fronts, what is truly strategical, are the densification and infill criteria within what is already zoned as urban. Extensive urbanization acts as a sponge: the dendritic structure (very dense and ramified) that supports it and the interstitial availabilities of ground, possess an enormous potential for densification and also for qualification without significant densification.

3.2 Promoting polycentrism

The polycentrism designation has, at least two origins and scales:

- at the systems and urban hierarchies level (national or supranational levels), polycentrism was always thought to be an antidote to the macrocephalic excesses of the urban network. "Paris and the French Desert" by Jean-François Gravier (1947), constituted, in that aspect, a reference for France. The creation of the Interministerial Committee for Territorial Amenagement, in 1960, and in 1963, the *Délégation à l'amenagement du territoire et l'action regionale* (DATAR), would be the beginning of a regional/national spatial planning policy and the creation of "balanced metropolises" to strengthen the urban network of the French Hexagon, preventing the deepening of regional asymmetries, and over all, the hegemonic polarization of Paris. More recently and in the European Union, documents such as Europe 2000, Europe 2000+, ESDP (European Spatial Development Perspective, 1999) and ESPON (European Spatial Planning Observation Network) retake similar designations, now at European level in order to prevent exaggerated polarization in the main metropolises and conurbations (Hall; Pain, 2006);
- at the metropolitan level, polycentrism goes back to the post-war period, as a means to solve housing problems in the main metropolises. The English *New Towns* and French *Villes Nouvelles*,

constitute examples of these experiences that, in the beginning, did not correspond to real town centers endowed with some polarization/functional centrality, but rather mainly residential areas with some equipment and services of proximity. Today, polycentrism asks for the condensation of new tertiary sectors with good infrastructures, associating industry and services and good mobility solutions (see, for the French case of *Villes Nouvelles*, http://www.villes-nouvelles.equipement.gouv.fr/pres/index.html; see. Merlin, 1991).

The central role previously played by the Welfare State, is now substituted by a greater involvement of both public and private actors and capitals, and the regulation forms mobilize a wide range of partnerships and planning and project strategies. The French SCOT experience (*Schéma de Cohérence Territoriale, 2000)* demonstrates the necessity for Inter-municipal agreements when defining the strategy and for greater articulation between decentralized institutions of the State. New opportunities that arise from infrastructure and mobility (TGV stations, expansion of transport networks, etc.), the localization of activities (business and technological parks, education and health facilities, logistic and great commercial areas, etc.), or the reuse of well-infrastructured obsolete areas, are some of the main opportunities that guide the strategic reinforcement options of polarities and networks of polarities.

The question now is that the designation of polycentrism has become a banality in all spatial scales, at the same time that the concept and the phenomenology of “central condition” diversifies. There has always been “center” when, in a place, coincided the maximum of accessibility, directional functions agglomeration, and landmarks (public buildings and spaces) such as those that derive from monumentality and patrimonial assets.

Today, these coincidences rarely occur in a single place.

Coimbra IC2 ligação ao Nó A1 Taveiro

Figure 27. Functional agglomeration next to a motorway node near Coimbra

The image illustrates one of the most common examples of “making center” on the extensive urbanization spatial scale. The accessibility (access junction to a motorway) and infrastructures (roads, telecommunications, vacant land for economic activities, energy, etc.), allow for new functional condensations which attract activities, employment and consumers that prior only existed in the “old” center. The *Edge City* U.S.A. model (Garreau, 1991) constitutes the best case studied.

This means that the designation “promotion of polycentrism” on the extensive urbanization scale can explain very distinct spatial policy directories that may be expressed as follows:

- reinforcement of old centers according to current politics on functional revitalization of old town centers;
- reinforcement of other traditional urban polarities and of lesser expression;
- diversification and functional reinforcement of “emergent centralities” normally produced by centers and extensive commercial areas;
- diversification and functional reinforcement of urban agglomerations due to the localization of major services and equipment (public and private), such as universities, health, justice, sports, leisure and other modern facilities and thematic urbanisms;
- new enterprise, industrial and logistic parks, science and technology, etc., more or less combined with other functions such as hotel related, services and housing;
- mega-structures that associate modal interfaces (motorway and high-speed trains; airports and city airports; etc.) to diverse demands for real estate; etc

That is, the dimension, the greater or minor functional specialization, and the geographic context vary constantly, with very distinct urbanistic results and impacts, without losing the essential of polycentrism but also without understanding the results on the restructuring of the whole of which these points are part. Nodality, polarity, connection, centrality, agglomeration, densification, etc., assume different meanings and formal, functional and architectural expressions that, in all, participate in the complex geometry of extensive urbanization, in its multi-scale character, and in the spatial and relational structure of its “heavy materials”. The infrastructural supports are extremely important as to the performance and fluidity of the system but they do not guarantee the desired combination of public and private transport because it is related to distinct things and clienteles (companies, people, merchandises, energy, information, etc.) with distinct logics, rhythms, times, flows and distinct forms of territorialisation. The *Plan de Campagne* example, between Marseilles and Aix-en-Provence, constitutes an enlightening study regarding the radical forms of polycentrism on a regional scale and in the scope of nodes and high-speed corridors (see. Bourdin, 2007).

4 Possible directions

Due to the extension of urbanization, its complexity and the disarticulation or fragmentation of the regulating entities (“splintering urbanism” as Graham and Marvin, 2001 refer), it is necessary to find alternatives to the conventional regulation methods, extremely centered on the municipal regulating plans (PMOTs - *Planos Municipais de Ordenamento do Território* – Municipal Land Use Plans). More than zoning projects or rigid normatives, there is the need for the capacity to adapt to the

opportunities, management and negotiation capabilities as well as documents of strategy and territorial structure. Furthermore, the possibility to develop a pro-active action and to initiate actions and projects with real operational capacity in order to converge/focus or precipitate mobile geometry and the wide-ranging interests of the various agents involved in territorial transformation are also necessary.

Regulating the multi-scaled urban regions implies a deeper knowledge of the logics of the great territorial extension (macro) - as they are the arterial roads or the biophysics systems -, and its articulation with the local transformations (micro).

4.1 The elementary solution: light urbanism and urbanistic *tuning (adjusting)*

The elementary solution does not contemplate the great scenarios of territorial and sectoral coherence, in favour of minimum urbanization units in perimeters zoned as urban or urbanizable: the lot and land division. More than a formal criterion of contiguity and urbanistic structuralization according to eighteenth-century rules, or the “Chart of Athens”, or the New Urbanism neo-traditional picturesque, the elementary solution is organized according to criteria that contribute to a higher quality of the biophysics elements and characterization of landscape.

In the extensive urbanization of Portugal’s northwest region where small agricultural rural properties mix with construction, environmental gains begin with the management of the use and rejection of water and effluent liquids; with the intensification and diversification of vegetal covers; with the maintenance of high levels of soil permeability ; with moderate use of pesticides, herbicides, fertilizers, etc.

The question of possessing minimum road network infrastructures that support construction and functions is of extreme importance, although it is different (less intense) from the streets and avenues of the canonical city. It relates to an existing and differently pressured network, with a variable profile (national and municipal roads, agricultural paths, access roads to new land divisions), which has progressively been constructed on, and it is the true pillar and backbone of extensive urbanization and its changeability.

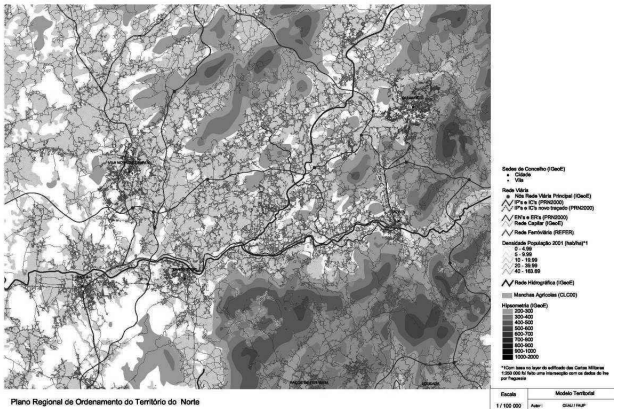

Figure 28. Urban structure of Vale do Ave region: notice the filigreed pattern that associates and interweaves road and construction (CEAU - *Centro de Estudos de Arquitectura e Urbanismo /FAUP – Faculdade de Arquitectura da Universidade do Porto*, PROT. N. - *Plano Regional de Ordenamento do Território do Norte*, Internal doc.).

Figure 29. Detailed view of Vila Nova de Gaia's road map with indication of spaces for collective use

"Road structures possess considerable weight in the municipal public space (approximately 70%), and are essential to constitute a future system, being the conducting elements par excellence. The opportunity is easily materialized through valorisation and accommodating actions for the pedestrian, as well as an adjusted circulation policy (one-way only automobile circulation thus making the real reduction of lanes possible and consequent widening of the sidewalks). Sidewalks must be rethought and seen as essential in the conception of the city. These must be sizeable, pleasant and leafier.

Only 12% of the existing public space are drawn or conformed, which reflects the low public investment in this domain, as well as the absence of private investment associated to the construction process of the city - the public areas are not seen as added-value to construction and consequent commercial promotion, but as an avoidable liability" (www.gaiurb.pt/).

The criteria for urbanization control should, therefore, be better adapted to this filigreed network of infrastructure which supports new and old buildings.

This strategy intends to be complementary to zoning. The public infrastructure (road networks, energy, sanitation, and telecommunications) constitutes a collectively shared externality which is also differentiating of the territorial qualities. The extensive urbanization territory interchanges heavy infrastructural and of high services rendered endowments (motorways and high-speed roads, railways, gas-lines and pipe-lines, air and harbour logistic platforms, high water distribution networks, sewage networks and treatments plants, etc.), with fragile endowments fit for less intense urban loads.

The high density of the canonical city and its territorial confinement have always depended on the extension and the quality of the service of these networks and the services that used them as support. As Leslie Martin said "the grid is the generator", but in this case "the road was the generator". When the network extension, the quality of its layout and its performance, and construction did not concur, processes of peripheralization began where the logics of construction in cheaper land coincided with physical distance from the more infrastructured urban areas and to a lesser endowment, quality and infrastructural diversity. As a certain infrastructural levelling "underneath" is generalized throughout constructed territory - roads, water, sanitation, energy,

telecommunications -, the alternation of points, corridors or areas with high infrastructural characteristics becomes frequent - access to gas network, electric energy, railroads and arterial roads and access, optical fibre, etc. -, either strengthening already existing polarities and urban intensities, or opening new opportunities for attraction.

The quality of the environment is, to a large extent, dependent on this infrastructural endowment, mainly when it comes to the use and rejection of effluents and solid residues.

In extensive urbanization the sufficiency of collective transportation is problematic: the movements are more erratic; the points of origin and destination much more diverse and are spread territorially, according to the distribution/dimension of the more polarized activities. Therefore, more than the conventional solutions for collective transportation, what really matters is the need to improve multi-modality and to organize auto-mobility beyond the individual (to companies and organizations, as can already be verified).

4.2 Planning through projects

Due to the fast changing environment and uncertainty which makes the execution of the plan difficult, to the great territorial extension of urbanization, and what was referred to in the beginning in terms of the embrittlement of the State, the Urban Project has come to attract a great deal of attention due to:

- its operational character in fixed territorial contexts and using normative financing formulas and allotment of costs and benefits;
- the capacity to articulate various interests and public and private actors in a management model and in a defined time for its accomplishment;
- the possibility to articulate it with local and national programs with different objectives in terms of sectoral policy;
- the capacity to adapt to a great variety of programs and objectives;
- the capacity to organize answers when faced with opportunities shared by the different actors involved;
- the capacity to articulate the layout of public space, the provision of infrastructures and constructability.

Whether in the context of the intervention in old town centers; in areas that have become disfunctional and obsolete; in problematic neighbourhoods; in new opportunity areas for companies and activities; etc., the intervention through projects produces true “rationality centers” as background of extensive urbanization. Moulded by a vertebrated plan, of strategical nature and widened territorial scope (see following point), a projects system located in most critical points of the “magma” of extensive urbanization has the capacity to diminish the entropy of the system, thus focusing investments, concentrating mobility supply and demand; offering multimodality solutions; producing infrastructure adequate to foreseen urban loads; diversifying the offer of functions and services, etc.

Figure 10. A4 node between Penafiel and Paredes

"Megaestructures", as Fig.10 or Fig.7 exemplifies (enterprise areas, large-scale hospital units, commercial centers, logistic activities), constitute examples of opportunities for Urban Projects that, in the Portuguese case, are still very confined to interventions of exception - EXPO Park, POLIS and Historical Centers projects - within the perimeters of urbanization already consolidated.

4.3 Planning the intermediate territorial scale: Territorial Coherence Schemes or Structural Plans

The French SCOT - Schéma de Cohérence Territoriale - constitutes an example of what a strategical plan of urbanistic regulation of a conurbation or metropolitan area can be:

Le Schéma de Cohérence Territoriale (SCOT) vise à doter l'agglomération lyonnaise de nouvelles orientations d'aménagement et à coordonner les politiques publiques touchant à toutes les dimensions de la vie quotidienne : se loger, se déplacer, travailler, se distraire (…). Projet politique, le SCOT opérera les choix pour mieux vivre ensemble. Projet territorial, il dessinera un modèle de développement de l'agglomération lyonnaise pour les 25 ans à venir. Son élaboration a été engagée en 2004, par le SEPAL. Elle fait l'objet d'une concertation permanente ouverte à tous. (…) Le SCOT vise à assurer une cohérence et un suivi des différents documents de planification sectoriels (PDU, PLU, PLH, SDUC,...), dans le respect des principes du développement durable. À la différence de l'ancien Schéma Directeur - essentiellement centré sur le droit des sols - il a une ambition plus large puisqu'il vise une organisation globale et intercommunale du cadre de vie : transport, habitat, économie, éducation, culture, sport, santé, sécurité…Le SCOT intègre par ailleurs la concertation comme un élément indispensable de la pertinence et de l'efficacité du projet territorial. (see: http://www.scot-agglolyon.fr/)

The Territorial Coherence Scheme (ECT - *Esquema de Coerência Territorial*), is an Instrument of Urbanistic Regulation of strategical nature that establishes, on a municipal level or association of municipalities, the general orientations for the spatial organization of the urban agglomeration. The Portuguese law contains the statute of the *Planos Intermunicipais de Ordenamento do Território* (Inter-municipal Spatial Plans) where the ECT could fit, but inter-municipality has yet to come in order to carry them out.

The ECT is directed, mainly, to the great questions that arise from the territorial extension of the urbanization, mobility problems of people and goods, the presence of sizable buildings and infrastructures, the intensity of use and degradation of environmental and landscaping resources, the deficiency in articulation between territorial and sectoral authorities, emphasizing:

- the type of conflicts between structures and national/regional dynamics (macro), and local scopes (micro) where these conflicts are strongly felt;
- the necessity to exceed the deficient territorial/urbanistic coordination between sectoral-national authorities; and the fragmentation of the municipal plans;
-the structuring effect of the arterial road structure and the mobility systems, and their connection to the infrastructures and logistic and industrial field activities areas of concentration;
-the concentration/agglomeration patterns of equipments and highly polarised activities and search for mobility generators (origins/destinations; distinct ways of transporting goods, people and information).
-the ecological structure's coherence in the considered territorial range and its articulation with the Municipal Ecological Structures and water and sewage systems and the Hydrographic Basin Plans; as well as the articulation with the plans, projects and local actions with a high impact in the biophysical qualities of the territory and its bio-diversity (regeneration, qualification, ecosystems replacement, ecological corridors, coast and marginal zones, urban system parks, forest, etc.)

The ECT may present actions and single projects in determined places, whose choice derivates from the high structuring potential these places have in the set of the urban agglomeration the ECT refers to. This criterion is applied, for example, to big buildings in obsolete industrial areas, to sites where a node of the arterial road network already exists or is projected; to new areas (or expansions) of business activities (all these examples relate to the denominated "new centralities", to pilot projects of qualification of Ecological Corridors, etc.

The logic and regulation of the organization of extensive urbanisation require a territorial scale of adequate intelligibility – more efficient for the regulation processes.

We propose a cartography organised in three groups:

- texture and biophysical and landscape's structure;
- network structure of connectivity and accessibility;
- structuring urbanisation patterns– areas; nodes, and urban axles of greater relevance and main concentrations of activities which generate high urban loads (the "heavy metals" of urbanisation).

The first group must bear in mind the main sketches of the organisation of biophysical systems (topography, hydrology, forest covers and agricultural areas), emphasising the main degradation and risk, and conflict/pressure situations.

The second must consider the main support system of what's constructed, emphasising a bigger or smaller diversity and permeability of the existing road network, and the connexion points with the high-capacity mobility network (mainly motorways) and the other networks that directly support the construction, inside and out of the most dense and contiguous urban agglomerations.

The third group must emphasise the most occurring urbanisation patterns based on the "heavy metals", distinguishing those where the extensions and density of the construction, activities, jobs and settlement, are of more importance for the structuring of the big urbanisation scale.

We will now exemplify an exercise of cartographic production and analysis for the Oporto Metropolitan core Area, only emphasising the third group: the structure of the "heavy metals".

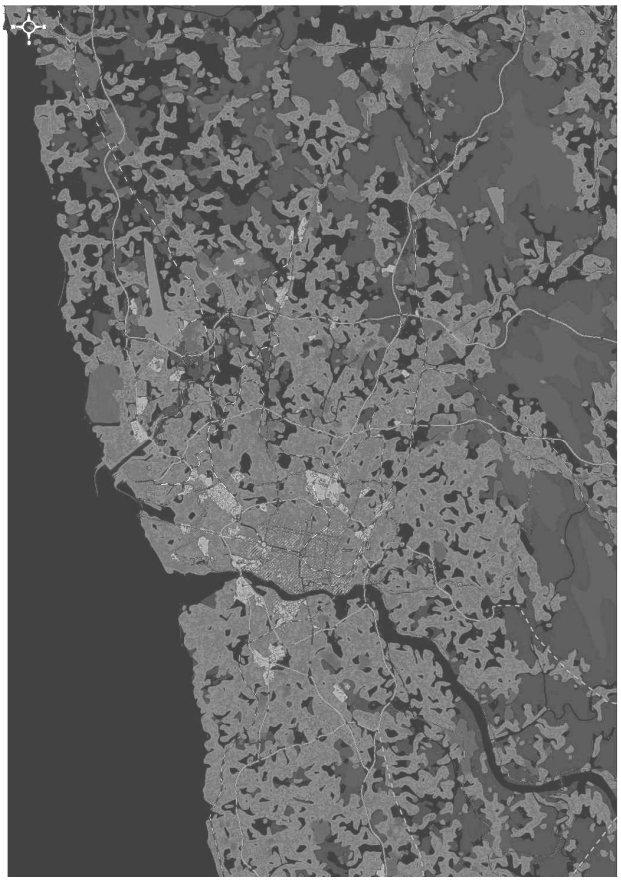

Figure 31. The "heavy metals" in the central core of Oporto's Metropolitan Area (source: CEAU/FAUP North, internal doc.)

References

Ascher, F. 1995. *Métapolis ou l'avenir des Villes.* Paris, Odile Jacob.

Ascher, F. (2005), Ces événements nous dépassent, feignons d'en être les organisateurs, La Tour d'Aigues, éditions de l'Aube.

Ascher, F. (2008), Les Nouveaux Compromis Urbaines, Paris, Ed. De L'Aube.

Bagnasco A. (1977), Tre Italie. La problematica terétoriale dello sviluppo economico italiano, Bologna, Il Mulino.

Bourdin, A. (sous la direction de), (2007), Mobilitè et Ecologie Urbaine, Ed. Descartes & Cie, Paris.

Brusco S. (1982), The Emilian Model : Productive Decentralization and Social Integration, Cambridge Journal of Economics, Vol 6, nº2, 167-184.

Capellin R. (1988), Transaction Costs Urban Agglomeration, Revue d'Economie Régionale et Urbaine, nº2.

Casttels, M. (2002), A Era da Informação: Economia, Sociedade e Cultura, Vol. I.

Casttels, M. (2002), A Sociedade em Rede Vol. II., Fundação Calouste Gulbenkian, Lisboa.

Chalas, Y. e Dubois-Taine, G. 1997. *La ville emergente.* La Tour d'Aigues, Éditions de l'Aube.

Chalas, Y., (sous la direction de), (2005), « L'Isle d'Abeau, de la ville nouvelle à la ville contemporaine », Ed. La Documentation française, Paris.

Choay, F. (2006), Pour une anthropologie de l'espace, ed. Le Seuil, Paris.

Coutras, J. 1999. Diversité des pratiques de déplacement et transformations urbaines. Paris, Coloque RATP.

Deprest, F. 1997. *Enquête sur le tourisme de masse.* Paris, Belin, Mappemonde.

Domingues, A. (2008) Paisagens transgénicas, in AAVV, Arquitectura em Lugares Comuns, Ed. Dafne, Porto.

Domingues, A. (2006), Cidade & Democracia, 30 anos de transformação urbana em Portugal, Ed. Argumentum, Lisboa.

Fua G. and Zacchia C. (1983), Industrializzazione senza fracture, Bologna, Il Mulino.

Garreau, J. 1991. *Edge city: Life in the New Frontier.* New York, Doubleday.

Graham, S., & Marvin, S. (2001), Splintering Urbanism : Networked Infrastructure, Technological Mobilities and the Urban Condition, Routledge, London

Gravier, Jean-François (1947), Paris et le Desert Français, ed. Le Portulan, Paris (ed. Flammarion, 1958).

Haegel e Lévy, J. 1997. Urbanités, identité spatiale et représentation de la société. In: C. Calenge, M. Lussault e B. Pagand. *Figures de l'urbain.* Tours, Maison des Sciences de la Ville.

Hall, P.; Pain, K. (2006), The Polycentric Metropolis: learning from megacity regions in Europe, Earthscan, London.

Hall, Peter (2005), " Retro Urbanism: on the Once and future TOD" in SAUNDRES, William S. (editor) (2005), Sprawl and Suburbia, University of Minnesota Press, London, pp. 122-130.

Harvey, D. (2005), " The New Urbanism and the Communitarian Trap" in SAUNDRES, William S. (editor) (2005), Sprawl and Suburbia, University of Minnesota Press, London, pp. 21-26.

Indovina, F. (1990), La città diffusa, Veneza, DAEST

Indovina, F.; Font, A.; Portas, N. (org.), (2007) La Explosión de la Ciudad, ed. Ministério de Vivienda, Madrid.

Innerarity, D (2002), *La transformación de la política*, Ed. Península, Barcelona.

Lévy, J. 1994. *L'espace légitime. Sur la dimension geógraphique de la fonction politique.* Paris, Presses de Sciences Politique.

Lévy, J. 1997. Definir l'espace par le temps. In: A . Obadia (org.) *Entreprendre la vile. Nouvelles temporalités, nouveaux services.* Actes du Colloque de Cerisy, set. 1996. La Tour d'Aigues, Editions de l'Aube.

Lévy, J. 1998. Espace et temps: une fausse symétrie. *Espaces Temps,* Histoire/ Géographie 2. Les promesses du désordre. N. 68-69-70.

Lynch, K. (1960) – *The image of the city*, MIT Press, Cambridge.

Mangin, D., (2004), La ville franchisée: Formes et structures de la ville contemporaine, Paris, Editions de la Villette.

Merlin, Pierre (1991), Les villes nouvelles en France, Paris, P.U.F.

Mitchell, William J.(1995), *City of Bits, MIT Press.*

Oswalt, P. (ed.), (2006), Srinking Cities, Hatje Cantz Publishers, Ostfildern

Piron, O.(1997), La ville emergente, *Urbanisme* n. 296, set-out.

Saundres, William S. (editor) (2005), Sprawl and Suburbia, University of Minnesota Press, London.

Schwartz, O. 1990. *La monde privé des ouvriers.* Paris, PUF.

Veltz (1988), "La ville éclatée", Éditions de l'Aube, Paris.

Veltz, Pierre (2002), Des lieux et des liens. Politique du territoire à l'heure de la mondialisation, Ed. de l'Aube, Paris.

Viard, Jean (2007), Éloge de la Mobilitè, Paris, Ed. De L'Aube.

Viganò, Paola (1999), La Città Elementare, Ed. Skira, Milano.

Part 4. Environmental Planning

Introduction to Environmental Planning

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Everyone knows that the aim of an integrated urban development, involving the environmental dimension, has recently become one of the most important issues at stake in planning. This is true as much at the level of strategic planning, as at the operational one. In every country, we observe the implementation of procedures, public policies and specific institutions in order to take into account the environmental constraints in projects of urban and regional planning. For example, in France, a national public agency, ADEME[14], has recently implemented a specific system of grants to local communities, which develops an integrated approach to urban planning and environmental preservation, including measures for adaptation to climate change, the so-called "approche environnementale de l'urbanisme"[15].

However, when we speak about an integrated approach or about policy integration, the main question is not only to consider the aims of environmental quality in planning projects, but to link these objectives with those of social and territorial cohesion, as well as those of competitiveness (in the Lisbon Strategy sense) in a holistic coherent way. In other words, environmental planning remains only one aspect of a sustainable urban planning. We have to keep this in mind when reading the following papers using sustainability as a driving force.

The papers of this session, whose contents and focus are quite different, all present a general concern for how to make an urban development more sustainable. With regard to sustainability issues, each of them raises questions about how to conceive sustainable urban development and sustainable urban policies, in direct or indirect ways.

