

The Social Construction of Virtual Cities – A Strategic View for Urban-Technological Development in Europe

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1 INTRODUCTION

The massive diffusion of new information and communication technologies (ICTs) – especially the more recent development of mobile and wireless technologies – has necessitated a through re-conceptualising of the relations between space, time and technologies. City-makers and urban scholars currently face an enormous challenge, as new notions of space and time increasingly call into question old paradigms. This process in turn affects the way ICTs are dealt with as part of government, planning and policy agendas. This ‘paradigm challenge’ affects the whole range of issues related to the analysis and management of spatial, economic, political, social and cultural aspects of contemporary urban life, and constitutes perhaps the main task in thinking through relations between cities and ICTs.

In their pioneering work *Telecommunications and the City*, Graham and Marvin (1996) introduced an element of order to the chaos of ideas and assumptions about telecommunications. They organised its impacts on crucial sectors such as the economy, social and cultural life, urban environments, infrastructure, urban physical form, and planning and governance. A whole chapter was dedicated to the conflict between old and new paradigms. Importantly, the challenges are grouped into three categories, namely the ‘challenge of invisibility’ (the non-physical aspect of ICTs), the ‘conceptual challenge’ (especially concerned with ideas of space, time and cities), and the ‘challenge to urban planning’ (the conflicts between the modernist city and the post-modern networked city).

Based on this and other contributions, the purpose of this paper is to attempt a demarcation of the conceptual challenges posed by the clash of ICTs and cities. More specifically, the aim of this paper is to establish the theoretical foundations for the understanding of this complex relationship and, at the same time, to look into more detail at two cases of urban-technological development in Europe: Newcastle upon Tyne in the UK and Antwerp in Belgium.

In addressing these issues, this paper analyses some of the ways in which ICTs are producing complex conflicts between traditional and new paradigms of space, time and technology, and creating some conceptual dilemmas for an integrative development of technologies and cities. For this analysis, I will concentrate in local government actions towards integrated urban and technological strategies, in the field known as urban technology.

The approach I have taken is supported by the theory of Social Construction of Technologies (SCOT), a paradigm that sets out to explain the most intimate political and social relations involved in the introduction, acceptance and absorption of technological artefacts within a social context. I believe that this approach offers an invaluable tool for understanding some of the dilemmas presented to local authorities by the socio-technical process of building the virtual city.

To address these issues, this paper is divided