At first sight, this is not the case of the text by Sara Santos, Paulo Pinho and Mafalda Ferreira about "the impact of closed condominiums in the urban form and structure of metropolitan areas". They study the impact of the closed condominiums at the macro-scale of the whole area of Greater Oporto, analyzing only the physical and functional impacts of these residential developments on the overall urban form and structure. Combining GIS and statistical spatial techniques, the authors provide a first diagnosis of the role played by these residential developments in the process of reshaping the metropolitan structure. Reading the conclusions of this study, it seems that the contribution of the closed condominiums to urban sprawl and to coastal development remains modest, and in line with current urban trends, as if the sprawl and unbalanced metropolitan spatial growth were rather consequences than causes of these trends. So, the closed condominiums cannot be regarded directly as responsible for an unsustainable model of development of Greater Oporto. However, we have to keep in mind that they are generally factors of gentrification, social exclusion and socio-spatial segregation. By the way, their high environmental quality, and the high level of quality of life they provide to their inhabitants, cannot be regarded as factors of urban sustainability.

[14] ADEME or Agence De l'Environnement et de la Maîtrise de l'Energie.
[15] Environmental approach of urbanism.

The second paper, written by Fernando Nunes da Silva and Francisco Serdoura, titled "Planning and Management of Urban Renovation Projects: the Expo area and the pursuit of sustainability", uses the case of the 1998 World Exhibition area as an example of a sustainable urban planning project, analyzing the innovations developed throughout the 14 years of the project, located on a waterfront occupied by obsolete industrial buildings and uses. This project was one of the most important projects of urban regeneration in Europe. It was simultaneously a project of industrial and port area reconversion, mixed with the organization of a world event, as was the case of projects such as Ria 2000 in Bilbao, Euralille in Lille, or the Olympic Village of Barcelona. The so-called Park of Nations in Lisbon was one of the most ambitious of these projects, based on a public-private partnership. As a flagship project, it was designed to change the image of the city, and to create a new metropolitan centrality. At the same time, the focus on the environmental questions was permanent and always on top of the major concerns of the process (the initial level of pollution, particularly of the ground, was extreme). So, one of the main objectives for all the phases of the project was to improve the quality of the environment and urban sustainability. However, the unsuccessful "Zero cost strategy" – the sales to the private developers having to balance the public costs of the rehabilitation of the area, which was impossible to achieve – lead to several revisions of the initial plans, to a densification of the neighborhood, and to a loss of architectural coherence[16]. At the same time, the increase in the prices of real estate in the area induced a rapid process of gentrification. For all these reasons, when we do not limit our analysis to the environmental features, the sustainability of the project can be discussed, as the paper suggests.

The third contribution whose authors are Cecilia Silva and Paulo Pinho is a case study which provides a design support tool, the "Structural Accessibility Layer", justifying the title of the chapter: "structural accessibility for urban policy: the case of greater Oporto". This case study evokes one of the key features of urban sustainability travel behavior, and highlights the need for an integrated approach to urban planning, land use policy, and transport policies. The paper ends with a discussion of the potentials and usefulness of the accessibility concept for urban policies. One of its main concerns is to illustrate the need to involve accessibility issues in urban planning, and to consider all the viable alternatives to car use, even if sustainable land use and transport conditions have a modest influence on sustainable travel behavior.

The previous chapter on accessibility illustrates the relevance in using quantitative design support tools. Generally speaking, the discussion about what sustainable urban policies should be, do not only need qualitative diagnosis, but also systems of quantitative indicators. We are thinking about economic, social and environmental indicators, in order to assess all the dimensions of sustainability in an integrated way. In a report for the French government, we analyzed several attempts to build such systems in France and in Germany[17]. However, the need for integrated

[16] See Carrière J-P., Demazière C. (2002) Urban Planning and Flagship Development Projects : Lessons from EXPO 98, Lisbon, *Planning Practice and Research*, 17(1), 69-79.

[17] Our study has shown that these attempts gave more weight to environmental indicators than to economic and social, which could be seen as a weakness...See Carrière J-P. and alii (2005) *La mise en œuvre de systèmes d'indicateurs locaux du développement durable, à partir d'une comparaison franco-allemande,* Rapport pour le Ministère de l'Environnement et du Développement Durable, Laboratoire CITERES, Université de Tours, Octobre 2005.

systems of indicators does not imply that the design of local sustainable urban policies could avoid using physical indicators.

In conclusion, there is no doubt that the three contributions presented here, each one in its specific domain, can contribute to the discussion of what should be a more integrated approach, where environmental issues are regarded as components of urban planning.

The impact of closed condominiums in the urban form and structure of metropolitan areas

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During the last two decades, Greater Oporto has been progressively occupied by a new type of private residential developments, so-called closed condominiums. This phenomenon has amplified the more general trends of urban dispersion and fragmentation of this metropolitan area. The paper is part of a research project which is currently studying the impact of these closed condominiums in the urban form at two different scales of analysis – micro and macro. The micro scale comprises the analysis of the local physical and social impacts of these new developments on the immediate surroundings and on the existing urban and suburban fabric. The macro scale refers, on the contrary, to the whole area of Greater Oporto and will be the focus of this paper. Our main concern is the identification and analysis of the physical and functional impacts of these private residential developments on the overall metropolitan form and structure. A sample of over one hundred closed condominiums in Greater Oporto constitutes our database which includes several socio-economic, spatial and location indicators as well as their main typo-morphological characteristics. Closed condominiums are usually recognized by their high level of functional auto-sufficiency presenting, consequently, a greater capacity to adapt to different locations and urban contexts. Our understanding of the past evolution and present dynamics of the metropolitan area of Oporto is an obvious advantage for this research. Our methodology combines GIS with a number of simple techniques of spatial statistics. The research points out the importance of these residential developments in reshaping certain urban and suburban areas. This paper is expected to contribute to a better understanding of these new types of urban production in the overall metropolitan form and structure and provide valuable recommendations to design more responsive planning policies.

Keywords: closed condominiums; urban impact; metropolitan form and structure

1 Introduction

New types of housing developments have been spreading worldwide, influencing the evolution of metropolitan areas in terms of their forms and structures. In many countries, (for example, the United States, South Africa and some countries of Latin America), these new developments take the form of gated communities – private residential developments with quite large dimensions, with a set of facilities and equipments, ruled by a private entity (generally a homeowner association) and usually with high security systems. Different versions of these gated communities have been emerging worldwide (Atkinson & Blandy, 2005). In Portugal, the phenomenon dates from the late 1980s. The first developments appeared in Algarve and around Cascais, especially as resorts and villas for tourist activities, but soon, private residential developments begin to emerge in the two main metropolitan areas – Lisbon and Oporto. The Portuguese terminology for these housing developments is *closed condominiums* (CCs), following the same designation of Brazil and some other countries. Closed condominiums are smaller developments in comparison to gated communities, but have similar characteristics in what concerns the security, the provision of services and facilities and the private management of the inner spaces.

The literature review on gated communities points out some topics of discussion that correspond to those we find in the postmodern discourse (Dear & Flusty, 1998; Ellin, 1999; Soja,

2001). Actually, gated communities, as well as other forms of private residential developments, shopping malls or thematic parks, are usually called postmodern urban products.

One of the most important topics of discussion related to gated communities refers to the social problems arising with the emergence of these new urban developments. Gates, walls and other explicit boundaries clearly define a private and exclusive territory within the city only accessible for a certain group of residents. These housing developments can contribute to the reinforcement of social segregation and social imbalances keeping out of the private spaces the excluded and unwanted, and producing a city of contrasts. Physical boundaries are usually complemented by sophisticated security systems, providing the residents the guarantee of a secure place to live in an urban scenario that is often characterized by increasing levels of criminality (Marcuse, 1997, Sandercock, 2005)). The type of management of the inner spaces, through a sort of private governance of neighbourhoods is also an important theme of discussion (Foldvary, 1994; Webster, 2003). The collective facilities and the services provided for the residents of a gated community require an intermediate level of governance at the neighbourhood scale, between the private and public spheres of action. The literature on gated communities, or closed condominiums, has revealed, however, a significant lack of research on the physical characteristics of the developments and their relationship with the overall urban form. This paper intends to contribute to filling this gap by analysing the impact of closed condominiums on the urban form and structure of metropolitan areas.

Based on an empirical study of Greater Oporto, it aims to trace to which extent closed condominiums favour or contribute to recent patterns of urban form and to the changing structure of this metropolitan area. The study is part of a three year research project, financed by the Portuguese Foundation for Science and Technology (FCT). The project includes two levels of analysis: macro and micro analysis. The macro scale analysis comprises the study of the whole area of Greater Oporto, including Oporto and five other municipalities around the city, and is the focus of this paper. The micro scale is based on a spatial statistical analysis and refers to the study of the typo-morphological aspects of these developments and to the associated impact on the immediate surroundings, as well as on the existing urban and suburban fabric.

2 Closed condominiums in Portugal

2.1 The phenomenon in Portugal – causes and evolution

The contextual causes for the phenomenon of closed condominiums (CCs) in Portugal, throughout the early 90s, are approximately the same found in other countries: a relatively favourable economic situation, more entrepreneurial dynamism, the introduction of marketing techniques in urban planning, an increase in urban insecurity, increasing financial restrictions applied to local authorities, the consideration of other forms of horizontal property, and a more demanding attitude towards housing (assessed not just as a building product but actually as a more complex real estate product including a variety of services and facilities). In all, these reasons are common to both the international scenario as well as to the Portuguese scenario. Nevertheless, in Portugal the strongest reasons for the emergence of these private residential developments are mainly three

(Santos, 2004). The first reason refers to the beneficial economic situation in the 1990s especially due to the then decrease in the interest rates and the more attractive mortgage conditions. CCs, as a particular type of housing, followed the boom in the Portuguese real estate market, and became more and more popular. The second reason is related to the increasing importance of urban marketing. New strategies in urban marketing were applied to the housing sector, some of which particularly suited to this new urban product. Selling a house in a CC is more than just selling a house. The product comprises the house and a set of facilities and services. In addition, the marketing refers to the green spaces, the security systems, the facilities and services, and to the possibility of living with a particular lifestyle. The image associated with the CC is an image of an exclusive and secure place to live in. The last reason is related to the Portuguese legal planning system. At that time, development control procedures favoured CCs in detriment of the more traditional land subdivision projects. One single planning permit for all buildings included in a CC, instead of multiple individual building permits in the case of land subdivision projects, meant lower costs in the planning process and lower municipal taxes.

During the last two decades, CCs have been spreading over the Portuguese urban landscape. The phenomenon of CCs accompanied a general turn in urban production from the traditional developer, usually a small and family-based company, to larger corporations involving large amounts of investments, as it is often the case with CCs.

Nevertheless, CCs are smaller than gated communities and have less facilities and services. Instead of almost a city within the city, as it is the case of gated communities, CCs are a set of residential buildings with some common services and facilities like a swimming-pool, tennis, playground, sometimes health-club or a condominium room, and security systems installed through a set of control systems (CCTV, gates and even a safeguard). However, CCs represent an important turn in city making, with inevitable impacts on the overall structure and form of urban areas. These large developments are turned to the inside, encouraging, at least in principle, more collective ways of living. The physical characteristics of these developments reinforce the barriers between the inner private spaces and the outer public spaces. In other words, CCs seem to turn their back to the city.

2.2 Definition of Closed Condominium

In Portugal, as well as in other countries, CCs do not have a legal definition. This is one of the reasons why it is quite difficult to trace the evolution of the phenomenon and to have an approximate number of CCs in a particular area. In our research project we used the following definition of closed condominium (CC): *one or more buildings, mostly residential, forming a housing development limited by a wall, or any other type of fence, with restricted access through a security control system, administered under a condominium agreement and usually (but not necessarily) approved through a single planning permit*. Our definition of CC has some obvious similarities to the ones presented for gated communities by other authors, e.g. Atkinson *at al*. (2005).

3 Research Methodology

3.1 Empirical objectives

The analysis of the impact of CCs on the urban form in Greater Oporto involved an empirical study structured in two parts. The first part included the CCs' identification and data collection. The identification was based on a systematic survey of newspapers (particularly adverts from the real estate sections), on data from real estate agencies (either through a direct contact or through the internet), on statistical data from local authorities and on *in loco* visits. CCs' characterization involved the collection of information from different sources, namely, town plans, aerial photographs, housing development data from real estate agencies and, most importantly, individual planning applications. All information was gathered and organized in individual files for each and every CC development.

In the second part, data was analyzed at the micro and macro scale. As referred to before, in this paper we will only focus on the macro analysis, i.e. on general location preferences and location trends. The analysis is mostly statistical and spatial, supported by a Geographic Information System (GIS).

3.2 Study area

The study area includes the municipality of Oporto and the five surrounding municipalities: Matosinhos, Maia, Gondomar, Valongo and Vila Nova de Gaia (Figure 32). Greater Oporto is about 562 km2 and has a population of around 1 million inhabitants. The city of Oporto stands out as the leader in a region distinguished by a heterogeneous territory. However, its capacity for attracting and maintaining population and jobs has been losing strength steadily. Our analysis will, ultimately, try to evaluate how CCs have been contributing to the decentralization and fragmentation of this territory.

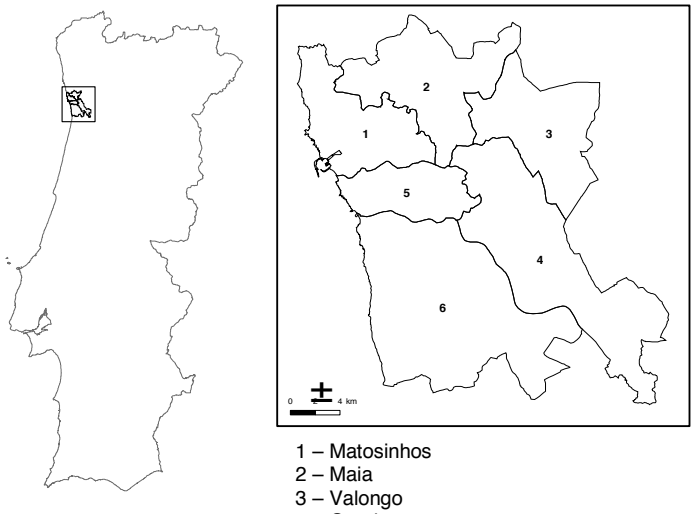


Figure 32. Municipalities of Greater Oporto

3.3 CCs in Greater Oporto

We were able to identify 367 CCs in the study area. Due to some difficulties in approaching the different local planning departments, and the fact that some CCs were still in construction or the building permits were not available for consultation, the number of CCs with a fully completed file came to 136 (Figure 33). Bearing in mind the nature of the difficulties we faced, evenly distributed across the whole spectrum of the CCs universe, we do not find reasons to question the representativeness of this smaller sample.

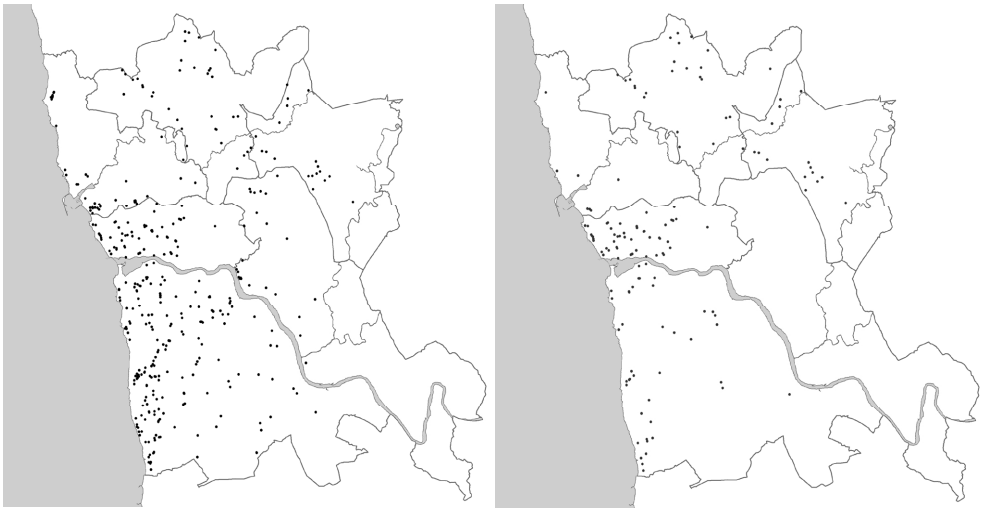


Figure 33. Sample of CCs initially identified (on the left) and fully characterized (on the right) in Greater Oporto

An individual file was filled for the 136 CCs, with information on: general data (location, planning application data), plot characteristics (total plot area, frontage dimension, plant shape, number of frontages, enclosure index, material used in the outer fence), morphology of buildings (built-up area, total floor space, number of buildings, building height, number of floors, buildings position in relation to plot frontage and continuity of the plot frontage), typologies of buildings (building uses, residential types, type of services and equipments, type of access to the buildings), common spaces (green areas, spaces of circulation, closed spaces for collective uses), and private spaces (private garages and private backyards). A deeper analysis of these characteristics will take place at the micro scale. Having in mind these characteristics of the developments, we were able to define the profile of a typical CC in Greater Oporto, as follows, see Table 15.

Table 15. Characteristics of a typical CC

Typology	Number of dwellings	50
	Function	Residential
	Typology	Multifamily
	Services	Minimum common lounge and playground
Morphology	Plot area	6500 m2
	Total floor space	7500 m2
	Building height	2 – 3 storeys
	Overall shape	Diverse

The typical CC is a multifamily development (almost 70%) with an average of 50 dwellings, mostly residential, and with the basic facilities – condominium lounge and playground. On average, the buildings are 2 or 3 storey height and the built-up index is 1,2 (total floor space / plot area), indicating relatively low densities by local current standards. Building shapes within the plot vary significantly (Figure 34 and Figure 35) but, usually, are the result of the combination of four simple forms: parallel buildings, in L, in U or O (totally closed).

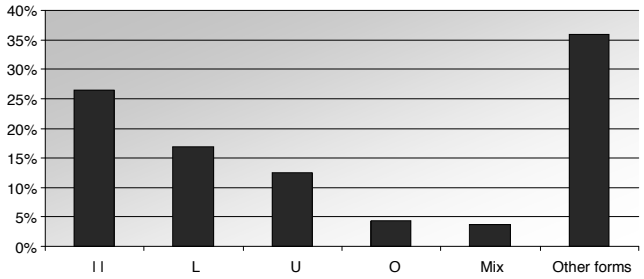


Figure 34. Building shapes within the plot

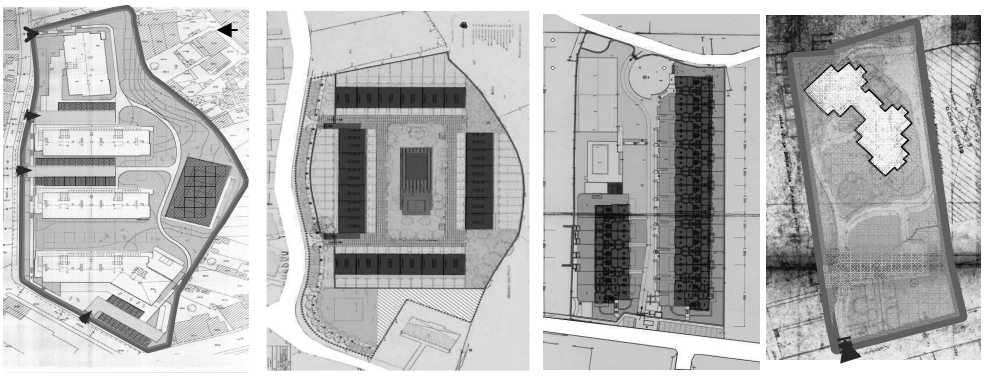


Figure 35. Examples of CCs in the study area

CCs often present a common basement between the buildings. This characteristic is important, and usually used by the Portuguese developers, in order to guarantee that these urban developments are considered by the Local Planning Departments as single units for planning purposes. In other words, when the buildings that constitute a development are physically interconnected by the common basement, they are still able to respect the Portuguese legal definition of horizontal property, under the notion of *horizontal property of contiguous buildings*. This constitutes an advantage in the planning application process because in this way only one single permit is required. In comparison to traditional land subdivision projects, CCs are, thus, more beneficial in financial terms.

It should be emphasized, however, that, recently, the planning legislation has changed, in order to make the development control processes of both CCs and land subdivision projects more alike.

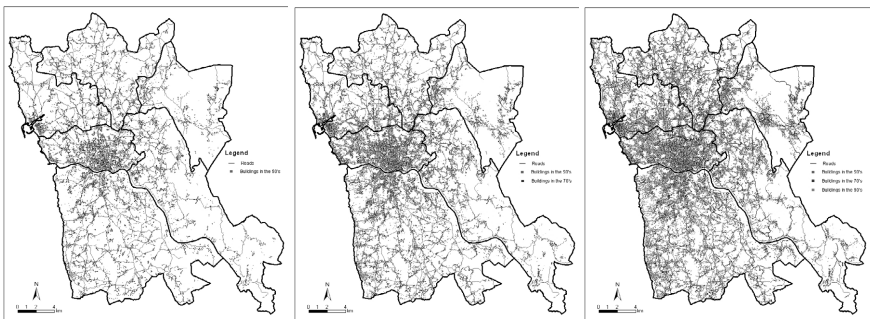
4 The Macro Analysis

The macro analysis focuses on the study of the relationships between the location of CCs and several variables characterizing, from a spatial perspective, the territory of Greater Oporto – the evolution of the study area, urban areas, green structure, transport systems, population, and attractiveness to the centre of Greater Oporto or to the coastline.

4.1 The evolution of urban form in Greater Oporto

The territory of Greater Oporto evolved from a traditional rural pattern with some scattered urban agglomerations throughout the region to present day metropolitan region. Some decades ago Oporto, as the political and economic core of this area, had a significant attractive capacity. Suburbanization caused the growth of the city and of the principal centres around it. The process of suburbanization strengthened, from an economic and demographic point of view, some existing towns in the periphery (Pinho, 2005, Pinho, *et al.*, 1999, Vazquez, 1992). The Metropolitan Area of Oporto followed a very particular evolution based on a late industrial development distinguished by two components, as follows: a diffused industry made of a large number of small and medium size units on traditional sectors, and a number of larger industrial units on more specialized sectors located on the outer ring of the metropolitan area. In recent decades, these industries have been progressively replaced by services. Nowadays, the attractiveness of Oporto has been restrained by the economic development of the outer ring which includes the larger peripheral municipalities referred to before. In this territorial context, the competitive advantages of the city of Oporto rely on a restricted number of capacities far from being totally fulfilled, in some innovative sectors and niches of diversified services and qualified employment.

More recently, throughout the 1980s and 1990s, urban decentralization trends have been reinforced by massive investments in the metropolitan trunk road network, made of new radial and concentric axes and major junctions, creating new centralities and new mobility patterns. Residential decentralization was accompanied by employment decentralization leading to the emergence of a new edge city on the outer ring of the metropolitan area. The superposition of these new patterns of territorial occupation on the traditional rural landscape, characterized by a dispersed type of settlement, slightly linear along the road network, end up generating a truly fragmented territory.



(a) (b) (c)

Figure 36. Evolution of urban form of Greater Oporto: in the 1950s (a), 70s (b) and 90s (c)

From Figures 36.a and 36.b, it is possible to identify the pattern of territorial dynamics from the 1950s to the 1970s. On one hand, the reinforcement of the centre of Greater Oporto, especially, in the city of Oporto, in Matosinhos and in Vila Nova de Gaia. On the other hand, in the outer ring, the linear growth along the main axis clearly shows the beginning of the decentralization process. In the following two decades, from the 1970s till the 1990s (Figures 6.b and 6.c), the dispersion of this territory and the growth of the outer ring on peripheral municipalities are evident, contrasting with the city centre decline. In all, this is the urban landscape in which our CCs have been emerging.

4.2 CCs and Land Uses

Figure 37 represents the urban areas and the urban expansion areas as defined in all the Municipal Master Plans included in our study area. By overlaying a spatial representation of the CCs on those same areas we can conclude that CCs tend to be located in existing urban areas (around 60%) and, especially, on the Western part of Greater Oporto. Only 30% of the CCs appear in urban expansion areas, mainly in the outer ring and following the growth trends of the metropolitan area. There are approximately 8,5% CCs located in other areas, not classified as urban or urban expansions, probably due to subsequent updates of the plans, or to misrepresentations of some of our CCs. There are no reasons to believe that CCs are being built illegally, given the fact that they constitute important investments sold in the open market. In fact, CCs appear much in line with the global trend of the housing sector, preferring consolidated urban areas (Figure 37), and the most dynamic areas as far as real estate investment is concerned (Figure 38).

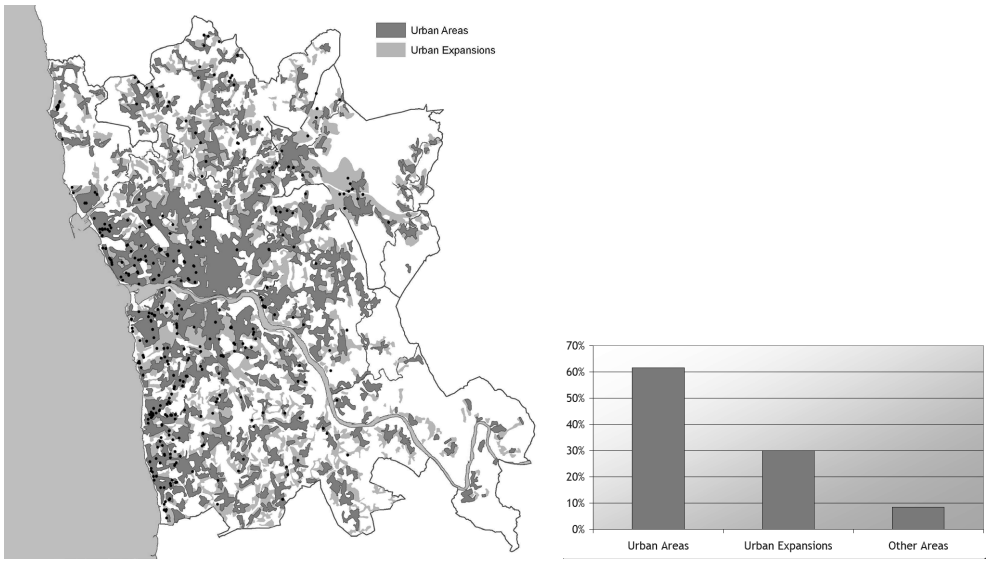


Figure 37. CCs and Urban areas

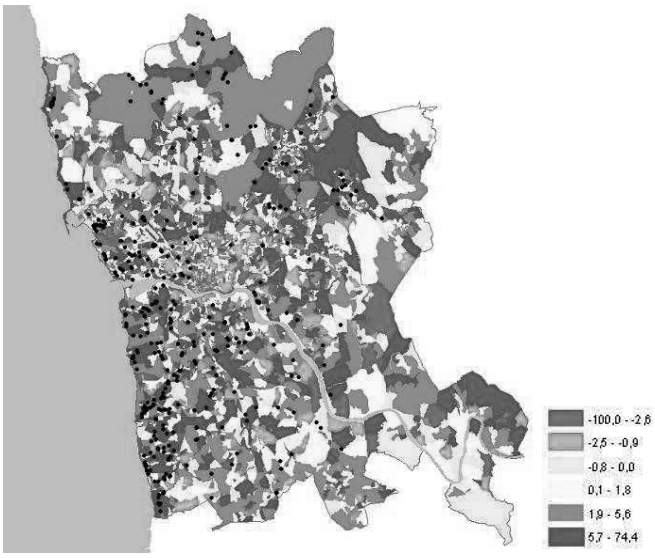


Figure 38. Map of dwellings' growth rates (1991 – 2001) and CC's location

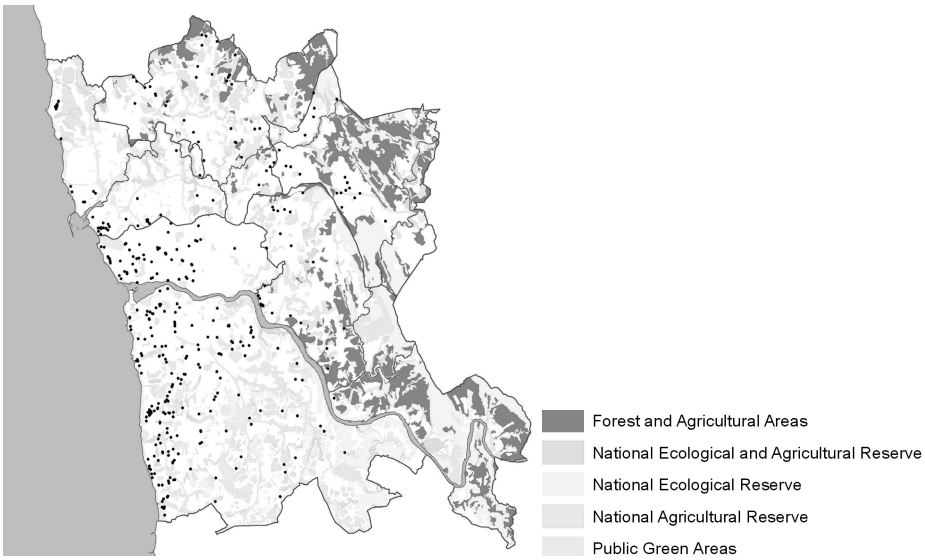


Figure 39. CCs and green areas

The real estate marketing strategies of CCs often refer to the importance of green areas within the developments, but also in the surroundings. With the purpose of studying the influence of the green structure of Greater Oporto in the CCs' location preferences, different types of green areas were considered and represented in the map of Figure 39 – forest and agricultural areas, National Ecological Reserve, National Agricultural Reserve and public green areas (parks and gardens). To evaluate the proximity of the CCs to green areas, we considered buffers of 500m. We identified 94% of CCs located within a distance of less than 500m from any type of green structure. The same process was then applied only to public green areas and, in this case, the value

decreased to 70%. In both cases, CCs seem to clearly prefer locations close to green areas, either in the form of surrounding green landscapes and nature conservation areas, or in the form of the more traditional urban parks or public urban gardens.

4.3 CCs and the transport systems

The transport system in Greater Oporto has received in the last decades considerable amounts of investment from central government in the road network and the light rail system. The new road network is mainly structured between radial and ring roads, around the city of Oporto. Urban expansion has been filling the spaces in-between these infrastructures showing a clear preference for good accessibility locations. However, these new urban areas emerge, most of the cases, disconnected from the existing urban fabrics. As regards to the investment in the light rail system, it was divided in two phases. The first phase, already concluded, is mainly radial in shape and corresponded, to a large extent, to the individual vision of the more central municipalities of Oporto, Maia, Matosinhos and Vila Nova de Gaia. The second phase of the metro project, under consideration at present, is supposed to integrate a strategic vision of Greater Oporto, contributing to metropolitan cohesion and competitiveness (Pinho, 2005; Pinho et al, 2007).

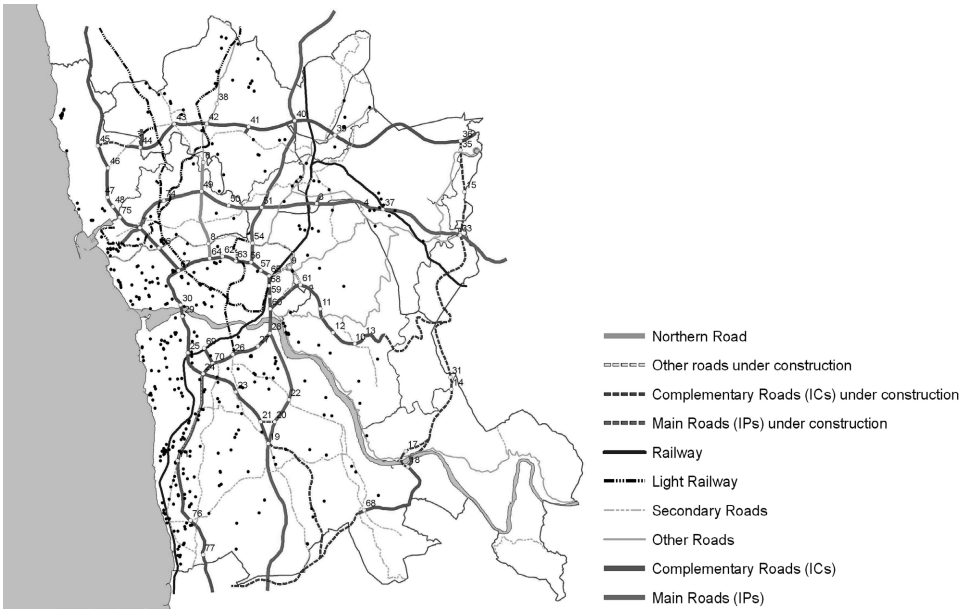


Figure 40. CCs and transport system

Accessibility represents an important aspect in the search for a place to live. In Greater Oporto, as in many other urban regions, good accessibility means proximity to the main motorway junctions and public transports in order to reach central areas and workplaces more easily. In the case of CCs, residents do not seem too much concerned about accessibility. Actually, from a spatial representation (Figure 40) of the main transport system of Greater Oporto, we have defined buffers of 1000m to the motorway junctions and buffers of 500m to railway and metro stations. The

results point out that in terms of the private transport there is a significant number of CCs near a motorway junction (68%), but, on the contrary, the proximity to public transport is only of 16%. It looks like accessibility is slightly neglected, perhaps, because the resident's mobility may be taken for granted.

4.4 CCs and population

The spatial distribution of population is in line with the representation of urban areas, with obvious higher densities in the central areas. Nevertheless, as we have referred to before, the urban core of the city of Oporto has been loosing population to the outer ring of the metropolitan area. Matosinhos, Maia and Vila Nova de Gaia have shown the capacity to attract population over the last decade. One of the main reasons lies in the real estate market, with the price in the housing sector decreasing as we move towards the periphery. Another reason is associated with the transport system. The overlay of Figure 41 with Figure 40 (main transport infrastructures) also shows the importance of the transport systems on the patterns of occupation. Lastly, we can point out some smaller areas subject to urban regeneration, for example on the coastline of Matosinhos or in some parts of Oporto, which have recently gained population.

The most affluent residential areas from upper-middle classes are mainly located on the Western part of the city of Oporto. On the contrary, on the Central and Eastern parts, we can find some pockets of seriously deprived areas within residential areas from the middle–lower classes and also some industrial areas. In fact, this duality between the Western and the Eastern parts reflects two different realities that may well explain the higher number of CCs in the Western part of the city.

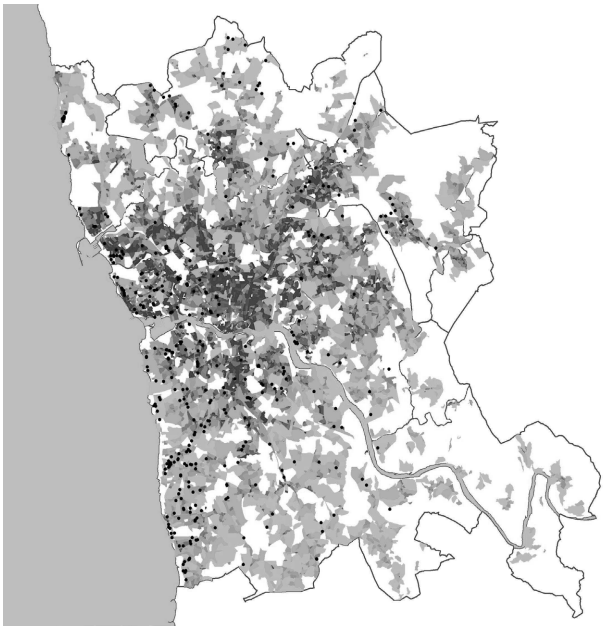


Figure 41. CCs and population densities

From the graphic below we can see that the majority of CCs appear in relatively low density areas (1000 to 3000inhab/km2). In fact, 57% of the CCs are located in areas of less than 3000inhab/km2 (Figure 42). These results were somehow expected because, as we could notice before, these low density areas tend to occupy the urban expansion areas of the outskirts of Greater Oporto. Indeed, the typical CC is a housing development with a moderate build-up index adequate to low densities.

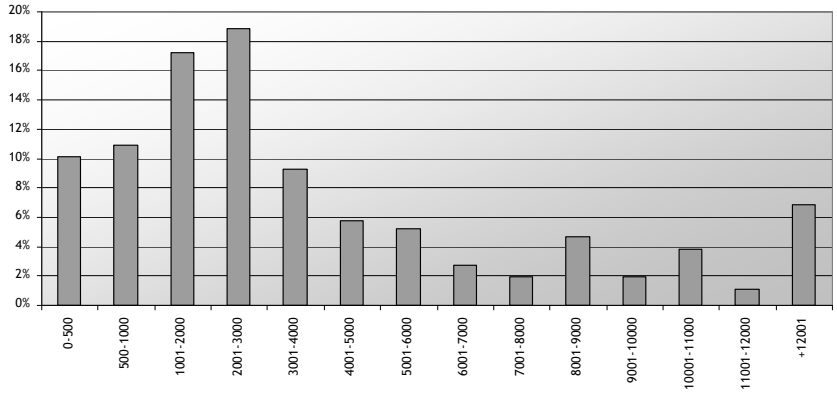


Figure 42. Percentage of CCs per population densities

4.5 CCs and the territorial structure of the Metropolitan Area of Oporto

Lastly, we are going to look in more detail at the CCs' location pattern in relation to dominant influences such as metropolitan centrality and polycentrality, and proximity to the coastline. In this first representation we have considered the Oporto city hall as the epicentre of this territory, and we have drawn a series of concentric circles, distant from each other of 1000m (Figure 43).

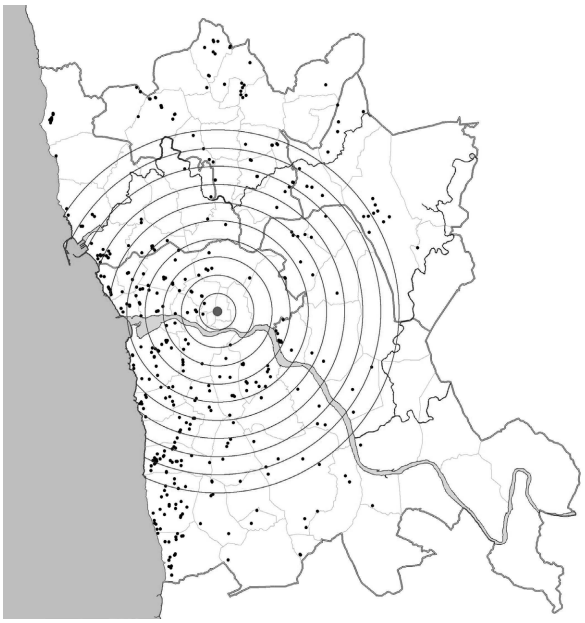


Figure 43. CCs and metropolitan centrality

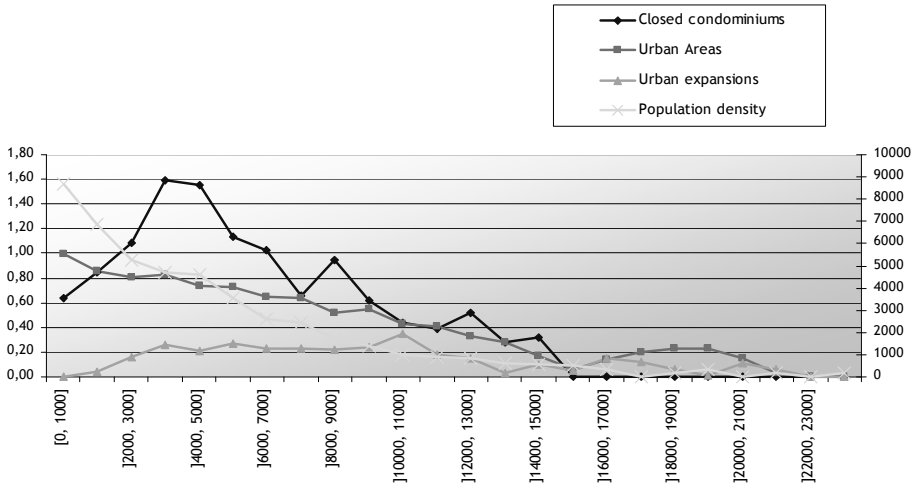


Figure 44. Distribution of CCs, urban areas, expansion areas, and population densities in relation to the city centre

From both the map (Figure 43) and the graph (Figure 44), we can see that CCs prefer locations on the outer areas of Oporto and on the inner rings of the suburban periphery, on distances ranging, approximately, from 2 to 10 km from the city centre. Indeed, the influence of the metropolitan centrality is still quite evident when we analyze the different variables, such as the occurrence of urban areas, of expansion areas and the distribution of population densities.

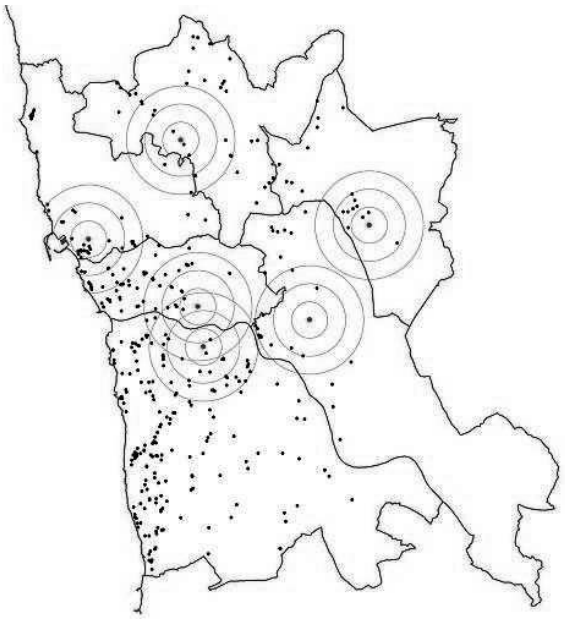


Figure 45. CCs and policentricity

Secondly, we have analyzed the attractiveness of the other main centres around Oporto, to assess the overall polycentrality effect. For this purpose, we have also considered the location of the city halls of each municipality. Figure 45 shows that, on the Northern and Central parts of the Metropolitan Area, CCs seem to follow a polycentric pattern of location, whereas on Southern areas, namely in the municipality of Gaia, that location pattern is not at all clear.

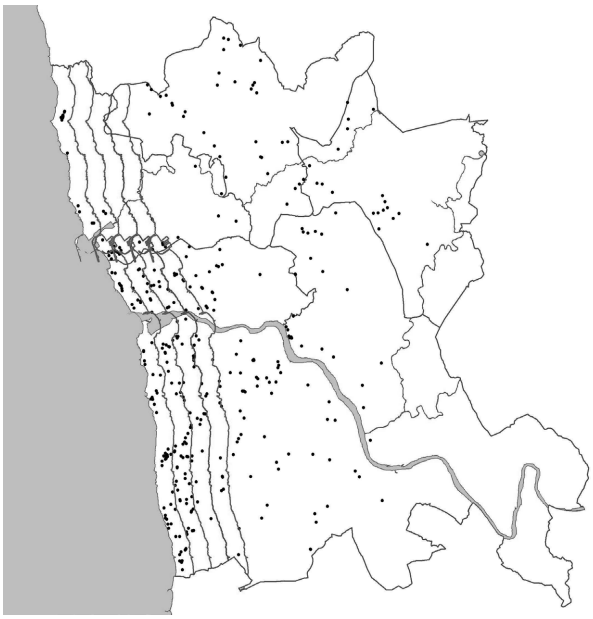


Figure 46. CCS and proximity to the coastline

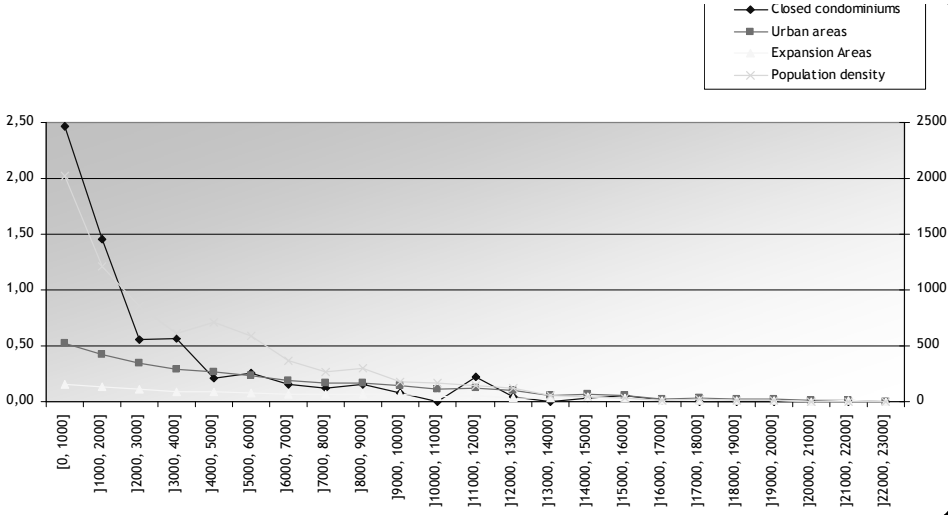


Figure 47. Distribution of CCs, urban areas, expansion areas, and population densities in relation to the coastline

The same procedure was applied regarding the proximity to the coastline. Here, the results show a clear preference for coastal locations, particularly in Oporto and Vila Nova de Gaia. Looking

at Figure 46, it is evident that the coastline represents an important attractiveness factor in the territory of Greater Oporto. Its effects are reflected on a strip of 6 km with higher concentrations of urban areas, expansion areas, population densities and, also, of the number of CCs (Figure 47). Indeed, the spatial duality identified in the city of Oporto is also most evident considering the whole metropolitan area, certainly due to the attractiveness of the coastline.

5 Conclusions

CCs are a relatively recent urban product, but increasingly popular in Portugal and elsewhere. Our study made evident the coexistence of flexible and diversified CC models. Anyway, we attempted to define a typical CC model in Greater Oporto in terms of qualitative and quantitative parameters, such as built-up areas, average number of dwellings, building types, facilities and uses, etc however, we did not manage to identify prevailing urban forms. In fact, the overall plant shapes of the CCs are quite diverse. The presence of a common basement to guarantee the unity of the whole development is one of the most frequent morphological characteristic seen in almost every CC in our study area. Regarding the shapes of the buildings, they vary significantly, but are usually designed with the purpose to create an interior collective space with facilities and equipments. Concave shapes promote the existence of inner spaces to allocate collective activities.

From the empirical study in Greater Oporto we can conclude that CCs prefer low density urban and suburban areas, filling, in many cases, existing gap sites. CCs tend to follow the global trends of the local housing market, preferring the most dynamic territories on the outer ring of Greater Oporto and on the coastal areas, where housing pressures have been higher. At the same time there seems to be a preference for areas offering better urban environmental quality. CCs marketing usually refer to the quality and availability of the natural resources around the developments, mentioning either, the green, the blue or both these structures. In addition, CCs don't seem to depend on general accessibility patterns relying, instead, on the expected mobility of their residents. However, in our case study, the contribution of CCs to sprawl and to coastal development has to be classified as modest and very much in line with current urban development trends.

In synthesis, the wide range of the CCs' characteristics reveals an extraordinary capacity of these urban products to adapt to different conditions and locations. This versatility is also one of the reasons, and an important one, for the apparent success of this model.

References

Atkinson, R. and Blandy, S. (2005) 'Introduction: International Perspectives on the New Enclavism and the Rise of Gated Communities', *Housing Studies*, 20(2), 177-186.

Dear, M.; and Flusty, S. (1998) 'Postmodern Urbanism', *Annals of the Association of American Geographers*, 88(1), 50-72.

Ellin, N. (1999) *Postmodern Urbanism*, Princeton architectural press, New York.

Foldvary, F. (1994) *Public Goods and Private Communities - The Market Provision of Social Services*. Hants, Edward Elgar Publishing.

Marcuse, P. (1997) 'Walls of fear and walls of support', in *Architecture of Fear*, Nan Ellin (Ed), Princeton Architectural Press, 101- 114.

Pinho, P. (2005) 'Pontes e Espaços – Tempo: da alta velocidade à circulação pedonal', Comunicação à *Conferência Porto Cidade Região*, Universidade do Porto.

Pinho, P., Morais, G., Moura e Sá, F., Torres, M. (2007) *Programa Estratégico de Desenvolvimento do Metro do Porto*, FEUP.

Pinho, P, Vázquez, I., Santos, P., Galego, I. (1999). *Regeneração Urbana na Área Metropolitana do Porto* – Relatório Final, PRAXIS XXI, FEUP/SPTA.

Sandercock, L. (2005) 'Difference, Fear and Habitus: A political Economy of Urban Fears', *Habitus: A Sense of Place,* Hillier, J & E. Rooksby (Eds), Ashgate, 219-234.

Santos, S. (2004) *Fragmentos Utópicos na Cidade Caótica: os Condomínios Fechados no Grande Porto*, unpublished PhD Thesis, Faculdade de Engenharia, Universidade do Porto.

Soja, E. (2001) *Postmetropolis: Critical Studies of Cities and Regions*, Blackwell.

Vazquez, I. (1992). *O Processo de Suburbanização no Grande Porto: A evolução da cidade do Porto e a estruturação territorial dos concelhos periféricos*, Tese de Doutoramento, Faculdade de Engenharia da Universidade do Porto.

Webster, C. (2003) 'The global emergence of private planning and governance', *AESOP conference*, Leuven, Belgium.

Acknowledgements

The authors would like to acknowledge and thank the contribution of Fernanda Sousa, Benedita Corte-Real and Vitor Oliveira, as part of the research group working in this project.

Structural Accessibility for Urban Policy: The case of Greater Oporto

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There is a general recognition of the need for a holistic approach to urban planning and policy making. The lack of policy integration is jeopardizing the quality of life and the competitiveness of urban areas as well as their sustainable development. With regard to sustainable travel behaviour (one of the key features of urban sustainability) urban policies are believed to require an integrated approach to land use and transport planning. This paper presents the results of an application to Greater Oporto of the Structural Accessibility Layer (SAL) – a design support tool for integrated land use and transport policies based on the concept of structural accessibility. The local accessibility conditions and the resulting potential for sustainable mobility patterns are mapped and analysed. In addition, the SAL supported the design of policy recommendations. The results of this case study provide an adequate background for a more general discussion on the role of the accessibility concept in urban policy formulation. Our research shows that the geographical representations of accessibility levels provide a new insight into mobility conditions for sustainability. Furthermore, the importance of accessibility measures for sustainable urban policies is rendered clear.

Keywords: Structural Accessibility; Urban Policy; Integrated Approach; Design Support Tool

1 Introduction

Current social and political concerns with environmental issues, social equity, quality of life and sustainability have been responsible for a growing recognition of the need for a holistic approach to urban policy. With regard to sustainable travel behaviour urban policies are believed to require an integrated approach to land use and transport planning.

Transport Policy has traditionally been responsible for the management of mobility patterns. Originally, transport policy aimed at providing an answer to travel needs by offering the necessary transport infrastructure and services – the 'predict and provide' paradigm. As part of the new requirements for sustainable development, there has been a general recognition of the need to manage the demand side of travel. The new 'predict and prevent' paradigm requires a broader approach to mobility management, which clearly surpasses the boundaries of traditional transport planning.

From the variety of constraints and motivations influencing travel behaviour, land use and transport systems provide the baseline exogenous conditions steering travel patterns. Land use raises the need to move in order to participate in disperse urban activities, while the transport system offers the conditions to satisfy these mobility needs. Thus, mobility patterns are constrained by the land use and transport system (or urban structure). The choice of specific travel patterns within the range of potential mobility patterns is further influenced by other aspects, such as socio-economic and demographic characteristics. Nevertheless, if the urban structure does not provide the necessary conditions to enable mobility to be sustainable then other policy actions on socio-economic and demographic characteristics have only limited potential.

Considering that land use and transport systems have a mutual influence (besides their influence on mobility patterns), there is a need for a careful combination of policies to reinforce each other avoiding adverse side-effects (Rodenburg *et al.*, 2002; 463).

Indeed, the need for the integration of land use and transport policies has been recognized by several authors (e.g. Banister, 1994a,b; ISIS, 1999; Wegner and Fürst, 1999; Halden, 2002; Stead, 2003; Cervero 2003). Integrated land use and transport policies can provide the necessary (albeit not sufficient) conditions for sustainable mobility patterns, without which complementary policy actions would have limited to no effect.

A study developed by NEA (2003), on the integration of public transport, suggests that higher levels of integration may increase efficiency and enable a better achievement of common objectives. Furthermore, Stead *et al.* (2003) state that 'there is an increasing recognition that inconsistent policies entail a higher risk of duplication, inefficient spending, a lower quality of service, difficulty in meeting goals, and, ultimately, of a reduced capacity to govern.' (Stead *et al.*, 2003; 16).

Nevertheless, in spite of clear theoretical and empirical evidences of interaction between land use and transport systems and of the broad political and academic recognition of the need to foster this integration, in practice, that is seldom carried out. One of the reasons for this fact is the lack of appropriate and readily available design support tools.

Several authors such as Halden *et al.* (2000), Bertolini *et al.* (2005) and Straatemeier (2006) believe that accessibility measures provide a useful framework for the design of integrated land use and transport policies. Accessibility measures are believed to adequately describe the link between transport and land use (Handy and Niemeire, 1997; Halden *et al.*, 2000; Halden, 2002; Bertolini *et al.*, 2005). Geurs and Wee (2004) argue that these measures are easy to interpret and operationalise. Finally, Straatemeier and Bertolini (2008) suggest that accessibility measures have the potential to deal with current limitations in the development of integrated land use and transport policies. They argue that accessibility has the potential to address a threefold need for; a common language between land use and transport, a link of transport planning to broader policy concerns and more emphasis on the policy design phase.

As a result, accessibility measures seem to provide a useful design support framework by shedding light on the sustainability of potential mobility enabled by land use and transport conditions.

This paper presents the results of an integrated land use and transport policy approach for mobility management in Greater Oporto. After a brief presentation of the accessibility analysis tool, an application to Greater Oporto is presented, providing a discussion of current accessibility conditions as well as policy strategies and recommendations. The paper ends with a brief discussion of the potentials and usefulness of the accessibility concept for urban policies.

2 The Accessibility analysis tool

The Structural Accessibility Layer – SAL (Silva, 2008) is a design support tool based on the concept of structural accessibility. *Structural Accessibility* is defined as the *extent to which the land use and transport system enable individuals to reach different types of opportunities* (adapted from the

accessibility concept presented by Geurs and Eck, 2001; 36). This definition reflects the spatial distribution of opportunities as well as the availability and service level of different transport modes. As defined by Silva (2008) the SAL includes two main accessibility-based indexes: the *diversity of activity index* (the accessibility measure) and the *comparative accessibility index* (the sustainability measure). These measures are geographically represented resorting to a high spatial disaggregation of analysis (at least at the census track level).

The diversity of activity index (DivAct) measures the accessibility level by each transport mode (non-motorized, public transport and the car). It is an aggregate measure of accessibility considering several mobility generating activities. The results of the diversity of activity index range from 0 (no accessible activities) to 1 (all considered activities are accessible) for each transport mode.

The comparative accessibility index uses the results of the first index to develop the comparative analysis of accessibilities by transport modes. This comparative index is then employed as a measure of sustainability of potential mobility patterns enabled by the baseline land use and transport conditions.

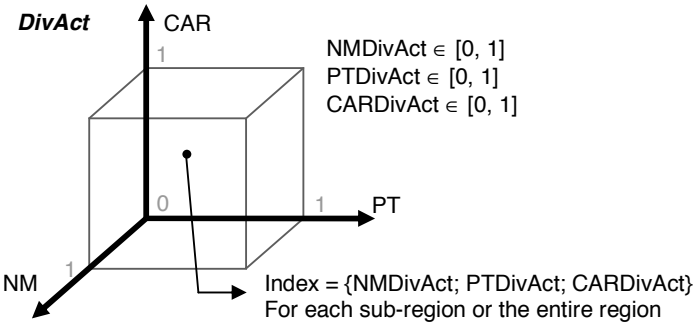

Figure 48. Potential combinations of accessibility values by the three transport modes *Source: Silva (2008)*

The comparative accessibility index is made operational by the benchmarking cube, dividing the full range of accessibility levels by transport mode (figure 48) into categories and clusters. *Categories* represent *different conditions provided by the land use and transport system for travel behaviour*, concerning the potential choice of transport mode. These are a result of the division of the range of accessibility levels by each transport mode into 3 accessibility classes: high accessibility level, class A; medium accessibility level, class B; and low accessibility level, class C. The benchmarking cube is divided into 27 accessibility categories, grouped into 9 accessibility clusters (see figure 49). *Clusters* define *different levels of sustainability of potential mobility (regarding mode choice) enabled by the baseline land use and transport conditions*.

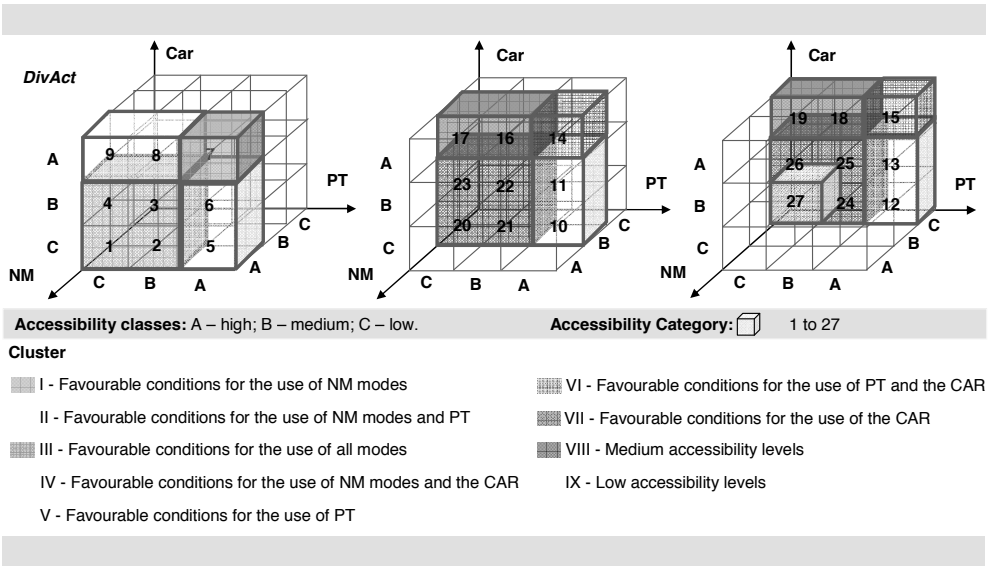

Figure 49. The benchmarking cube *Source: Silva (2008)*

Clusters I to VII are a result of the grouping of accessibility categories representing land use and transport conditions favouring the use of the same transport mode (or modes). A transport mode is considered to be favoured by land use and transport conditions when it provides high accessibility levels. These clusters are ordered according to decreasing sustainability of mode choice favoured by the urban structure. Land use and transport conditions unable to provide high accessibility levels by any transport mode are grouped into clusters VIII and IX according to the highest level of accessibility provided. Contrarily to cluster numeration, the category number has no associated meaning besides of the position in the benchmarking cube.

The accessibility and sustainability measure, confer SAL a twofold capability: first, to analyse the present constraints of urban structure on the sustainability of potential mobility patterns; and second, to support the identification of operational policy options (contextualized by policy strategies) to enhance conditions for sustainable mobility patterns.

3 The case study application to the Greater Oporto

The region chosen for this case study comprises the core municipalities of the metropolitan area of Oporto (see Figure 50), the so-called Greater Oporto (GO). This region is located in the north-west of Portugal, encompassing the municipalities of Gondomar, Maia, Matosinhos, Oporto, Valongo and Vila Nova de Gaia, covering an area of about 560 km^2 (around 70% of the whole metropolitan area). Almost 1.1 million people live in this region (representing 90% of metropolitan population) with a workforce of around half a million.

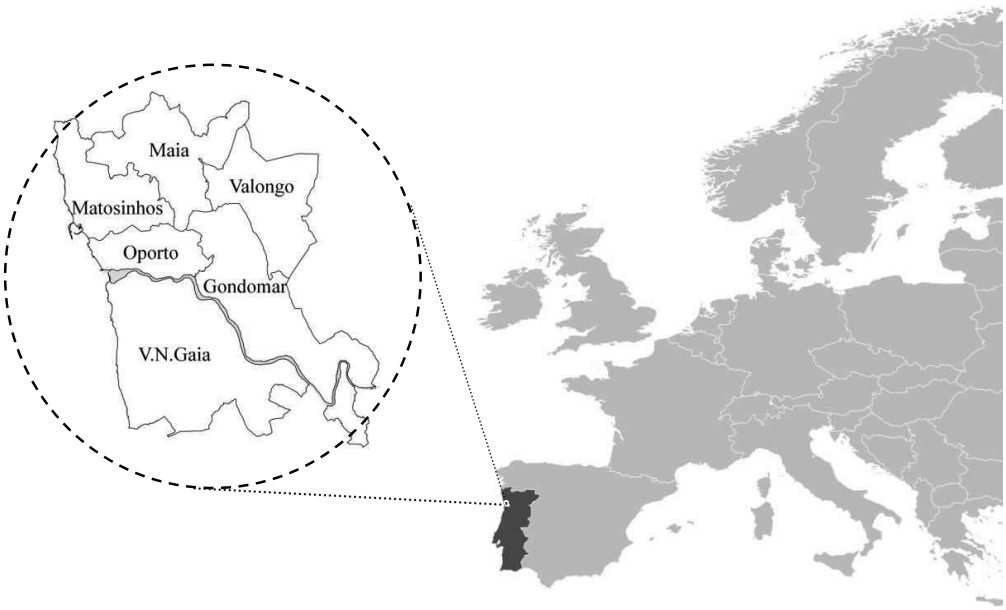

Figure 50. Europe / Portugal / GO / Municipalities

The transport system of the region has suffered important changes in recent years. The last two decades have been marked by the construction of several motorways, considerably reducing time-distance between places. As a result, it is fair to say that the case study region has a high road density. Public transport service has also suffered several changes in the last few years, with the introduction of a light-rail system (in 2002). A network oriented service is steadily replacing the established door-to-door service (including, for instance, pricing integration and network redesign), mainly among the different public transport operators. The area covered by the light-rail and the train system is, somehow, limited to the central area of the Oporto city and to a few radial corridors. The network oriented strategy followed by the public operators is more evident in the city of Oporto and to the North. The remaining study region is mainly served by private operators following the traditional door-to-door strategy.

The study region has, currently, a high car use dependency. More than half of the trips engaged by its inhabitants are made by car. In only one decade public transport has largely been replaced by the car for work and school travel purposes (see Figure 51).

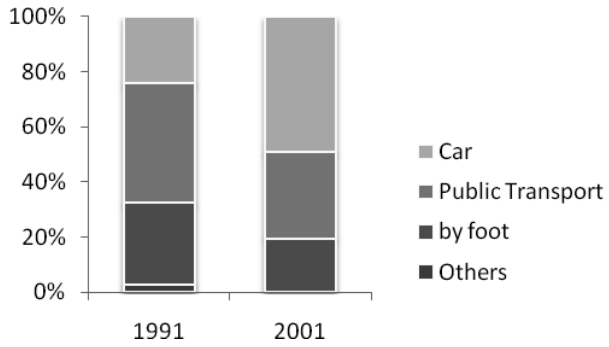

Figure 51. GO's Modal split for the main modes in 1991 and 2001 (considering only work and school trips) - *Data Source: INE (1991) and INE (2001)*

With regard to trip purpose, work trips are clearly dominant in the GO. In any case, these represent less than half of the total travel in the study region (see Figure 52). Other relevant activities for travel generation are leisure, school and shopping activities. Increasing complexity of travel behaviour is also visible in the significant importance of *other* trip purposes (more than 15%).

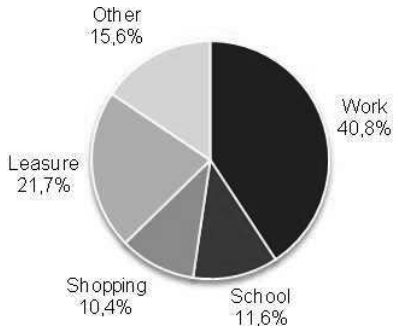

Figure 52. Distribution of trip purposes (*Source: INE 2000*)

Travel behaviour in the metropolitan area of Oporto appears to be increasingly unsustainable. This phenomenon has several interrelated reasons such as; increasing distances between households and activities (related to decentralization of occupation, to the changes in the transport system and to the vicious cycle of car use), increasing complexity of travel needs (related to higher incomes and quality of life standards) and increasing car dependency (related to inefficiencies in public transport service and, also, to social status stigma). In this context, this metropolitan area provides an interesting case study to test the importance for urban policy formulation of an integrated approach to land use and transport planning.

3.1 SAL applied to Greater Oporto

For this case study the SAL used a highly disaggregated spatial analysis at the census track level. The diversity of activities as well as accessibility categories and clusters were defined for each census track (or sub-region) and for the entire region (using a weighted average by population). A broad list of activities was considered in the definition of travel generators including: employment, schools, leisure, shopping, healthcare and other activities. In total, 18 different activities were identified as relevant for travel generation. Accessibility limits were defined separately for each transport mode. For the car, activities were considered to be accessible within 30 minutes travel time. For non-motorized modes (which solely considered walking), a 20 minutes travel time limit was considered acceptable. With regard to public transport use, accessibility limits were considered to be more complex. In addition to a general time limit of 45 minutes, accessibility was also considered to be limited by the number of interchanges inside the public transport systems (maximum of 2), the increase of cost with interchange (no increase was considered acceptable), the walking distance at the interchange (maximum of 100m) and the waiting time at the interchange (maximum of 5 min). Mobility conditions in each transport system were calibrated based on average travel speed values for walking, for each public transport route and for road driving speed (taking into consideration congestion level and road hierarchy).

Finally, accessibility classes, dividing the benchmarking cube, were considered to be defined for the following values of the diversity of activity index:

Class A (high accessibility): [0.85; 1]

Class B (medium accessibility): [0.5; 0.85[

Class C (low accessibility): [0; 0.5[

3.2 Current Accessibility conditions

Current accessibility conditions in the study region are summarized in the following maps. Figure 53 represents small scale variations of accessibility conditions by non-motorized modes and by public transport. Given the homogeneity of the car accessibility map, its representation was considered unnecessary (in this respect, almost the entire study region presents the maximum value for the diversity of activity index). Figure 54 presents the results of the comparative accessibility index (for both, categories and clusters).

Table 16. Accessibility classes for each transport mode by area and by population - *Source: Silva (2008)*

	Analysis by Area (% of 563km^2)			**Analysis by Population (% of 1.089.118 inhabitants)**		
	NM	**PT**	**CAR**	**NM**	**PT**	**CAR**
A	43,5%	47,8%	100,0%	77,6%	83,4%	100,0%
DivAct=1	*7,3%*	*31,3%*	*86,5%*	*25,2%*	*71,2%*	*98,1%*
B	48,6%	4,0%	0,0%	21,3%	1,7%	0,0%
C	7,9%	48,2%	0,0%	1,1%	15,0%	0,0%
DivAct=0	*0,0%*	*48,2%*	*0,0%*	*0,0%*	*15,0%*	*0,0%*

It is clear that the vast majority of the population of the study region lives within good accessibility conditions by all three transport modes (see table 16). The car provides high accessibility levels for all inhabitants while public transport provides high accessibility for more than 4/5th of the population. Less than one quarter of the regional population lives in medium and low accessibility conditions. Although almost 78% of inhabitants share high accessibility levels by foot, this privileged part of the population lives in restricted areas, representing around 40% of the region. Only one quarter of the residents live within maximum local accessibility conditions (having access to all considered activities at walking distance). These people share around 7% of the study region located in the core municipality and southern Matosinhos and northern Vila Nova de Gaia (see figure 53).

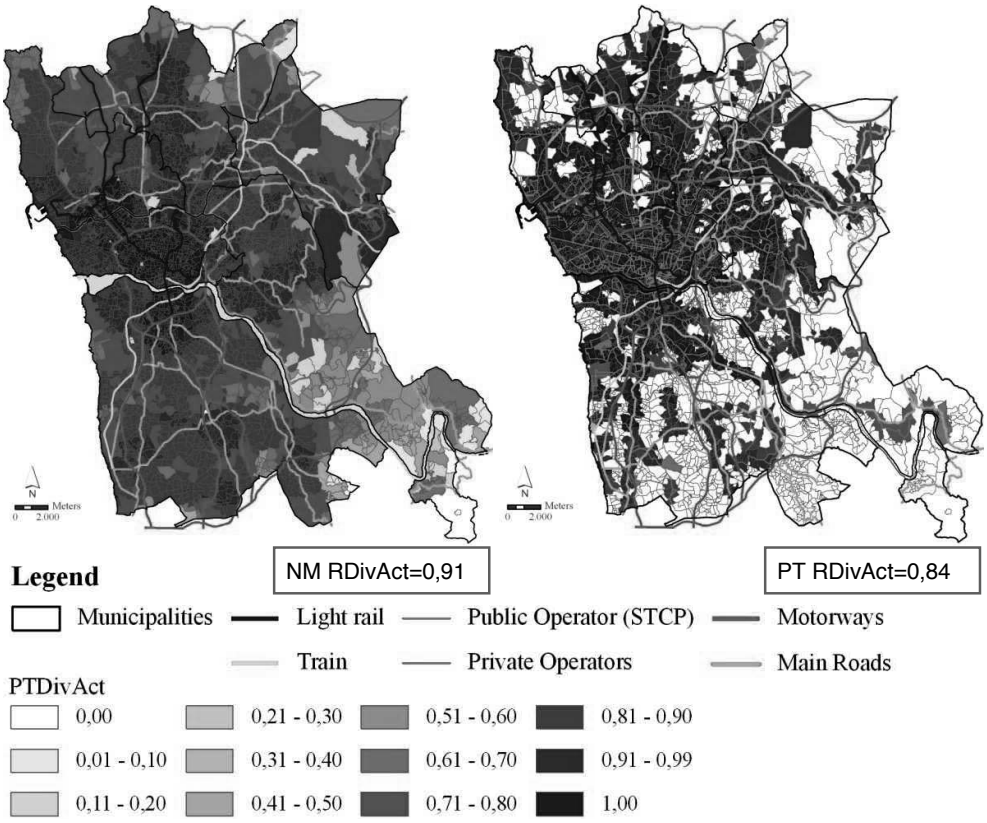

Figure 53. Diversity of Activities accessible by non-motorized modes and public transport - *Source: Silva (2008)*

The diversity of activity index by non-motorized modes provides a clear picture of the urban centres' structure of the study region. Urban centres of different levels are clearly highlighted by the geographical representation of this indicator. This outline of the main urban centres seems to be strongly related to traditional urban agglomerations along the main national road network (excluding motorways). While to the north these agglomerations are closer together forming urban corridors

instead of centres, urban development has been more disperse to the south enabling a clearer recognition of boundaries of each urban centre.

Less than 22% of the population of the study area lives in areas presenting medium accessibility levels, being unable to walk to several every-day activities. The remaining 1% of population living in conditions of low non-motorized accessibility is scattered on an area representing 8% of the study region. In average the region presents a diversity of activity index of 0.91 (accessibility class A).

Figure 53 also presents the geographical distribution of accessibility levels by public transport modes (including public and private operators). This measure clearly marks the spatial distribution of public transport availability, with almost half of the study region area having no access to public transport service. However, although a very large area has no access to public transport service, it only holds 15% of the overall population. The vast majority of the remaining 85% of the population lives in areas with high levels of accessibility to diversity of activities by public transport (83%). 71% live in conditions of maximum accessibility to activities by public transport. Only 2% of the population lives in medium accessibility conditions by public transport in 4% of the study area. On average, the region presents an accessibility index of 0.84 (accessibility class B but very close to class A).

For the public transport the diversity of activity index gives us a representation of spatial distribution of public transport network as well as of public transport service level and activity density around public transport access points.

Considering the recent changes in the public transport network and service level (with the construction of the light rail system and reformulation of the public road operator), introducing a network effect-based service (in opposition to the traditional door-to-door service), it is natural to find the highest accessibility levels around these operators.

With regard to car accessibility, almost the entire study area provides their inhabitants with accessibility to all activity types (98% of the population living in 87% of the study area). The whole study region presents high accessibility levels providing good conditions to the entire population for the use of the car as access mode for everyday activities. On average, the study region presents almost the maximum accessibility level, with a value of 0.99 regarding activities accessible by car.

Figure 54 represents the comparative accessibility index or category, resulting from the comparison of mode accessibility. This map illustrates the land use and transport conditions constraining the higher or lower sustainability of mobility. In other words, it represents the sustainability of potential mobility. As car accessibility was found to be high (class A) for the entire study region, only 9 of the accessibility categories defined by the benchmarking cube can be found. Consequently only 4 of 9 accessibility clusters are attainable in these conditions – cluster III, non-motorized, public transport and car favouring conditions (represented in brown), cluster IV, non-motorized and car favouring conditions (represented in different shades of orange), cluster VI public transport and car favouring conditions (represented in different shades of grey) and cluster VII, car favouring conditions (represented in different shades of lilac).

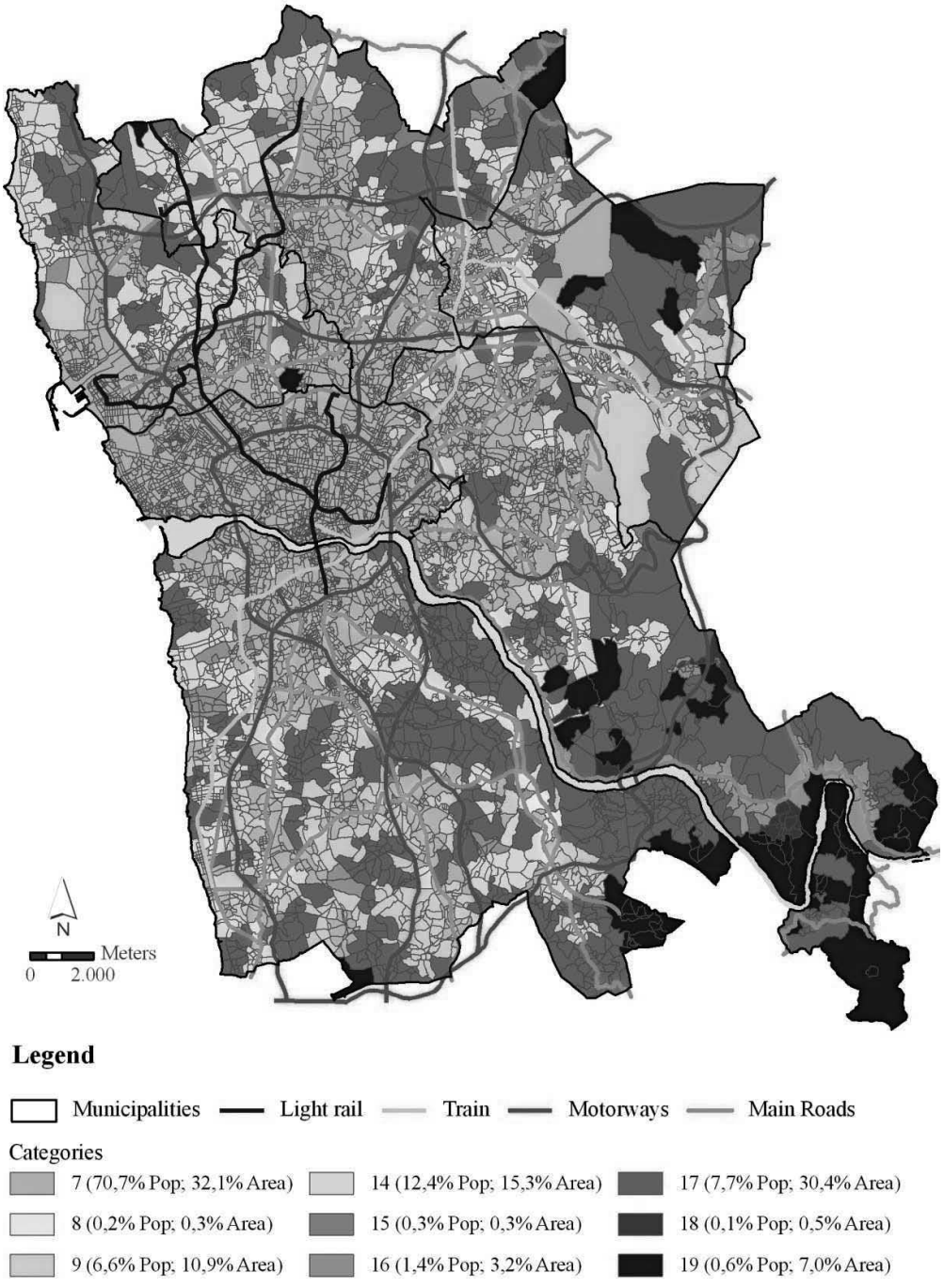

Figure 54. Categories and clusters of accessibility - *Source: Silva (2008)*

The clear majority of the population lives under land use and transport conditions providing high accessibility by all transport modes (category 7; 71% of population), in an area smaller than 33% of the study region. The most frequent accessibility categories provided by land use and

transport conditions are categories 7, 9, 14 and 17. Categories 9, 14 and 17 are present in almost 60% of the study region, defining accessibility conditions of nearly 27% of the regional population. Remaining accessibility categories have a residual importance in the study area.

Table 17. Clusters by area and population - *Data Source: Silva (2008)*

	Clusters				Total
	III	IV	VI	VII	
Area km^2	181	63	87	231	562
%	*32,1%*	*11,3%*	*15,5%*	*41,0%*	*100,0%*
Population	769691	74327	137892	107208	1089118
%	*70,7%*	*6,8%*	*12,7%*	*9,8%*	*100,0%*

Table 17 shows around 70% of the population living in areas providing land use and transport conditions favouring all transport modes (cluster III) while the remaining population mainly live in public transport and car favouring conditions (cluster VI). Around 7% of the population live in non-motorized and car favouring conditions (cluster IV) and almost 10% live in car favouring conditions (cluster VII).

The map clearly shows areas of the study region providing land use and transport conditions which enable travel behaviour to be sustainable – areas in cluster III, IV and VI – although real travel patterns may still have low levels of sustainability since car use is an available mode choice (there is almost no constrain to car use besides moderate congestion in a small central area). The remaining region does not provide the necessary land use and transport conditions to foster sustainable travel behaviour. Even if inhabitants would be willing to pursue more sustainable travel behaviour land use and transport conditions would disable them from doing so (without loss of quality of life).

In general, the study region falls into category 8 of accessibility to diversity of activities, resulting from accessibility class A for non-motorized modes (NM_RDivAct=0.91) and for the car (CAR_RDivAct=0.99) and from accessibility class B for public transport (PT_RDivAct=0.84). This places the study region as a whole in accessibility cluster IV, with land use and transport systems providing non-motorized and car favouring conditions.

Summarizing, the region clearly has two distinct areas with regard to land use and transport conditions for sustainable travel behaviour. Nevertheless, on average, it is fair to say that the region provides already good conditions for the use of both non-motorized modes and the car, although conditions for car use are considerably better than for walking. On the other hand public transport accessibility is still not at acceptable levels and considerably lower than car accessibility, offering a clear advantage for car use and therefore for non-sustainable travel behaviour.

3.3 Policy recommendations

The development of policy recommendations for the Greater Oporto followed two main steps: first, the definition of a general strategy for the entire study region, and second, the development of a more detailed strategy for groups of sub-regions in similar conditions. Each of these steps were based on the analysis results of the SAL, the accessibility and sustainability measures and further

complementary information (such as population density maps, real travel patterns, existing land use and/or transport plans, etc). The SAL supported the design of integrated policies by serving as a framework for the selection of objectives (for policy formulation) and for the selection of policy actions to bring about the chosen objectives. Policy choice was supported by the ability of the SAL to test outcomes of different policy scenarios.

Strategies were based on four main aspects: first, time range; second, choice of the general objective on the benchmarking cube (choice of the desired accessibility category for the time range horizon); third, definition of the general path on the benchmarking cube (strategy for the general evolution of accessibility categories, from the current to the desired status); and fourth, general strategy for the urban structure (e.g. choosing between homogenizing and differentiating strategies for urban occupation). Although this last aspect is solely defined for the general strategy level, it has a strong influence on the detailed strategy level.

Table 18 summarizes the general strategy for the study region. It was reasonable to consider the use of a 10 year time horizon for the development of an integrated strategy plan focussing on land use and transport measures. Indeed, in Portugal, most land use plans are prepared for a 10 year span.

Table 18. Summary of the general strategy

Aspect	**Choice**
Time range	10 years
Objective on cube	Category 7
Path on cube	From category 8 to 7 (increase accessibility by PT)
Urban Structure	Decentralized concentration

Considering the average accessibility category of the study area – category 8 – it was considered realistic to aim to reach category 7 in the time range. This would create favourable land use and transport conditions for the use of all transport modes providing a potential for sustainability gains. More ambitious objectives, such as category 6, are almost impossible to foresee in the near future, especially in the absence of a strong social and political will to change travel behaviour towards higher sustainability.

The general path on the cube envisages a clear increase of public transport accessibility in the region which actually is the transport mode providing worst conditions. Furthermore, it seems necessary to further improve walking accessibility as well as to define the first steps of a long range strategy for car use control. This involves a shift of the study region's position in the cube slightly down and to the front and, considerably, to the right.

Bearing in mind the size of the study area and the heterogeneity of locally available activities it is unreasonable to expect a homogenization of accessibility levels. On the other hand, the decentralized concentration seems to be a sound strategy to enhance general accessibility levels in the area. It will enable the concentration of population and activities in limited areas providing, in addition, an interesting urban system for the development of efficient and economically sound public transport systems. The general idea is to promote the development of an urban structure

based on a network of urban centres supported by a network of major public transport routes. In current urban structure conditions, the strategy proposed for the GO involves the reinforcement of the main urban centralities, inverting recent trends of dispersed decentralization and urban sprawl.

Figure 55 presents a schematic representation of the proposed urban structure, highlighting several levels of urban centralities as well as the main public transport structure. The existing urban structure was identified based on the non-motorized diversity of activity index map, specifically, on class A accessibility level (high accessibility). 1st level urban centres provide walking accessibility to all activities considered (DicAct=1) while 2nd and 3rd level urban centres provide slightly lower accessibility conditions (DivAct = [0.9;1[and DivAct = [0.85;0.9[, respectively). The urban structure proposed in Figure 54 also defines new centralities; one for Gondomar and another for Matosinhos and Maia along the existing light rail corridor. These new centralities are marked in grey. The former was defined to cope with the lack of centralities in the south-eastern part of Gondomar which would seriously compromise an efficient public transport system based on a network of urban centralities. The latter aims to take advantage of an important (and highly sustainable) existing transport facility.

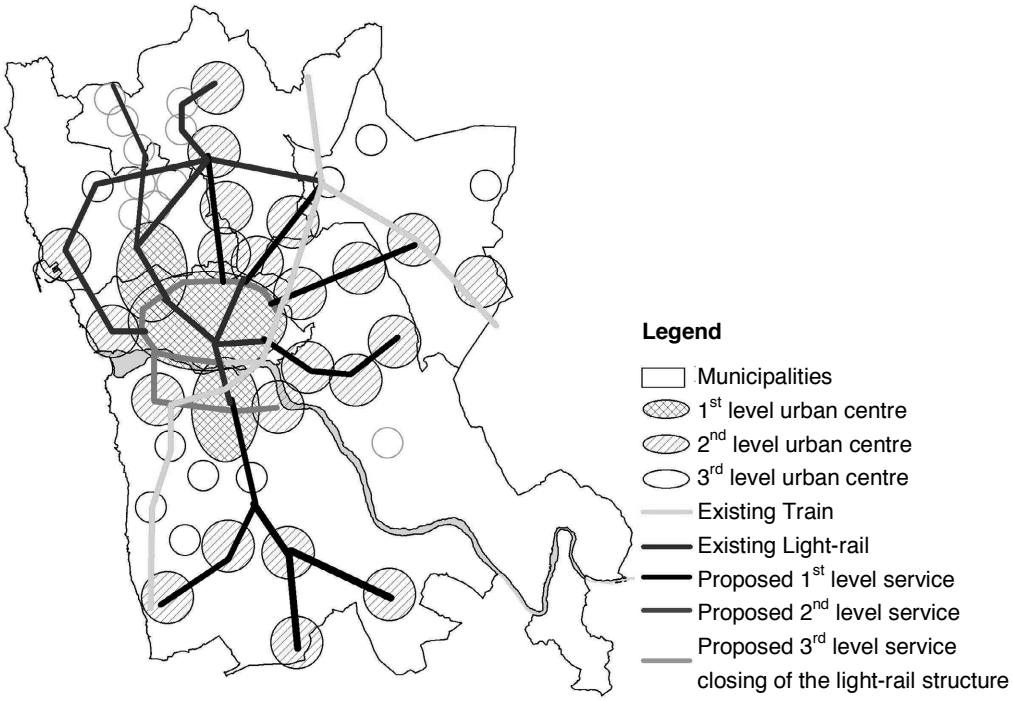

Figure 55. Proposed urban structure for the general strategy for the Greater Oporto

The general structure for the public transport system was defined in accordance to the proposed structure of urban centres. The first level public transport connects the second level urban centres to the main centre of the region (through major public transport interchanges located at strategic points of the public transport network of the main centre). The second level public transport connects a selected number of second level urban centres between each other while the third level works as local public transport access.

With regard to the main public transport structure, figure 55 presents the backbone for the proposed regional public transport system, including some of the existing subsystems. The first level public transport service is proposed along the main corridors of urban centres to the north of the main centre and with a more complex structure to the south (opening branches towards the south of Vila Nova de Gaia and connecting these centres to the light rail network). In combination with the existing rail and light-rail system, these new first level routes form the main radial system of the region. One major circular route is proposed connecting Maia and Matosinhos to answer the strong interdependency between these two municipalities. This route can be extended eastward from Maia to Valongo (more specifically Ermesinde, holding a major rail station where rail routes to the north diverge), and southward from Matosinhos to Oporto. This circular system would work as an extension of the rail route coming from the east, ending at an inner circular route of the light rail (third level system).

One additional circular route for the light rail network system is proposed. This route belongs to the urban network of the major urban centre and rings the municipality of Oporto. This route ties the second level transport network to the urban centre network (light rail and bus) by providing an increase in choice for travel to the main centre. Furthermore it ties the second level transport network together and to a larger regional transport service providing a public transport service which is tailored to encompass some of the complexities of current travel patterns. The provision of real network-based public transport service is essential for the preparation of car use restriction strategies.

Summarizing, to achieve the desired accessibility levels (cluster III) the general strategy envisages the development of a transit oriented urban structure at the regional scale. This large scale urban structure is based on high accessibility levels at local level for a limited number of urban centres. These urban centres work as preferential locations for population and activities. Urban development outside urban centres is to be discouraged. With regard to public transport, a general structure is proposed aiming to provide sustainable medium distance travel which enables sustainable access to all activities (especially non-local activities) by enabling a variety of travel patterns. Additionally there is a requirement for a larger range of public transport and better service levels of the existing service.

The detailed strategy for groups of sub-regions was defined based on the outlined strategy for the entire study region. Figure 56 presents the division of the study region into strategy groups. Ten different groups were defined based on their accessibility conditions and occupation. Table 19 summarizes the detailed strategy for each of the ten groups defined in figure 56.

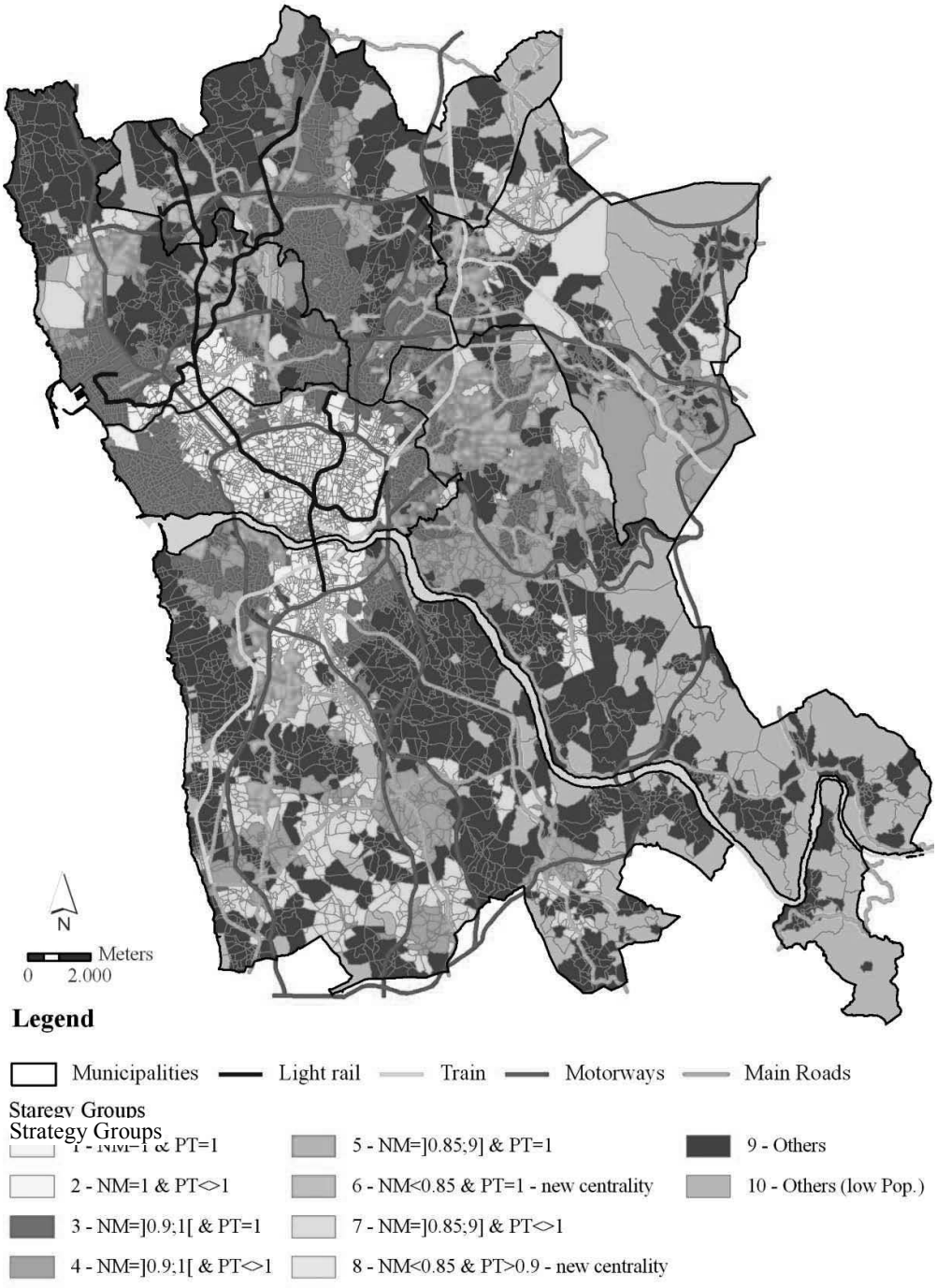

Figure 56. Strategy mapping - *Source: Silva (2008)*

Table 19. Summary of strategy and action for each strategy group - *Source: Silva (2008)*

Group	Objective				Path				Urban Centres	Actions	
	Category	Class			Category	Class				Main	Detail
		NM	PT	CAR		NM	PT	CAR			
1	7	A	A	A	7→7	-	-	A ↓A	1st level	1 4	1.1 4.1
2	7	A	A	A	7/9→7	-	A ↑A C→A	A ↓A	1st level	1 2 4	1.1 2.3.2 4.1
3	7	A	A	A	7→7	A ↑A	-	A ↓A	2nd level	1 3 4	1.1 3.2 4.2
4	7	A	A	A	7/8/9→7	A ↑A	A ↑A B→A C→A	A ↓A	2nd level	1 2 3 4	1.1 2.1/2.2 3.2 4.2
5	7	A	A	A	7(5) →7	A ↑A	-	A ↓A	3rd level	1 3 4	1.1 3.3 4.3
6	7	A	A	A	14→7	B→A	-	A ↓A	3rd level	1 3 4	1.1 3.3 4.3
7	7	A	A	A	7/8/9(5) →7	A ↑A	A ↑A B→A C→A	A ↓A	3rd level	1 2 3 4	1.1 2.3.1 3.3 4.3
8	7	A	A	A	14→7	B→A	A ↑A	A ↓A	3rd level	1 2 3 4	1.1 2.3.1 3.3 4.3
9	14/15	B/C	A	A	14/16/17(20-23) →14 15/18/19(24-27) →15	-	A ↑A B→A C→A	-	Remaining region	2	2.3.3/2.4
10	-	-	-	-		-	-	-	rural	1	1.2

With regard to actions, these were chosen to bring about changes to four main aspects: urban occupation or population density (1), public transport network and service (2), distribution and diversity of activities (3), and, car use convenience (4). These main actions are then further detailed in the last column.

The first group, providing accessibility to all activity types by public transport and walking, encompasses the best conditions for sustainable mobility in the study region. Further urban development and population density should be encouraged in these sub-regions. Additionally, considering the availability of viable alternatives, car use should be discouraged and even hindered through the reduction of car infrastructure capacity. The second group, should follow a similar strategy to the one defined for the first group adding public transport service improvement, in order to provide accessibility to all activity types by this mode. Public transport improvements should centre on the expansion of the network as well as on increasing frequency of the existing network (even if at the expense of door-to-door service). The third group should follow a similar strategy to the one defined for the first group, adding possible improvements to local accessibility levels. Being a second level urban centrality, not all activity types must be at walking distance. Therefore a more detailed survey of lacking activities (provided by the SAL) as well as the assessment of the need for these activities at walking distance (which is a local decision) is required. This information can then be used to detail the activity types which should be encouraged (if any) as well as their preferred location. Furthermore, car use restriction should also be more limited than for first level urban areas with measures mainly centred on travel price.

The fourth group should follow a similar strategy to the one defined for the third group adding the improvement of public transport service. The improvement for second level urban centralities, involves the development or reinforcement of the first and second level public transport structure (improving frequencies and speed while providing direct service between centres). The fifth group should follow a similar strategy to the one defined for the third group but with lower expectations on locally accessible activities, regarding that third level centres are involved (see action 3.3). Furthermore, car use restrictions should also be more limited than for second level urban areas with measures mainly centred on traffic calming. The seventh group adds public transport accessibility concerns to the general strategy of the fifth group. Considering the level of the urban centre, public transport strategy should focus on the direct access to higher level urban centres providing access to lacking activities. The sixth and eighth strategy groups should follow the general strategy of the fifth and seventh group, respectively. Aiming at the development of new third level urban centres, special attention is required for the development of strategies attracting new activities, as well as on the activity types required. The ninth strategy group should act solely upon the public transport aiming to provide a viable alternative to the car (which is currently the only viable transport mode). These sub-regions require an effective alternative transport offering access to the nearest urban centre providing most activities and also access to higher level transport service. This requires door-to-door public transport systems or even ‘on demand’ transport services. Giving the low density of urban occupation in these areas it is unreasonable to strive for high levels of walking accessibility. The tenth strategy group is characterized by very low density of occupation (less than 150inh/km^2) therefore, excluding viability of public transport measures. As a result no aim is defined

for these rural sub-regions, were action should centre on disabling any further occupation (or even reversing any prior urban development).

4 Conclusions: accessibility and urban policies

Generally speaking, accessibility has been disregarded in urban planning in spite of the widespread recognition of its importance to urban living. Local planning departments tend to overestimate the role of mobility attached to economic growth objectives in detriment of softer measures designed to increase the general accessibility levels within an urban region.

This paper aimed to illustrate the role of the accessibility concept for urban policy formulation in the context of sustainable development. The research involved the use of an accessibility-based tool – the Structural Accessibility Layer (SAL) – in the design of integrated land use and transport policies. The SAL shed light on structural accessibility patterns and enabled, as well as supported, the definition of a range urban mobility policies tailored to the Greater Oporto case. In this sense, the concept of structural accessibility was found to be a useful tool to bridge the gap between land use and transport planning.

Finally, the application of SAL to Greater Oporto shows that only 10% of the resident population has no viable alternative to car use. However, the current modal split in this region shows that more than 50% of trips are being made by car. These results suggest two things: first there seems to be a need for push instead of pull land use and transport measures (i.e. to disable car use instead of simply enable sustainable alternatives); and second there seems to be a need for policy measures on complementary field (influencing for instance lifestyles) in the absence of urban structure push measures. Indeed, with regard to the influence of urban structure on mobility, this research shows that sustainable land use and transport conditions have but modest influence on sustainable travel behaviour.

References

Banister, D (1994a) *Transport Planning*, E&FN Spon. London.

Banister, D (1994b) "Reducing the need to travel through planning", *Town Planning Reviews* **65**(4) 349-354.

Bertolini, L, Clercq, F and Kapoen, L (2005) "Sustainable accessibility: a conceptual framework to integrate transport and land use plan-making. Two test-applications in the Netherlands and a reflection on the way forward", *Transport Policy* **12**(3) 207-220.

Cervero, R (2003) "Growing smart by linking transportation and land use: perspectives from California", *Built Environment* **29**(1) 66-78.

Geurs, K and Wee, B (2004) "Accessibility evaluation of land-use and transport strategies: review and research directions", *Journal of Transport Geography* **12** 127–140.

Halden, D (2002) "Using accessibility measures to integrate land use and transport policy in Edinburgh and the Lothians", *Transport Policy* **9** 313–324.

Halden, D, McGuigan, D, Nisbet, A and McKinnon, A (2000) *Accessibility: Review of measuring techniques and their application,* Scottish Executive, Edinburgh.

Handy, S and Niemeier D (1997) "Measuring accessibility: an exploration of issues and alternatives", *Environment and Planning A* **29**(7) 1175-1194.

INE (1991) *Recenseamento Geral da População 1991,* INE. Lisboa.

INE (2000) *Inquérito à Mobilidade da População Residente 2000,* INE. Lisboa.

INE (2001) *Recenseamento Geral da População 2001,* INE. Lisboa.

ISIS (1999) *Outline of Concept. Deliverable 1 of the European Project TRANSLAND,* European Commission.

NEA (2003) *Integration and Regulatory Structures in Public Transport. Final Report,* European Commission DG TREN.

Rodenburg, C, Ubbles, B and Nijkamp, P (2002) "Policy scenarios for achieving sustainable transport in Europe", *Transport Reviews* **22**(4) 229-472.

Silva C (2008) *Comparative Accessibility for Mobility Management – The Structural Accessibility Layer*, PhD Thesis by the Faculty of Engineering of the Oporto University, Oporto.

Stead, D (2003) "Transport and land-use planning policy: really joint up?" *International Social Science Journal* **55**(2) 333-347.

Stead, D, Geerlings, H and Meijers, E (2003) *Integrated land use planning, transport and environmental policy-making: an international comparison,* NOVEM, Utrecht.

Straatemeier, T (2006) "Accessibility: an interesting concept to address strategic planning issues in the Amsterdam region?" *AMIDSt: Transportation Planning a Policy Design Challenge*, Amsterdam.

Straatemeier, T and Bertolini, L (2008) "Joint Accessibility Design: a framework developed for and with practitioners to stimulate the integration of regional land-use and transport strategies in the Netherlands", *TRB 2008*. Washington D.C.

Wegner, M and Fürst, F (1999) *Land-Use Transport Interaction: State of the art. Deliverable 2a of the European Project TRANSLAND,* European Commission.

Action types considered:

1 Act upon urban occupation (population density):

1.1 Action stimulating occupation (increasing population density);

1.2 Action restricting occupation (maintaining or even decreasing population density);

2 Act upon public transport service:

2.1 Develop a 1st level network providing direct and fast access of 2nd level centralities to the main urban centre (service characteristics: high frequency, speed and capacity, few stops; favoured mode: train, light rail or segregated bus routes);

2.2 Develop a 2nd level network providing direct and fast access between the main 2nd level centres (service characteristics: high frequency, speed and capacity, few stops; favoured mode: light rail, segregated or not segregated bus routes);

2.3 Develop a 3rd level network

2.3.1 Providing direct access from a 3rd level centre to the most convenient higher level centre (service characteristics: low frequency, few stops, medium capacity; favoured mode: bus);

2.3.2 Providing frequent and wide ranging access between larger urban centres (service characteristics: high frequency and reliability, network service in opposition to a door-to-door network; favoured mode: light rail and segregated or not segregated bus);

2.3.3 Providing interurban access to the most convenient centre (service characteristics: radial, low frequency, many stops, door-to-door network, medium to low capacity; favoured mode: bus);

2.4 Develop a 4th level network providing local access in low population density (service characteristics: time table based or on-demand frequency, low capacity, many stops, door-to-door network; favoured mode: small busses, vans or taxis);

3 Act upon activity diversity (in connection with urban centre level)

3.1 Providing local access to all activity types in the 1st level urban centres; Aim NMDivAct=1

3.2 Providing local access to almost every activity type in 2nd level centres; it is reasonable that activity types such as universities (3), cinema (6) and theatre (7) are not present at this centralities (at least not the guarantee of access for all its population); aim NMDivAct>0.95

3.3 Providing local access to most relevant activity types in 3rd level centres; it is reasonable that activity types such as universities (3), cinema (6) theatre (7), other leisure activities (9), non-food shopping (11), hospital and clinics (13), postal office (15) and other activities (17) are not present at this centralities (at least not the guarantee of access for all its population); aim NMDivAct>0.85.

4 Act upon car use restriction (in connection with urban centre level)

4.1 Reduce capacity of road network (for instance, reduce parking spaces, reduce width of roads and number of lanes) – indicated for 1st level urban centres;

4.2 Increase travel price (for instance increase parking prices) – indicated for 2nd level urban centres;

4.3 Traffic calming measures (such as the reduction of maximum travel speed, the use of roundabouts) – indicated for 3rd level urban centres.

The EXPO area and the pursuit of sustainability[18]

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Urban renovation projects are gaining a new impulse in most of European cities. The embracing of a valorisation philosophy of the existing urban fabric and the new opportunities open in cities by the transfer and closing of major industrial areas, put in evidence the advantages to renovate and rehabilitate those areas, namely the cases where traditional industrial plants occupied waterfronts or areas that became potential centralities regarding the urban extensions of the late decades of the 20th century. The pursuit of a more sustainable urban development, and the need to articulate public perspectives with the attraction of private investments, were also major issues in acting in such areas. The possibility to develop new approaches to built neighbourhoods more balanced and sustainable became a challenge that many renovation projects aim to attend. The case of the 340 ha where the Portuguese government decides to implement the Universal Exhibition of 1998, is one of such an example. Adopting a new perspective to deal with such an event, the EXPO 98 in Lisbon is an interesting case study of planning and management an important renovation project, not only by its extension but also for the consideration, since the beginning, of what should be the area after the Exhibition. Major concerns with urban sustainability where present in all the planning, rehabilitation and construction phases, with interesting and pioneering results at the end of the process. In other hand, the articulation between public visions and objectives regarding the future of the new urban neighbourhood, the role of the private sector in the operation, and the institutional cooperation among different levels of government constitute interesting case studies of Public to Public and Public to Private partnerships. This paper presents and discusses the renovation project of the EXPO 98 area and subsequent urban neighbourhood, putting in evidence the main characteristics and innovations developed in the 14 years of this process. Particular attention is given to the sustainable planning aspects, the coherence between objectives and results obtained and to the institutional framework adopted.

Keywords: planning evaluation, urban sustainability, EXPO'98

1 The context

The 1998 Lisbon World Exhibition planning resulted from a number of relevant aspects that proved to be decisive in obtaining the BIE's (*Bureau International des Expositions)* selection of the Portuguese application for the event, such as:

- the celebration, in that year, of the 500th anniversary of the discovery of the sea-route between Europe and India;
- the rising importance of ocean-related issues in the international political agenda;
- the Lisbon municipality's planning strategy at the time;
- the growing attention played to urban renewal, in Portugal and elsewhere, and the use of big events as driving forces for those processes;
- the availability of European structural funds;
- the environmental laws then produced by the EU.

[18] This paper is a result of a research project financed by FCT: *POCTI/AUR/43884/2002 – The Urban Renewal of Harbour Areas and the Resulting Public Space: A comparative study of Lisbon, Barcelona and Rotterdam.*

Oil-refining plants in urban settings

In 1984, the EU considered that, to better cope with industrial air pollution, that certain principles should be implemented, in order to achieve its reduction within the communities involved. (Directive of the European Council 84/360/CEE, 28 June 1984). The areas occupied by old oil refineries and storage tanks, in the eastern part of Lisbon were, therefore, condemned to disappear on the short term from this urban setting, to relocate and technologically update.

The Oceans in the political agenda

In 1992, UNESCO's General Conference summit approved unanimously 1998 as the "International Year of the Oceans" [19]. "The objective was to focus and draw the attention of the public, governments and decision makers at large, on the importance of the oceans and sea environment as resources for sustainable development" (UNESCO, 1992). The major aim of the International Year of the Ocean was to foster awareness and commitment from governments to take action, provide adequate resources and give priority to the ocean and coastal areas which they deem as finite economical assets. The subject chosen by the Portuguese government was therefore clearly well suited to this new global agenda.

Lisbon Strategic Plan, 1992 (LSP)

On another level, the planning system developed by the Lisbon municipality from 1990 greatly emphasized the Lisbon Strategic Plan [Plano Estratégico de Lisboa (PEL, 1992)], which stated Lisbon's eastern riverfront as the opportunity – area to locate EXPO'98.

The land-use management model (…) considers an urban development structure that recognized four areas or territorial units with some degree of inner homogeneity and similar problematic and potential". The urban renewal operation thus enforced was framed within strategic area IV – "the riverfront arch – connecting city and river without compromising the harbour".

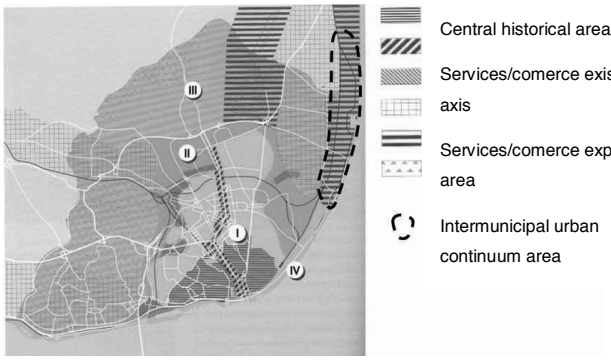

Figure 57. Strategical Plan of Lisbon, 1992 (Source: Strategical Plan of Lisbon, C.M.Lisboa, 1992)

[19] http://ioc.unesco.org/iyo/

The consolidation and renewal of the area (known as the “riverside bow”) had, as overall goals:

- to enhance the dwelling function;
- to settle younger citizens within city limits;
- to improve environment quality and heritage setting
- to promote culture production;
- to aim at science, technology and advanced educational resources.

This undertaking could give its contribution to solve some important urban planning issues, as identified by the above mentioned Strategic Plan:

City-river connection – demanding the output of projects and ideas to solve and unlock functional relationships between city fabric, as well as organize both functions and structure in riverside areas;

Integration and development in eastern Lisbon – implying new transportation infrastructures, to strengthen connectivity with other city areas, emphasizing comprehensive development in the area, through the use of new public equipments and private activities.

The Strategic Plan (SP) listed three actions within the second level objective:

- the development of business and services areas (new central districts);
- equipment-providing to outer-circle neighbourhoods;
- the qualification of eastern Lisbon.

In reality, the aim was to reduce pressure on the traditional Lisbon CBD and to balance the social and spatial city fabric, generating new centralities and spreading activities hither to sources of considerable traffic flow.

“Contra-generating” is meant by the SP as the creation of new service and office areas (learning towards the up-ended segment) and the provision of new equipment both in expanding as in consolidated areas.

Lisbon City Master Plan (LCMP) (1994)

In 1989 a new urban planning and management cycle began. This Plan gave top-priority to the settling of regulations on the occupation, use and transformation of the territories within administrative limits – thus translating the base concepts and options that the SP mentioned. The urban structure model as described for the city is shown in Figure .

Give its specific land-occupation pattern, the municipality realm was assigned to the single class-identification: “Urban Space”. Considering the wide array of categories within it, the Plan draws-up the following subclasses:

- territorial / heritage areas;
- consolidated areas;
- urban growth and structuring areas;
- urban conversion areas;
- green space areas;
- historical alleys and lanes;
- special use areas;
- equipment and public services areas;

- technological and research areas;
- corridor areas;
- EXPO intervention site.

Offices were mainly proposed in locations such as the “Baixa” historical core, the “New Boulevards Area” (early 20th century) – with a special focus on “Oct. 5th Boulevard” and “Republic Avenue”, the areas ranging from Marquês de Pombal Square, Edward VII Park and Rato Square.

The LCMP stated to reinforce beside these CBD areas, the office settlement in off-centre locations such as the Chelas nucleus, the Olivais centre and the EXPO site, the Boavista former landfill, the western section of the Alcântara industrial area, and in several other spread nuclei in the northern city arch.

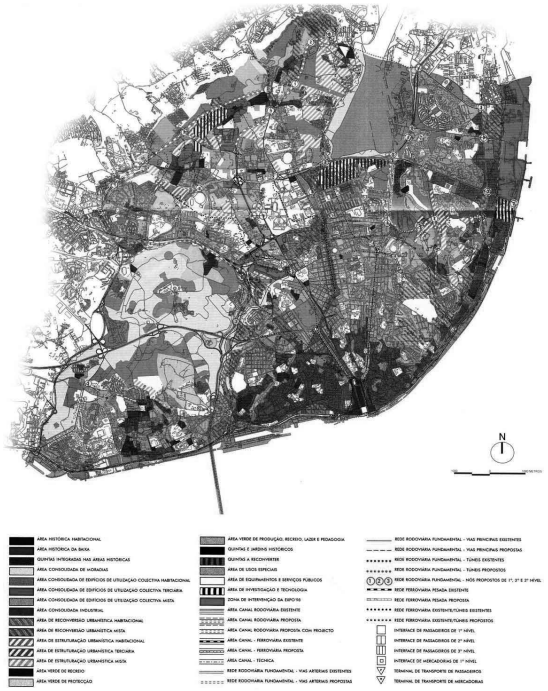

Figure 58. Lisbon’s Land Use Plan, 1994 (Source: CML/DPE, Municipal Director Plan, 1994)

Financial flows to the EXPO project provided by EU funding.

Important financed help was made available by the EEC (as the EU officially named at the time) immediately after Portugal joined the organization, in 1985 – thus enabling the government to face and plan considerable public investment in the general updating and building of infrastructure, social facilities and public equipments. The investment on a specifics (and strategic) large-scale project such as the EXPO came within this context.

As stated in the European Union’s Social and Economic Council, Annual Report on the 2nd European Support Plan, (…) the good execution rate attained by the urban renewal program (96%) was naturally a consequence of the investments connected to EXPO’98 – by itself reaching a 122% achievements rate.

For sure, the 233 M€ of co-financed public expenditure in the EXPO project were not enough to substantially change the direction global public investment with EEC funding (11.970 M€) took since 1994. Therefore, the ceasing of these EEC co-funding (albeit lasting till mid 1998) won't be sufficient to re-establish the predefined balances outlined to spatially spread the global investment.

The same acknowledgement can be red on the State Treasury Examine Office (STEO) report on the "Global evaluation on the impacts of the Urban Renewal Operational Intervent, 2nd E. Support Plan (2001)". The Environment and Urban Renewal Program came as one of the Regional Development Program (RDP) innovations with the purpose of satisfying basic population needs and the improvement of their life-standards.

The evaluation made by the RDP, taking into account housing policies, led to programmed investments bound to fulfil the following goals: "(…) to support, in what regards basic infrastructures and transport facilities and network, the set-up of an International World Exhibition in Lisbon.

"Urban Renewal" had been set as a subprogram belonging to the Third Axis – "Strengthen Quality of Life and Social Cohesion" – detailing measures and actions in the following way: "Third means: EXPO'98".

The opportunity

The area where EXPO'98 was to be later located was an immense yard where urban voids and obsolete industrial structures were commonplaces or fatally sentenced by emerging, gradually more severe, environmental laws.

"An urban void becomes an occasion; an event evoked with the only purpose of creating an occasion (…). The choices on every particular city's future are not the result of knowledge but the output of those occasions themselves." (Indovina, 1996)

According to Indovina (1996) cities have a wide range of motivations to pray that such events take place in their territories: the image cast, resources attraction, and the assignment of major "sine qua non" public projects, essential to support and enable the main exhibitional venture.

As mentioned before, EXPO'98 World Exhibition was developed according to "The Sea and the Oceans", general theme. A task force was gathered to survey alternative locations at a metropolitan scale, ranging from the northwest harbour front (in a stretch from Pedrouços to Santo Amaro docks, between the railway line and the margin) to the north-eastern riverfront (loosely encircling the Olivais docks, up to the former Beirolas mast clump) or even a far-off, eccentrically area, in a outer regional ring (Figure 59).

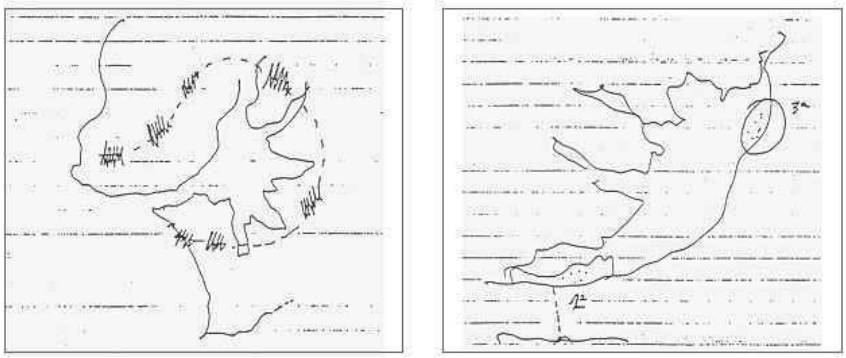

Figure 59. Different alternatives for the placement of EXPO'98 (Source: "Relatório da Exposição Internacional de Lisboa", Parque EXPO, 1998)

Among the ten most valued factors taken into account[20], a handful was deemed mandatory to the project's outline:

- flat grounds, with a riverside front;
- solved soil property, with immediate availability;
- overall potential to mesh and blend with the surrounding urban economical and social fabric, i.e., the ability to effectively give birth to a fully-fledged new city stretch.

The main purposes set for the World Exhibition were also determinant to the decision maker's choice: to stress the country's vocation, it's positioning in the European context, the promotion of urban renewal, the Discoveries Commemorations, the enhancement of tourism and general economical stimulation.

In spite of its qualities and outstanding urban setting, a detailed analysis of the western riverfront showed its shortcomings: unfit to accommodate large crowds, stuck in a narrow stretch between the river and 10 to 12 road tracks and a double-gauge commuter railway line, with overall limited access capabilities. Moreover, the adjoining consolidated urban fabric presented narrow opportunities for change if large-scale renewal and surgical transformation – always delicate in an historic area – were not to be undertaken[2].

On the other hand, the eastern Lisbon neighbourhoods, off stream as they were from the major growth and development historical urban phenomena, allowed the World Exhibition to act as a catalyst for its integration and balancing process in the global urban process.

The working group concluded that "(…) developing the Belém scenario is not advisable (…) insofar as it reinforces an unbalanced city structure, by drawing an equipment, public and private service, culture, leisure and tourist uses to an area already satisfactorily planned and supplied this array of functions.

Therefore, on February 1, 1991 "(…) the Government officials responsible for the Survey Task Force finally chose Lisbon's eastern riverfront as the elected site (…)". This decision stood on the following criteria:

[20] "Documentos para a história da Expo'98 – 1989-1992", Parque das Nações, S.A. 1999

- the re-establishment of an effective citizen-river relationship, ceasing a long-standing isolation of one of Europe's most beautiful riversides;
- the promotion of the whole Tagus Estuary rehabilitation, improving its population life-standards, and stirring social and economical life in wider edges of the riverfront, by means of a comprehensive assessment of its potentials.

2 The starting point

"In that far-off beginning, this area was a chaos of metal structures, mud, twisted steel, scrap metal, garbage, ruins and abandonment. (…) Left-overs from civilisation and vestiges of human activity leave us with a final impression of an area which is marginal to the life of the city that has continued to develop and modernise."[21]

Figure 60. Images of the site before the intervention (Source: "Caminho do Oriente – Guia do Património Industrial", Livros Horizonte 1999)

At the heart of the oriental side of the city of Lisbon, lies an immensity of land (340ha) segregated physically and socially from the urban life by the railway infrastructure. This area was populated by thousands of old containers, oil and gas tanks/refineries, the municipal animal slaughter, uncontrolled wasteland, and an old war material deposit. According to some Parque EXPO documents, at that time the I.Z. (Intervention zone) was a mixture of warehouses with old and abandoned houses, unquestionably a forgotten part of Lisbon.

"In the second half of the XIX century with the construction of the northern railway line and the consequent growth of the Lisbon Port, a great change occurred permanently in the physiognomy of the site. The industrial identity of this area attracted rural population that came to the city to work and live often in poor conditions."[22]

[21] "Memória da Intervenção", Orlando Farinha, PROMARK – Grupo Parque EXPO S.A. 1998
[22] "Documentos para a história da EXPO'98 – 1989-1992", Parque das Nações, S.A. 1999

In Figure 61 one can see four main land owners: the public administrative domain of APL (Lisbon Port Authority) with 37% of the total of the I.Z. (287900m2) and 34% belonging to other public entities. PETROGAL (Oil Company) and CP (Portuguese railway operator) held at that time 19% and private stakeholders owned the remaining 10%.

The land property scheme ranged from the rental and concession or licence, to the use of private or public terrains by the respective owner institution.

The same document referred that there were no major limitations to the foreseen processual aspects, when the administration once decides to break the licence/concession contracts. Besides that condition, almost 70% of the total IZ was public property, clearly taken as an advantage when considering such a big urban renewal project.

"This was a site marked by rigorous geometric forms, cylinders, spheres, endless parallel pipes, elegant perspectives, structures which mark space in a network whose supposed rationality reveals itself to be an oneiric web of conjectural or hidden meaning."

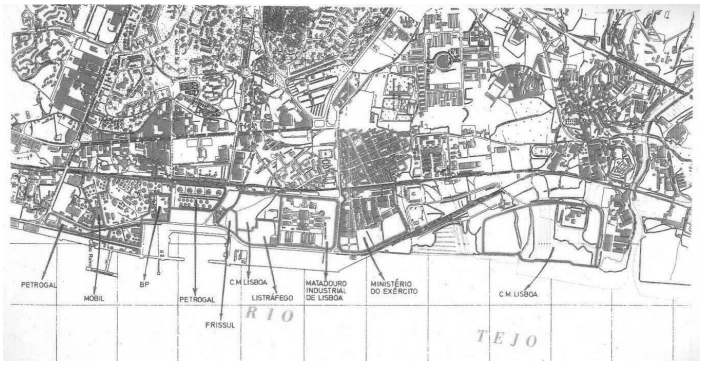

Figure 61. Fundiary situation before the intervention (Source: "Documentos para a história da Expo'98 – 1989-1992", Parque das Nações, S.A. 1999)

Figure 62. Forms of land occupation in the EXPO area before the intervention (Source: "Record of Revedelopement", Abílio Leitão and Bruno Portela)

At that time the surrounding area of the IZ was defined by the progressive abandon of urban and architectural patrimony; high concentration of social housing neighbourhoods with low quality construction; lack of social, cultural and sport facilities; and low accessibility inside the city,

contributed to the bad image of the zone. Despite the construction of the EXPO new urbanization, the main identity of this territory still remains industrial.

3 The project and its objectives

3.1 Urban Objectives

The organization and working demands of a World Exhibition do not necessarily meet the ones of an urban renewal operation. This kind of ephemeral event is characterized by the meeting of cultures in a confined space (Vassalo Rosa, 1999).

The planning team had in mind the future integration of the Intervention zone (I.Z.) to the 'public esteem''[23]. After the event it was really important to consolidate and strongly link the area to the existent urban network of the city. Therefore, interventions with a strong urban character were promoted in order accommodate better the population needs.

The concern with the intervention defined in the Urban Plan (P.U.) was extended to the development of projects that assured the high quality and comfort of the public space. Blending this renewed area within the city was at the same time an opportunity to articulate the 'ephemeral' with the 'definitive'. In this way the memory of the exhibition could last and be associated with the architectural land marks, sceneries and urban installations created on purpose for the event.

To assure the accomplishment of those recommendations, specific goals were defined:

- the public space had to be the structuring element of the future renewal operation;
- the centrality and attractiveness of the IZ had to be extended to the maximum possibilities;
- the linkage of the IZ with the surrounding urban fabric, avoiding the "isle effect" within the city
- Enlightening the public space through the design of several elements: the general axis; the urban mesh and the connections between them;
- Renewal of degraded areas and occupation of the empty spaces;
- The projects should take into account the environmental and urban conditions;
- Generate an accessibility network, linked coherently with the metropolitan one;
- a green continuum should be shaped, articulated with the urban structure, valuing at the same time the sea sight;
- the diversity of urban fabrics and the architectural quality and singularity should be stimulated;
- the relation of the road network with the buildings and other infrastructures should be optimized;

The EXPO Project area accounted 340ha, and nowadays one can say that the public space is the real core element of this territory. The exterior area (not built / public) accounts 54,0% of the total surface, and the remaining 46,0% is mainly urbanization space (36,0%) and hidric domain (10,0%).

[23] In the sense that the development of a planning process trough a renewal and requalification operation of an area characterized by its degradation in environmental, functional, economically and socially terms, will bring it values that will end by its integration in the day to day life of the citizens.

Table 21. Main urban indexes of the Parque das Nações Renewal Operation (Source: Phd Thesis "Public space, Public Life", Francisco Serdoura, 2006)

	PP1	PP2	PP3	PP4	PP5	PP6	Urban Plan
Private Space							
Implantation Area							1.251.175
Construction Area							2.529.257
Mix Use							2.149.224
Commerce	107.340	31.646	27.088	28.924	3.400	805	199.203
Services	475.781	21.945	94.424	54.312	17.389	2.794	666.645
Housing	195.377	70.350	278.069	667.564	57.046	0	1.268.405
Industry	5.298	0	0	9.672	0	0	14.970
Non-mix Use							488.633
Transport Infrastructures	64.023	5.000	9.500	15.750	0	54.250	148.523
Sewer Water Treatement Station	0	0	0	0	0	65.750	65.750
Equipments	45.319	1.450	42.759	71.265	4.999	103.568	269.360
Public Space							1.864.400

According to the planning proposal of the P.U., the functional structure of EXPO articulates with the city trough the combination of several types of use (housing, services, commerce, etc) as it is shown in Figure .

At a first glance the area seems mainly residential (1 268 406,0 m^2) but a careful analysis confirms the multifunctional character of the project, with a strong allocation of services and commerce as well as higher urban support functions (facilities – 161 271,0m^2 and special uses - 173 673,0 m^2).

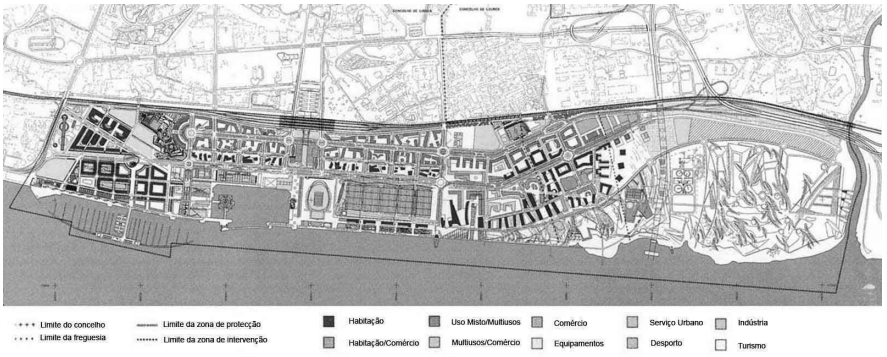

Figure 63. Parque das Nações/EXPO Urban Plan (Source: 'Lisbon EXPO 98', Trigueiros e Sat (ed.), Vassalo Rosa, 1996)

Figure 64. Parque das Nações/EXPO Detail Plans (PP – Plano de Pormenor) (Source: adapted from Figure)

Construction goals of a new urban space

The renewed area combines several public space typologies (streets, squares, riverfront sidewalks, parks, etc.) where people can meet and choose different ambiances (quiet, exposed, etc.). The circulation spaces define a well organized network that structures the entire urban system of the intervention. The pedestrian path system is well differentiated from the traffic one, which grants a determinant role to each when it comes to the space dynamics.

The traffic system is well connected to the exterior (city and region) and internally is supported by a hierarchical network that warranties good and efficient conditions to motorized fluidity. This aspect reveals the intention to break barriers promoting at the same time the integration of the zone within the city. Every existent connection is at the same time visual and physical. The main idea was to attenuate the 'frontier effect' between the renewal area and its vicinity (Vaz, 1999). The railway line obstacle is mitigated by a set of transversal cut-troughs, elevated or not, that assure the linkage between the main longitudinal axis (Av. D.João II) and the surrounding road network (Figure 65).

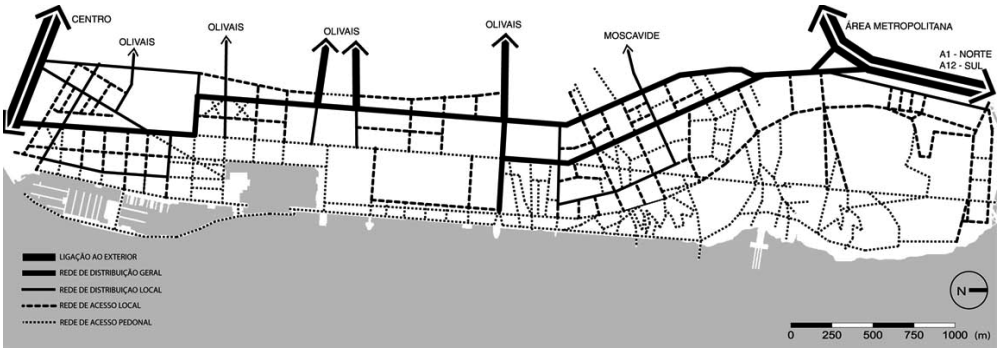

Figure 65. Parque das Nações Road Network (Source: Phd Thesis "Public space, Public Life", Francisco Serdoura, 2006)

The pedestrian circulation is of extreme importance in what concerns the public space liveability of this area (specially the enclosed exhibition area) [24].

The urban design generated a contrast with the neighbouring environment through the application of different materials, adapted to a thematic context that provide simple and memorable images (Toussaint, 1995).

The thematic gardens, the water integration in the organization of the public space, the urban green park, the riverside cafes, among other aspects, provide urban comfort and a sight system that work frequently as sightseeing points allowing the life inside itself.

[24] The central avenue is the main pedestrian course of the area. Is an important and structuring public space that stimulates the stroll and urban life.

3.2 Environmental Objectives

"Cities and urban zones change through times. This inevitable changing process can be positive, since the driving forces create opportunities to adapt and enhance urban area conditions. The integration of the sustainable development concept could be the characteristic that can distinguish the urban requalification from the first attempts of urban changes." (Barros, 2007)

Constant in all phases of the EXPO's urban renewal operation, the environmental issues is rationalized in three different phases. The first one is about the preparation of the territory and the consequent treatment of the existent environmental pathologies. Secondly, the focus was set up transversally in all actions of the new construction per say (EXPO and POST-EXPO facilities/infrastructures). The last phase is about the environmental monitorization, which as the name says is still going on. In 1995 Parque EXPO, S.A. asked an external entity to work on a Environmental Incidence Study.

In an early stage, when a comparison of the possible locations for the EXPO took the worst environmental aspects for the Oriental zone were the 'air quality' and 'hydric quality' (Tejo and Trancão river). Despite the existence of worse air pollution sources before EXPO than after, the main problems in this sector were related with the sanitary landfill of Beirolas and the high pollution state of the Trancão River. The hydric condition of the area needed urgently a cleaning of the River Trancão[25].

According to the European directive (85/337/CE – related with the effects of private or public projects in the environment) *"The approval of projects that (…), are susceptible of provoking important environmental impacts, are submitted to a previous environmental assessment as a basic formality"*, Parque EXPO also had to submit an Environmental Incidence Study (prepared in 1995). This study allowed a global vision of the intervention and systematized the study of environmental incidences of the project. In this study several actions took place: identification and evaluation of the construction and exploration impacts; definition of mitigation measures of the negative impacts; definition of the Global Monitorization Plan, among other actions.

To outline the environmental strategy, the non polluting waste resulting from demolitions was treated *in situ* by simple recycle mechanisms. In this way the construction contractors/ developers were forced to re-integrate those materials avoiding the exploration of borrowed material facilities with high damage to the environment.

The following components were analysed: geology and geo-technical land conditions, water and air quality; acoustical environment; biotic system; landscape; hydrodynamics; socio-economical aspects; production of solid and water waste.

The project was dismissed from environmental impacts evaluation by governmental act (Ministry of Public Works, Environment and Natural Resources, 1995), but in the meantime had to accomplish the creation and implementation of an Environmental Monitorization Program, that still works in these days. The main goals are:

- Guarantee adequate protection conditions to the environment and public health;

[25] "The water pollution of the river conditioned its consumer use, including gardening purposes. Its water basin has a dimension of 29000ha, and drains water from 1,3 equivalent inhabitants." ("Documentos para a história da Expo'98 – 1989-1992", Parque das Nações, S.A. 1999)

-Support the decision of complementary actions, tendentiously aiming the correction/elimination of residual or accidental Environmental dysfunctions;

- Allow Parque EXPO'98 to know and disseminate the operation success in the field of local environmental requalification;

- Accomplish the requirements of legal institutions with the power in this area of expertise to check and demand the fulfilling of all legal aspects.

The monitorization is divided in the analysis of the same environmental aspects (with the results disseminated in the internet site). For each aspect the measurements are directed by ECOSERVIÇOS/COBA[26].

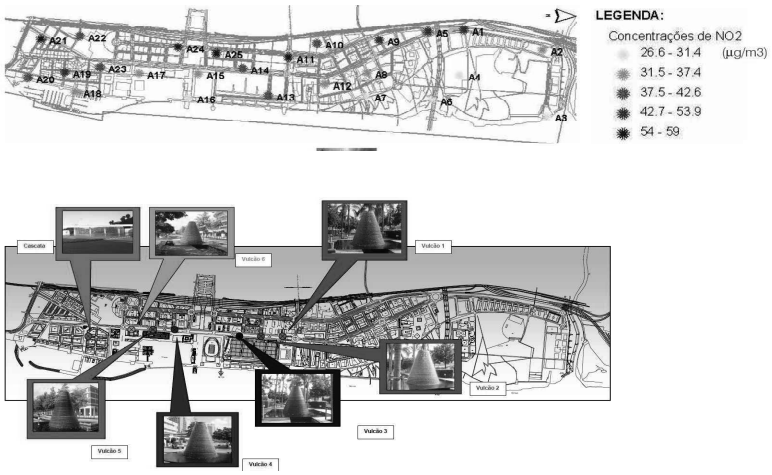

Figure 66. Some examples of the Monitorization Plan –measurements of ornamental water and air quality**.** (Source: Monitorization Plan, Parque EXPO, 2006)

The environmental renewal of the site was a very distinct one, by the search of new and innovative solutions. The main goal was to establish a favourable urban, environmental and landscape scenery that could open the possibility to meet nature needs. To permit its finalization the most sensible areas were protected, and a total fruition of the riverfront area was established. In terms of the urban management of the site, special infrastructures were built in order to rationalize mainly the energy consumption of buildings, examples: 1) Hot and Cold centralized distribution system; 2) Pneumatic waste collection system; 3) Technical gallery, among others.

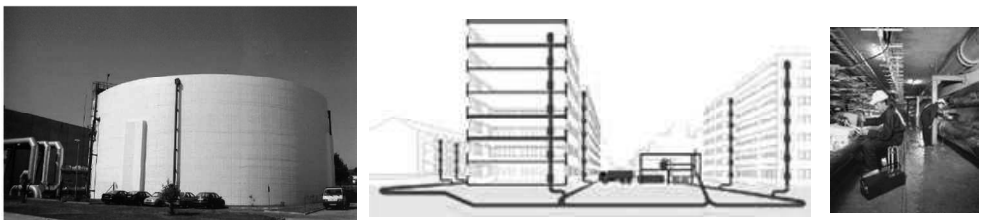

Figure 67. Innovative Infrastructures by order (1); (2); (3) (Source: Parque EXPO, 2006)

[26] www.parquedasnacoes.pt

3.3 Economical and financial objectives

According to EXPO'98 Report (1998)[27] the financial and economical model created to execute the global EXPO project was based on the following essential characteristics: "1) Integration of the Exhibition inside the urban renewal project area (IZ); 2) The responsibility to realize the project globally was assigned to the company Parque EXPO'98, S.A.; 3) Besides the company capital based on money, the State integrated in this company the land of the I.Z.;4) Parque EXPO'98, S.A. assumes all the costs of the global project; 5) to finance theses activities, the company participates also in the capital market, taking care of all the extra costs; 6) the State covers the 'Warranties' needed in that market; 7) the support of these costs is done with the profits made at that time and in the future; 8) the economical-financial model is based on the long run, being 2010 the project horizon; 9) the discrepancy between the profits and the investments, is by itself, an important element for the financial structure of the project, because it reflects in a extra financial effort." (…)

The last aspect was undoubtedly the most important one when it conditioned the application of the economical model (almost 51% were only earned in the second phase) (Cabral & Rato, 2000).

The older data accessed (Pluriannual budget of Parque EXPO, 1996) show the coincidence between "costs" and "profits" and therefore the idea of the "zero cost" and the self-sustainability of the operation (Wemans, 1999).

The costs are divided according to the different phases of the project: the preparation of the zone; the construction; the conception and promotion of the event; the operations (the event); the constitution of the holding firms and the organizational and administrative costs. The preparation of the area accounted more than 45 percent of the total costs, reflecting the complexity of the environmental recovery and transformation of the site.

The revenues are dispersed in two big parts that account for 75%: the commercial revenues (including the selling of tickets and the sponsors) and the real estate operations, representing the second one a little bit more than half of the total gains. The European funds were estimated to reach 7,9%, and the remaining percentage of revenues came from the state capital investment (6.4 %) and the post-Expo closing down operations with the sale of pavilions and other gains.

"With the start of the site and exposition works, it was not possible to maintain these values, specially the costs. Many factors contributed to this evolution. Some are specific to the project, others derive from the fact that the whole operation had a fixed deadline, and had already started late". (João Cabral & Berta Rato, 2000)

[27] "Relatório da Exposição Mundial de Lisboa de 1998", Edições Parque EXPO, 1998

Table 22. Costs and revenues of the Expo project (constant prices 1995) (Source: pluriannual budget of Parque EXPO, S.A., 1996)

		Investment	
		(10^6 contos)	(10^6 Euro)
Cost of land, expropriations, rehousing and infrastructures	16,5%	**42.0**	215,385
Exposition (direct costs - running of the Expo)	17,9%	**46.0**	235,897
Construction (direct costs - demolitions, infrastructures and environmental rehabilitation)	29,4%	**75.0**	384,615
Property development and marketing	2,8%	**6.9**	35,384
Exposition (planning, security, public relations, participating countries)	1,9%	**4.9**	25,128
Shares on other firms	5,8%	**15.0**	76,923
Partnerships with external operators	1,5%	**3.9**	20
General expenditures (organisation and administration)	7,6%	**19.6**	100,513
Financial costs and charges	16,3%	**42.0**	215,385
Other	0,2%	**0.4**	2,051
Total	100,0%	**257.0**	1,317,948

		Investment	
		(10^6 contos)	(10^6 Euro)
Ticket sales, publicity and sponsors	24,2%	**62,2**	317,948
Sale of land and property	51,0%	**131**	671,795
Sale of company shares	6,1%	**15,6**	79,487
European Funding	7,9%	**20,4**	104,615
State direct funding (social capital)	6,8%	**17,5**	89,743
Other (renting of spaces)	4,0%	**10,3**	52,308
Total	100,0%	**257**	1,317,948

Despite the several delays and the consequent cost implications of that situation, “more problems were found that meant further delays (unexpected adverse soil conditions, and a three months interruption in decision making as a result of a change in the administration of Parque EXPO). In fact, has it is shown in Table 23 and Table 24, within a year the amount of investment increased 50%.

Estimates from 1997 (Parque EXPO official information) have shown also that the “Zero Cost” objective was quickly slipping out of control with the increasing costs of the EXPO infrastructure and facilities, as well as with the new road network in the access and the surrounding area, reaching a balance of 300M negatives.

Table 23. Structure of costs for Parque EXPO and Intervention Zone (Source: Parque EXPO’98, Information 42, Feb. 1997)

	February 96		**December 96**		**January 97**	
COSTS	**(10^6 contos)**	**(10^6 Euro)**	**(10^6 contos)**	**(10^6 Euro)**	**(10^6 contos)**	**(10^6 Euro)**
1. Parque Expo SA	204.7	1023.5	244.7	1223.5	254.7	1273.5
Financial costs	36.5	182.5	42.0	210	62.9	314.5
Total 1.	*241..2*	*1206*	*286.7*	*1433.5*	*317.6*	*1588*
2. Other Companies (shareholders)	27.0	135	28.2	141	28.2	141
Financial costs	3..9	19.5	3.6	18	3.6	18
Total 2.	*30.9*	*154.5*	*31.8*	*159*	*31.8*	*159*
The Expo group (1+2)	**272.1**	**1360.5**	**318.5**	**1592.5**	**349.4**	**1747**
3. External Operations Parque Expo	16.1	80.5	19.9	99.5	19.9	99.5
4. External Operations GIL (CP+Metro)	16.6	83	18.2	91	18.2	91
Total 3+4	*32.7*	*163.5*	*38.1*	*190.5*	*38.1*	*190.5*
TOTAL COSTS	304.8	**1524**	356.6	**1783**	387.5	**1937.5**

Table 24. Structure of revenues for Parque EXPO and Intervention Zone (Source: Parque EXPO'98, Information 42, Feb. 1997)

	February 96		December 96		January 97	
REVENUES	**(10^6 contos)**	**(10^6 Euro)**	**(10^6 contos)**	**(10^6 Euro)**	**(10^6 contos)**	**(10^6 Euro)**
1. Parque Expo SA						
Sales (Expo98, land and property)	210.4	1052	229.9	1149.5	229.9	1149.5
EU Funds	20.4	102	20.4	102	20.4	102
State	17.5	87.5	36.5	182.5	17.5	87.5
Total 1.	*248.3*	*1241.5*	*286.8*	*1434*	*267.8*	*1339*
2. Other Companies (shareholders)						
Own sources of income	10.3	51.5	11.1	55.5	11.1	55.5
EU Funds	9.4	47	9.6	48	9.6	48
State	--	--	1.7	8.5	1.7	8.5
Total 2.	*19.7*	*98.5*	*22.4*	*112*	*22.4*	*112*
3. External Operations Parque Expo						
EU Funds	6.4	32	9.2	46	9.2	46
Municipalities	6.1	30.5	7.3	36.5	7.3	36.5
State	3.6	18	3.4	17	3.4	17
Total 3.	*16.1*	*80.5*	*19.9*	*99.5*	*19.9*	*99.5*
4. External Operations GIL (CP+Metro)						
EU Funds	9.5	47.5	9.2	46	9.2	46
Transport Companies (CP+Metro)	7.1	35.5	9.0	45	9	45
Total 4.	*16.6*	*83*	*18.2*	*91*	*18.2*	*91*
TOTAL REVENUES	300.7	**1503.5**	347.3	**1736.5**	328.5	**1642.5**

In other hand according to official estimates from the report delivered by Parque EXPO to the *Bureau International des Expositions (BIE),* the structure of costs is different from these first data (some of the investments were already made at that time also).

Table 25. Structure of Costs and revenues of the EXPO Project, provisional data (Source: Relatório da EXPO'98, Parque Expo, 2000)

	Costs (m€)	**Revenues (m€)**
Recovery and Renewal of the I.Z.	218,5	
Urbanization of the Intervention Zone (I.Z.)	503,3	953,2
The Exhibition	641,5	364,1
Complementary construction works and urbanization of the I.Z.	191,0	
Road network	41,9	
European funding		304,3
Total	1.596,2	1.621,6

The European funds at that time would cover partially the basic Infrastructures (21%); the environmental improvement (21%); the transport infrastructures (51%) and the equipment of Multipurpose Pavilion (7%).

3.4 Social and Cultural Objectives

By the year 1995, a quantitative study about the "image of the Urban Renewal Operation" was carried out to characterize the social-economic situation at that time (within the Environmental Incidence Study), and evaluate the knowledge and expectations associated with the event.

The sample size of this survey was composed by 700 individuals: 23% from the surrounding parishes of the I.Z.; 42% from other parishes of the city of Lisbon and 35% from other neighboring municipalities of the AML (Lisbon's Metropolitan Area). The middle sized class was well represented, accounting with 71% of the sample share, immediately followed by the high class with 20%.

Globally a large part had a general perception of the degradation conditions of the I.Z., the lack of green spaces and urban quality of the space, although the closer they lived by the better picture they had from the site. It was notorious that nobody knew for sure the details of the urban operation that would take place in that area, but despite that fact 80% had a positive opinion about the impacts in the future of the Oriental part of the city (based on the environmental rehabilitation of a dead part of the city the most common reason of this point of view). As for the negative aspects foreseen, the "cost" was recurrently remembered by the interviewed population considering by the way "an unprofitable investment, unnecessary and/or inadequate to the economical and social situation of the country". The main findings of this study stressed out that "the principal negative impact reports to the possibility of the new urban pattern be disconnected from the surroundings of the I.Z. by the adoption of a not inclusive design solution, as well as the abandon of the place by the management entities".

It's quite interesting to point out that certain concerns of the interviewees are in fact realistic, but not by the failure of the urban model but instead victim of the "site" where it took place. Qualifications as "ghost city", "peripheral zone", "satellite city", "social rupture site", are aspects that nowadays characterize the EXPO area in the end of the afternoon/night period. In the meantime new intrinsic dynamics start in the northern part of the project, where the urban design and the relation established between the building and the street (with open blocks at the pedestrian level) allow different utilizations of the semi-public / semi-private space creating small centralities that promote successful commercial activity, although within a local scale. In the south zone the rotation of the type of business is higher and inconstant. The idea that the EXPO area is a dorm, being the central zone the most dynamic, is actually what happens during the day because of the great attraction that this zone has above all the others (concentration of services, commercial centre that actuates as a anchor facility, special use facilities, etc)

Population dynamics

After the event, the area recaptured the real estate dynamic that had been interrupted with the event of Lisbon's World Exhibition 1998. The last census (2001) accounted 3 000 people (Figure 68). In 2003, according to Parque EXPO esteems, the inhabitants totalized almost 11000.

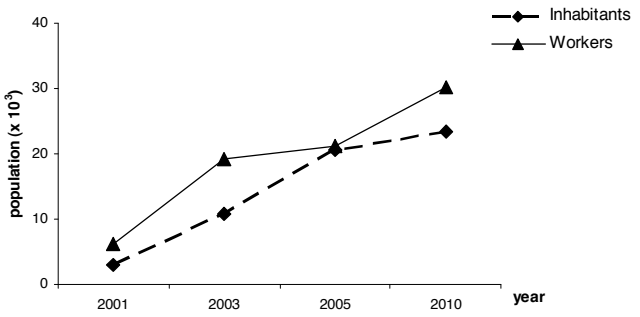

Figure 68. Population Dynamics in the EXPO (Source: INE-Portugal, Parque EXPO S.A.)

The same estimative predicted that in 2005, the residents living in all the planned area would reach the 20500. At the end of the operation the population that should be living in this area would reach the 23300.

From 2000 to 2003, the employed population had a quick growth and reached approximately 20000.

Table 26. Resident and employed population inside the EXPO area (2003-2010) (Source: Parque EXPO S.A.

Land Use	at 2003 (nº of people)	until 2005 (nº of people)	until 2010 (nº of people)	TOTAL PU (nº of people)
Housing	10.888	9.620	2.806	23.314
Offices	4.875	1.374	8.092	14.340
Shops	2.819	643	472	3.935
Civic Facilities	1.200	5	431	1.637
Hotels	314	0	53	367
Special Uses	9.416	0	0	9.416
Infrastructures	410	0	9	419
Light Industries	168	0	0	168

Source: Parque EXPO, S.A.

The population dynamic of the EXPO area, and the share of resident and employed population is directly connected with the consistent planning process that has perpetuated some assurance of mixing uses in all the area.

4 The implementation process

Institutional and Legal framework

The institutional setting for the project was closely connected to its specificities. A short span of time was needed to deal with preliminary tear-down, scrapping and plot preparation for the whole of the 330 ha. To construct the exhibition precincts, public spaces and supporting equipments, both in and outside (approx. 30 ha) the World Exhibition grounds, and simultaneously build the large access network system (with *Vasco da Gama* bridge as the main undertaking), was a feat only possible through the creation of specific offices and both Public-Public and Public-Private partnerships. The following legal measures acted as the operational mainstay:

Parque EXPO 98, S.A. - Anonymous Public Funding Corporation (according to Law Decree 88/93). The size of the project and the complexity of the construction management schedule, as well as the management of funding to the activities involved with the World Exhibition, pointed to the need to entrust them to an entity with an entrepreneurial profile;

- *Urban Reconversion Critical Area* decreed, associated with power-endorsement to the Corporation to act as promoter of the measures needed to reconvert the area (LD 16/93);

- *Exception Terms Urban Structuring* procedure created for the *Expo* administration within the site limits, valid through Dec.1999, enabling the Corporation to directly evaluate and approve both detail and master plans, and to license private project applications (Law nr. 57/93, and LD 354/93);

- *State Public Realm Disengagement of the areas under Lisbon Port Authority jurisdiction (*LD 207/93*);*

- *Tax Easement Benefits,* assuring poll tax, transaction tax, and inheritance and granting tax exemption, as well as notarial and seal tax exemption (DL 234/94)

"The social capital of Parque EXPO'98 is entirely public, the main shareholders are the state and the municipalities of Lisbon and Loures. The government granted the Parque EXPO with full and exclusive planning and licensing powers within the whole of the EXPO development area (Intervention Zone, I.Z.). Special tax exemption facilities were granted to Parque EXPO until 1999, and the company had also the power to acquire land in a compulsory manner. The whole operation was exempted also from environmental impact assessment (joint statement from the Environment and the Public Works Ministries – governmental decree of 22/09/1995). It was agreed however that an environmental study would be produced and evaluated by an independent and qualified institution.

Parque EXPO'98 is the main shareholder of 6 other companies which were constituted to run the real estate project (promotion, development and commercialization of the 330 ha of the urban complex), the EXPO Urbe, the Exposition, and some of the facilities after the Exposition (Oceanary, the multipurpose pavilion, GIL – transport intermodal station, Valorsul)."

Public-Public and Public-Private Partnerships

Within the urban renewal process, the detail and master plans developed, implemented and monitored under *Parque EXPO*'s supervision had as main goals the strengthening of river-city links, enhancing landscape and environment, by adequately designing public space and integrating this territory, with its own identity, in the nearby urban fabric.

The partnership between *Parque EXPO* the municipalities of Lisbon and Loures outlined guidelines regarding soil occupation that enabled the operation to become agile and allow a fully integrated, multifunctional territorial structuring.

5 From theory to practice

The urban renewal strategy intended to value: the 'site'; the anchor equipments; the accessibilities; the quality and comfort of the public space. All the public space was built since the international event. In fact the public space was the supporting basis of the exhibition which later led to the urban

stability of the area. That particularity stimulated people to understand and foresee a future reference space in terms of community life.

Figure 69 synthesises all the three phases of construction in the EXPO area: Built area (field work interpretation in 2003); under construction (works finalized within a year) and proposed area (with projects approved in 2003).

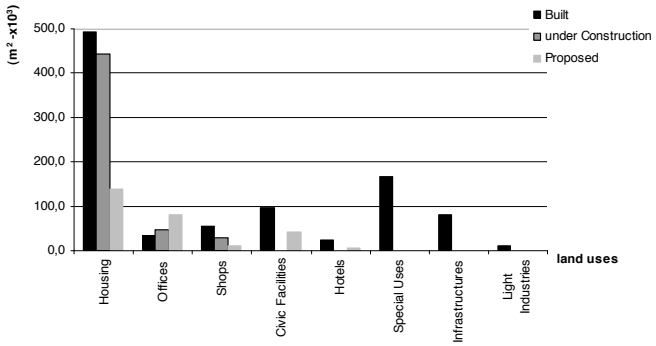

Figure 69. Construction account of the I.Z. in 2003 – Parque das Nações (Source: Phd Thesis "Public space, Public Life", Francisco Serdoura, 2006)

From a total area of 2 592 257,0 m^2, 55% were built by the end of 2003 corresponding to the following uses: 41% of Housing; 20% Services; 12% of special uses; 10% commerce and 17% facilities. In that time 24% of the total area was being built and the construction dynamics seemed to confirm the emergence of a new prestigious residential area. Nevertheless the strong provision of office space was an opportunity to create a multifunctional zone.

The impacts induced by the rising land prices on the urbanization process weren't calculated (Cabral & Rato, 2003). That increase transformed that area in one of the most expensive ones in Lisbon. Since that moment the housing demand was guided by speculation and capital investment. Low occupation rates are the immediate effect, but on the long run that fact can compromise a great part of the housing function. That fact made it unfeasible the existence of affordable housing in the given area as it was predicted.

"According to real estate agents the office market accounts 70 000 m^2/year. Assuming that 20% of the demand is concentrated in the EXPO it will take almost 28 years to absorb the 400.000 m^2 of the projected office area." (Cabral & Rato, 2003).

However some strategic objectives weren't accomplished. The renewal operation aimed to eliminate by urban management the obstacles that divided the IZ from the city. Despite the fact that the physical barriers were tackled by the new traffic system, the real estate model led to an unequivocal social segregation of the resident population. This aspect allied to the incapacity of the municipality of Lisbon to take advantage of these changes and expand them to the near vicinity (the EXPO surrounding plan), contributed to the creation of the "social Isle" of EXPO.

Economical and financial data

Despite the absence of clear data and the apparent contradictions between official sources from the same entity (as shown in chapter 3.3), the report of the State Treasure Examine Office – STEO (Tribunal de Contas) plays an important role in the comprehension of the economical-financial context of EXPO'98 Project.

According to this report "the technical costs of the project (investment and working expenses) reached 377,19 million contos[28] (Tribunal de Contas, 2000), although the global project was more expensive: 421,4 million contos. The revenues – from 1993 to1998 – range a global value of 183,2 million contos, which gives a final balance of 238,2 million contos[29] (Tribunal de Contas, 2000).

Besides stating that Parque EXPO was technically broke (end of 1998), the STEO verified that *"there was a lack of rigour in the physical planning and programming of several operational areas, with the constant changes of the deadlines and global costs of the construction works."*

The report elaborates numerous critics to the performance of the financial model, to the absence of control and holding responsibility of the organizational structure that ultimately reflects to the company a negative image with several corruption cases. [30]

The same fiscal institution advices Parque EXPO "to eliminate the flaws and management inefficiencies, which surely had a big impact in the State National Account (…)".

Analysing the STEO report becomes clear that the *"Zero Cost"* was nothing more than a theoretical exercise of "financial engineering". On the other hand the constant reference to that idea led to a progressive densification of the I.Z. with the increasing housing instead of services/commerce and the reduction of the public facilities plots.

Table 27. Total Pavement Area by type of USE in 1995, 1999 and 2003

	Abc (m2)		
Year / Uses	**1995**	**1999**	**2003**
1. Services / Commerce	1.006.751	835.149	865.848
2. Housing and Hotels	924.257	1.273.648	1.294.506
TOTAL (1+2)	**1.931.008**	**2.108.797**	**2.160.354**
3. Colective Equipments (1)	229.533	175.738	161.271
TOTAL (1+2+3)	**2.160.541**	**2.284.535**	**2.321.625**

(1) - The correspondent value didn't take into account Transport and Urban infrastructures (maritime station and the intermodal gare), as well as the "turistic equipments" (hotels in practice), the Oceanarium, the Multipurpose pavilion and the Lisbon's International Exhibition Center (FIL)
Abc - Área bruta de construção (total pavement area)

Source: Portaria 1210/95, 6 Octb.; Portaria 1357/95, 17 Nov.; Portaria 1130-B/99 and 1130-C/99, 31 Dec. and Phd Thesis "Public space, Public Life", Francisco Serdoura, 2004

[28] 1 conto ≈ 5 eur in 2008
[29] Respectively ≈ 1,900 M€; 2,700 M€; 915 M€; 5,670 M€.
[30] Remembering court cases as "Mar da Palha Housing Cooperative" (Aug.1998), implicating the ex-director of accounting and treasury of Parque EXPO and vice-president of the same *housing cooperative*, Dr. João Caldeira, accused by the public attorney of "abuse of trust and fiscal fraud" by the embezzlement of 2,125 M€, (Tribunal de Contas, 2000). Recently was arrested in Brazil by Drug traffic (April 2008). The case of the "three hotel boats" that were rented at a high price and registered a low occupation during the event. This business was a tremendously bad for the company with a cost of 4,7 million contos (23,5 M€) and a revenue of 765,8 thousand contos (3,8 M€)." (Tribunal de Contas, 2000).

During the last years some facilities have been privatised, the most obvious example is the health facility predicted inside PP3 (Detailed Plan nr.3) that turn into a private hospital “CUF Descobertas”.

This and other cases (exemplified by urban design and use changes from 1995 to 1999,

are also part of a huge criticism by the *Inhabitant and Commercial Association of EXPO* (AMCPN)[31]. The association strongly questions the missing construction of the programmed schools (only one is built out of four); the unified management of the I.Z.; more public transports, a health centre (or extension of the existent one); and the creation of the Oriente parish.

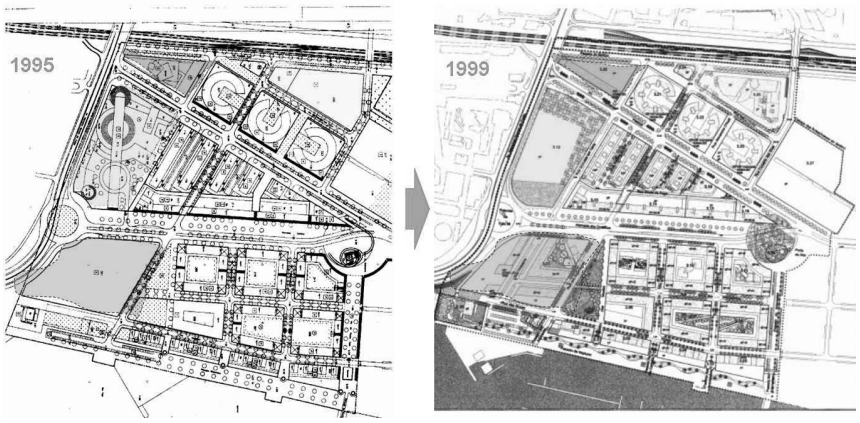

Figure 70. PP3 Plan and the immediate visible changes between 1995-1999[32]

As it is stated in official Parque EXPO accounting documents (“Annual Accounting Report” of 2006 and 2007), the passive debt of the company has been reduced during the last years – recovering from 700,754 M (2005) to 560,844 M (2006), although like it is mentioned in the STEO report “the level of the aggregated data reveals a fragile financial structure” (Directorate General of Treasury and Finance, 2007).

It was also referred in several documents the external impacts of the EXPO Project in a macroeconomic context: increase of tourism by 10% (plus 18 million people in August 1998); generation of new direct and indirect jobs; expansion of the services, industry and transport sector, new and better accessibilities; environmental rehabilitation of the site.

As it is mentioned in Cabral (2000), based on a report published in April 1998 by the Department of Prospective and Planning at the Planning Ministry “the model points to a concentration of efforts in 1998 in all the components, contributing to a growth in GDP of 1 percent.” (João Cabral, 2000). The consumption also benefited from the event, promoting a growth in income (as a result of the number of jobs created). Wemans (1998) refers that the competitiveness of

[31] http://www.amcpn.com/index.php?s=outelet

[32] Note: due to the bad legibility of the PP3 map available to the general public, it was impossible to identify the type of use of each plot. The different colors only indicate big changes verified in the urban design and position of the buildings in the plot, making visible.

Lisbon in the context of other cities relies fundamentally in the existence of a “city project” as an important strategy element.

Table 28. PP3 Plan and the visible type of use changes between 1995-1999 (Source: P1210/95, 6 October and P1130-B/99, 31 December)

1995 _ PP3

Categoria de Espaços	Parcela	Área de Referência da Parcela	Área da Parcela (m2)	Área de Implantação (m2)	Área de Pav. Edificável Acima do Terreno (m2)
Equip. Colectivo	3.01	30792	19890	3950	7900
Hab. Média Dens.	3.02	4668	2103	1620	3185 + (1620)
Hab. Média Dens.	3.03	5042	2331	2331	3629 + (2331)
Hab. Média Dens.	3.04	5275	2353	2353	3607 + (2353)
Hab. Média Dens.	3.05	6488	3074	3074	4366 + (3074)
Equip. Turístico	3.06	11640	8040	3850	11000
Hab. Média Dens.	3.07	8996	6227	3150	14893
Hab. Média Dens.	3.08	10290	6861	3330	16835
Hab. Média Dens.	3.09	11749	7041	4200	20040
Hab. Média Dens.	3.10	11749	7041	4200	19385
Hab. Média Dens.	3.11	12373	6168	3690	19305
Multiusos	3.12	33239	23177	14600	83147
Hab. Alta Dens.	3.13	6235	3477	2655	14505
Hab. Alta Dens.	3.14	7822	3965	3415	15860
Hab. Alta Dens.	3.15	5784	3378	2760	12345
Hab. Alta Dens.	3.16	6857	1492	1310	7155
Hab. Alta Dens.	3.17	11108	8657	6135	27788
Hab. Alta Dens.	3.18	8099	5149	3470	20375
Equip. Colectivo	3.19	3915	1499	680	3000
Equip. Colectivo	3.20	10910	5116	1500	3000
Hab. Alta Dens.	3.21	10098	6222	5135	25240
Hab. Alta Dens.	3.22	10082	6218	5135	25240
Hab. Alta Dens.	3.23	10132	6218	5135	25240
Equip. Colectivo	3.24	2325	699	453	1000
Equip. Colectivo	3.25	2792	1460	1128	1780
Equip. Turístico	3.26	12872	9274	3055	13500
Equip. Colectivo	3.27	24164	18624	3250	6500
Equip. Desportivo	3.28	12069	8688	*(1)	*(1)
Equip. Colectivo	3.29	2300	744	*(1)	*(1)
Multiusos	3.30	6036	2185	912	1100

1999 _ PP3

Número da parcela	Categoria do espaço	Área total da parcela (metros quadrados)	Construção: Área bruta de pavimentos (metros quadrados) (*) Habitação (*)	Serviços (*)	Comércio/ restauração	Equipamento colectivo	Equipamento turístico	Equipamento/ infra-estrutura urbana	Indús aux
3.01	Hm	18 742	39 103	–	1 574	–	–	201	–
3.02	Hm	2 067	4 734	–	–	–	–	–	–
3.03	Hm	2 392	3 883	–	983	–	–	–	–
3.04	Hm	2 392	3 870	–	983	–	–	–	–
3.05	Hm	3 090	2 896	–	1 500	–	–	–	–
3.06	Hm	4 914	7 512	–	–	1 388	–	–	–
3.07	Hm	6 227	14 005	1 299	–	–	–	–	–
3.08	Hm	6 861	16 009	–	826	–	–	–	–
3.09	Hm	7 041	19 704	125	987	–	–	–	–
3.10	Hm	7 041	18 178	2 074	–	–	–	–	–
3.11	Hm	6 168	18 125	–	1 280	–	–	–	–
3.12	Ec	20 485		–	–	6 500	–	–	–
3.13	Ha	3 809 7	14 295	2 430	2 252	–	–	–	–
3.14	Ha	4 269	9 685	3 025	2 793	–	–	–	–
3.15	Ha	3 487	7 731	2 472	2 273	–	–	–	–
3.16	Ha	1 519	5 324	1 059	1 059	–	–	–	–
3.17	Ha	8 529	30 035	–	–	–	–	–	–
3.18	Ha	5 135	16 560	–	–	–	–	–	–
3.19	Ec	2 215		–	–	3 000	–	–	–
3.20	M	5 101	17 080	–	–	–	–	–	–
3.21	M	6 211		24 640	2 337	–	–	–	–
3.22	M	6 215		24 640	2 337	–	–	–	–
3.23	M	6 212		24 640	2 337	–	–	–	–
3.24	Ei	699		–	–	–	–	1 000	–
3.26	Ec	10 725		–	–	22 581	–	–	–
3.27	Ec	19 191		–	–	6 500	–	–	–
3.29	Ei	528		–	–	–	–	0	–
3.30	M	4 228		1 137	–	–	–	–	–
3.31	Hm	165		–	165	–	–	–	–
3.32	Hm	168		–	168	–	–	–	–
3.33	Hm	225		–	235	–	–	–	–
3.34	Ec	923		–	–	1 642	–	–	–

Besides these positive effects (external effects associated to the construction of EXPO project), there’s one evidence that no one can ignore: the “zero cost” objective was far from being succeeded, and that aspect ended up being the main reason to densify the area and change the land use significantly – promoting more housing instead of tertiary activities and social facilities. The finance model proposed for the EXPO’98 Project revealed to be a major flop. This failure caused also by the deficient management of the several urban construction works, the assumption of costs of surrounding infrastructures that should not be only paid by EXPO’ 98; some corruption incidents and the deficient plot sale programming that followed the exhibition.

6 Some conclusions for the future

The urban rehabilitation process associated and developed trough the EXPO’ 98 project, is undoubtedly an interesting case study and one of the most successful project of the kind. We can just remember what have succeed with the previous world exhibition in 1992 in Seville, to have the right dimension of what could be an urban and financial disaster when the reality follows a way that was not the one considered in the prognostic studies that have justified the development and urban model for the exhibition project and the subsequent need of technical and financial resources. In that respect, the Lisbon experience is not only a case of success but also a model that have been adopted for the following world Exhibitions.

However, after ten years after the closing of the EXPO’ 98 and more then 16 from the first urban plan elaborated for the event and the following neighbourhood, we should also compare what have been said at the time to justify the public involvement and financing and what were the

objectives of that significant urban renewal operation and, in other hand, what in fact has happen and reached. Of course, in such a type of urban project (340 ha to be “clean” and then developed in a new urban multifunctional structure) it’s expected to have some deviations from the initial aims, projections and calculations. What is important is to analyze the dimension of those differences and what were the main reasons that could explain them, in a perspective of lessons learned to avoid the same mistakes and erroneous perceptions of the reality in the future.

In other hand, the singularity of the legal framework and development process adopted in the EXPO’s project and in the urban development that follows, should also be analyzed in a critical perspective, because, in our opinion, is not exportable for other urban renewal interventions, as the subsequent POLIS program have shown in a sometimes hard way.

In fact, the initial concentration of the property in public “hands” (71 % of the total area), and the need of delocalization of the petrol companies and refinery, as well as the amount of European funds available for this type of environmental and renewal operations, created a very particular and unrepeatable situation and facilitate in a very significant way all the initial operation. The imperative deadline to the exhibition opening and the psychological “push” that the government wanted to give to the nation’s proud, were also of great importance to mobilize funds and wills, as well to rapidly overcome the innumerous problems that the implementation process have put. The special urban legal framework to develop the area, to evaluate the expected environmental impacts and to approve the projected urban infrastructures and buildings, that have been put in place by central government – overcoming the legal competences of the municipalities in those areas – is a clear result of that context. The exceptional legal procedures that were adopted for the EXPO’s project and subsequent urban development of the area will be no longer be possible and constitute a clear example of the failure of our normal legal framework to deal with such a type of public initiatives in the urban domain.

Regarding the objectives that have been signalized to justify and promote the operation, we can conclude that the most important ones associated to social and urbanity aspects, were far to be reached. Firstly, the objective to obtain a zero cost at the end of the operation, has introduced three significant distortions to the initial purpose to a balanced social environment and a good provision of social facilities that should serve not only the future population of the new neighbourhood but also to contribute to reduce this deficit existing in the surrounding ones.

The last data that we have access shows clearly that the urban development model that have been pursued – in order to maximized the profits of selling urban plots – makes that the actual resident population is mainly of the high medium and upper classes, and almost nothing have been promoted to lower classes, the exception have been a few housing cooperatives mainly occupied by medium class stratus. In other hand, the necessity to reduce the continuous deficit of the public enterprise that manage and promote the area (the Parque EXPO, SA), have give place to a significant change of land uses and densification. The substitution of plots previously designated as social facilities or offices for more housing areas; the alteration of some detail plans to accommodate more floor area to be commercialized; the privatization of the health facilities; and the abandon of the objective to have some houses schemes to be implemented as controlled costs by the public administration, are some examples of the changes that have been operated to get

more profit in the urban operation that follows the EXPO. The final result was the transformation of the *Parque das Nações* neighbourhood in an exclusive urban area, where the social facilities of proximity were substitute by city prestigious equipments, such as the Oceanary, the multipurpose pavilion, the exhibition and congress centre, the national ballet theatre, the Science Museum or the – until now unused - Portugal pavilion. At last, a new casino – the biggest in Portugal – has occupied an exhibition building dedicated to the discoveries and knowledge. The claims of the actual population for more social facilities and more proximity shops and services, as well as against the traffic problems already existing, are clear signs of the consequences of those changes in the initial zoning and detail plans.

If the social segregation is now a fact in this neighbourhood, the urban integration with the surrounded areas, still objectives to be accomplish, in spite of the good accessibilities that have been put in place. However, the resolution of this problem is not a responsibility of the *Parque EXPO* enterprise, but reveals the incapacity of the Lisbon municipality to cope with transformations that the EXPO project have introduce in the territory. As a consequence of that, the objective to rehabilitate all the oriental part of Lisbon and create there a new urban centrality, have been restricted to the *Parque das Nações* area. Even there, is clear now that the main offices blocks and the major urban activity are concentrated in the central area of the neighbourhood. The north and south parts of it are mainly residential, what difficult the extension of that centrality to their existing boundaries. In other hand, the failure of the marina have create a kind of an urban empty life in the south area, where the lack of shops and urban services is a constant, transforming the evolving residential area in a single dormitory.

At least, the existing public transport system is clearly insufficient and unattractive to cope with the amount of population and people that already live and work in the zone. The main interface complex – where urban and regional buses, metro and trains share an impressive architectural structure – is not enough to serve conveniently all the area, taking in account its length (almost 5 km) and the social-economic characteristics of its population and jobs. As a result, the only alternative to move from a place to another inside the neighbourhood is to walk – if the distance is acceptable – or drive a car, with the subsequent consequences in terms of traffic and parking facilities.

In any case, the final balance of the EXPO urban operation shouldn't be mined by those negative aspects. The quality of the public urban space, the fruition of the river front, the environmental preoccupations and realizations, the existing centrality and the city equipments that have been built in the area, are major outcomes that should be properly valuated. They constitute now a reference for urban development in national terms.

However, we cannot consider that the objective of urban sustainability has been reached. The social aspects and the financial failure of the project are sufficiently important to avoid that statement.

References

FCT Project, Fernando Nunes da Silva, *POCTI/AUR/43884/2002 – The Urban Renewal of Harbour Areas and the Resulting Public Space: A comparative study of Lisbon, Barcelona and Rotterdam.*

Cabral, J. e Rato, B. (2003) "Urban Development for Competitiveness and Cohesion: The EXPO 98 Urban Project in Lisbon" in Frank Moulaert, Arantxa Rodriguez and Eric Swyngedouw (ed), 'The Globalized City. Economic Restructuring and Social Polarization in European Cities'. Oxford Geographical and Environmental Studies. Oxford University Press. UK. pp. 209-228.

CML/DPE (1992) "Plano Estratégico de Lisboa". Câmara Municipal de Lisboa/Direcção de Projecto de Planeamento Estratégico. Lisboa.

CML/DPE (1992) "Plano Director Municipal - Regulamento". Câmara Municipal de Lisboa/Direcção de Projecto de Planeamento Estratégico. Lisboa.

Portas, N. (1999) "O Pós-EXPO e o resto à volta". in *'A cidade da EXPO'98'*, organizado por Matias Ferreira, Vítor e Indovina, Francesco. Editorial Bizâncio. Lisboa. Portugal. pp. 184-195.

Touissant, M. (1995) "Planear/Projectar a EXPO'98 a sua ZI". O urbanismo e o urbanista". Jornal Arquitectos. Associação dos Arquitectos Portugueses. Ano 148. Nº XIII. Junho de 1995. pp. 10-45.

Vassalo Rosa, L. (1996) "EXPO'98. A cidade de Lisboa". in *'Lisbon World EXPO'98. Projects'* editado por Tigueiros, Luís e Sat, Cláudio com Oliveira, Cristina. Editorial Blau. Lisboa. Portugal. pp. 39-55.

Vassalo Rosa, L. (1999) "A Cidade da EXPO 98. Uma reconversão na Frente Ribeirinha de Lisboa?". in *'A cidade da EXPO'98'*, organizado por Matias Ferreira, Vítor e Indovina, Francesco. Editorial Bizâncio. Lisboa. Portugal. pp. 173-183.

Wemans, L. (1999) "A EXPO'98 – da avaliação económica aos custos sociais. O 'custo zero', a 'engenharia financeira' e o 'défice de setenta milhões'" in *'A cidade da EXPO'98'*, organizado por Matias Ferreira, Vítor e Indovina, Francesco. Editorial Bizâncio. Lisboa. Portugal. pp.252-287

Indovina, F. (1996) "Great Events and the Accidental City" in *'Lisbon World EXPO'98. Projects'* editado por Trigueiros, Luís e Sat, Cláudio com Oliveira, Cristina. Editorial Blau. Lisboa. Portugal. Pp 25 - 32

Tribunal de Contas (2000) "Relatório da Auditoria ao Projecto EXPO'98". Lisboa.

Folgado, Deolinda e Custódio, Luís (1999) "Caminho do Oriente – guia do património industrial". Livros Horizonte. Lisboa

Parque EXPO (1999) "Metamorfoses". Parque EXPO'98 S.A. (ed.). Lisboa

Parque EXPO (1999) "Record of redevelopment". Parque EXPO (ed.). Lisboa

Castro, A. E Lucas, J. (1999) "A EXPO'98 – Cronologia de um Processo" in *'A cidade da EXPO'98'*, organizado por Matias Ferreira, Vítor e Indovina, Francesco. Editorial Bizâncio. Lisboa. Portugal. pp.345-422

Parque EXPO (1999) "Relatório – Exposição Mundial de Lisboa de 1998", Parque EXPO'98 S.A.

Parque EXPO (1999) "Documentos para a história da Expo'98 – 1989-1992", Parque EXPO'98 S.A.

HPK, Eng. Ambiental Lda. (1995) "Estudo de Incidências Ambientais"

Vassalo Rosa, L (1995) "O Plano de Urbanização da Zona de Intervenção da Parque EXPO'98 S.A."

Serdoura, F. (2006) "Espaço Público, Vida Pública – O caso do Parque das Nações" Dissertação para obtenção de Grau de Doutoramento em Planeamento Regional e Urbano, IST-UTL, Lisboa.

Ventura Bento, N. (2006) "Operações de Renovação Urbana em Frentes de Água – De um conceito de sustentabilidade alargada ao Ideal de Modernidade" Dissertação para obtenção de Grau de Mestre em Urbanística e Gestão do Território, IST-UTL, Lisboa

Barros, S. (2007) "O programa Polis e a Componente Ambiental" Parque EXPO'98 S.A. (ed). Lisboa. Portugal

Parque EXPO (2008) *"Relatório de Contas de 2007"* Parque EXPO

Parque EXPO (2007) *"Relatório de Contas de 2006"* Parque EXPO

Parque EXPO (2006) *"Relatório de Sustentabilidade",* Parque EXPO

Glossary

I.Z. – *Intervention Zone*,

BIE – Bureau international des Expositions,

LSP – Lisbon Strategic Plan, PEL – Plano Estratégico de Lisboa,

RDP – Regional Development Plan,
APL – Administração do Porto de Lisboa, *Lisbon Port Authority*,
AML – Área metropolitana de Lisboa, *Lisbon Metropolitan Área*,
PDM – Plano Director Municipal, *Municipal Master plan*,
PP – Plano de Pormenor, *Detailed Plan*,
PU – Plano de Urbanização, *Urban Plan*,
PMA - Programa de Monitorização Ambiental, *Environmental Monitorization Program*,
STEO – Tribunal de Contas, *State Treasure Examine Office*,
AMCPN – Associação de Moradores e Comerciantes do Parque das Nações

1 conto = 1000$00 ≈ 5 eur (2008)

Acknowledgements
Francisco Peixoto, Rosa Nunes, Pedro Pinto, Paulo Cambra, Rita Soares.

Appendix 1. Abstracts of papers presented at the conference not included in this book

Evaluation and organizational learning in regional development and spatial planning: a reflexive practitioner's perspective

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The paper discusses the role of evaluation in planning, from the perspective of organizational learning effects and reflexive practices that evaluation can induce. The several stages of regional development and spatial planning policies in Portugal, principally after the beginning of the successive programming periods of Structural Funds, represent the empirical base of the paper. The author's approach is built on a reflexive practitioner's view combining research work on territorially-focused public policies at the University with evaluation experience of the EU co-funded regional operational interventions. After an introduction, establishing the main scope and questions addressed, the paper is divided into three sections. Firstly, it presents some conceptual insights on the different ways evaluation resources and practices can be used as powerful instruments in organizational learning-oriented regional development and spatial planning processes and simultaneously as an input for a reflexive practitioner's view. Secondly, the paper tries to show how evaluation identified some crucial gaps in Portugal between spatial planning and regional development policies, identifying some orientations to eradicate them. Finally, in a policy-oriented set of conclusions, the paper argues that the next programming period 2007-2013 will be a critical period for generating more systematic evaluation practices concerning regional development and spatial planning policies. For the first time after 34 years of democracy in Portugal, within a context of no autonomous regions, a National Programme for the Spatial Planning Policy will coexist with Regional Spatial Plans (NUTS II) and innovation and competitiveness-oriented regional development policies. New organizational challenges will appear calling for a more interactive and proactive role of evaluation.

Keywords: evaluation; organizational learning; spatial planning; regional development.

SEA for strategic evaluation in planning

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Strategic Environmental Assessment (SEA) can contribute to evaluation in planning by strategically enabling environmental integration and assessment throughout the planning process. The presentation addresses SEA as a decision-centred instrument, that is driven by the dynamics of the planning process and which is focused on assessing strategic processes, rather than plans or programmes. It aims at the integration of environmental issues and the identification of sustainability paths, defining SEA as a strategic facilitator of sustainability processes. A decision-centred SEA means that SEA is flexible and taylor-made to each decision process, conceived as a framework of key elements and activities that need to be strategically positioned to enable SEA to play its decision support role and to ensure its added-value to decision-making. This also requires great flexibility in planning, yet structured as opposed to disorganized. It is through the structured, rather than prescriptive, conciliation of both planning and SEA processes that the dialogue can be established. The presentation points out in particular to how SEA can be made methodologically more strategic, using an approach based on the identification of key integrated factors – the critical factors for decision-making - that influence and structure the whole SEA approach. This call for the consideration of technical and other supra-technical dimensions, in which the socio-political role of SEA is determinant. Which means that SEA need to act strategically in relation to why doing, who to engage, what to consider and when to influence the planning process.

Keywords: SEA; sustainability; integration; strategic approaches.

The value of flexibility in airport planning: a real options analysis

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In the last two decades, airports have suffered major changes. Governments, airport authorities, airlines and other stakeholders, invested large amounts of capital, building large and capital intensive infrastructures under a great deal of uncertainty. The risk comes essentially from the difficulty in forecasting demand in the long run. Under a highly dynamic environment, how to make economically rational decisions on investments of billions of Euros, and with revenue highly unstable and unpredictable? Literature and empirical evidence, suggests that the development of airports should be done in incremental steps, decreasing the CAPEX and thus making the project less risky. This paper, looks at a case study – the future new Lisbon Airport – identifying the possibilities for flexible solutions, and quantify the economic value of developing a more flexible "airport system development plan". The methodology used is a Real Options analysis for a 30 year timeframe. Results suggest that by developing flexible solutions, economic benefits (both public and private) may be expected. In fact, the NPV of a project may change from negative to positive.

Keywords: airport planning, flexibility, real options.

Planning, Pragmatism and Societal Change

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There are now already more than a couple of decades throughout which I have been trying to combine critical thinking about the nature and purpose of planning with the actual development of planning practice - mainly geared towards, the design and the deployment of spatial strategic frameworks. The paper is based, essentially, on a particularly enjoyable and fruitful learning experience which took place in the late 1990s and early years of the current decade, when myself and other colleagues at the University of Aveiro were responsible for the preparation of three municipal (spatial) strategic plans. In the second half of the 1990s, many Portuguese municipalities were starting to prepare (non-statutory) strategic plans. Although the rhetoric was changing, stimulated by a national programme (PROSIURB), the approach to (spatial) plan making, however, was still largely reflecting the traditional planning perspective and methodology. In this context, we thought the planning school could (and should) make a contribution through the preparation of municipal strategic plans "by the book", going against the prevailing traditions and literally attempting to translate the emerging theoretical perspectives into guidelines for planning practice. This experience revealed a most interesting paradox, that in order to be effective (pragmatic), development planning needs to actively promote institutional (societal) change. Such conclusion further underlines the inevitability and urgency of an open minded debate on the nature and purpose of spatial planning in contemporary (Portuguese) society.

Keywords: planning practice; strategic plans; development planning; institutional change.

cityAIR: a new air quality index for cities

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Due to a generalised increase of mobility and road traffic in urban areas, the total emissions from road traffic have risen significantly, assuming the main responsibility for the disregard of air quality standards. Pollutant concentrations are evaluated through monitoring, using permanent measurement stations or mobile units, and prediction models based on emissions and meteorological conditions. In order to find an air quality index, the pollutant concentrations are combined through a classification scale anchored on the legal limits and, on the other side, on the impacts over human heath. Typically these classification models consider only the worse pollutant, i.e. the one which concentration is higher given a certain scale. The objective of this paper is to present a new air quality index, cityAIR, developed for urban contexts. The mathematical formulation of cityAIR stands on two logics: whenever at least one of the pollutants considered overcomes the legal limits for the concentration, this will be the only relevant one for the index calculation, and the value will be the minimum of the scale (zero or red); when there is no limit violation, then all the pollutants are considered for the overall air quality, which is calculated through a multi-criteria combination of the concentrations, where trade-off is allowed. A case study is presented, where a cityAIR values surface was calculated for Viana do Castelo, a mid-sized Portuguese city, considering concentrations of CO, NO2, O3, C6H6 and PM10.

Keywords: air quality; prediction models; urban pollution.

Organizing Committee: Paulo Pinho, Paulo Conceição, Sara Santos, Vítor Oliveira, Sandra Melo

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CITTA 1st Annual Conference on Planning Research

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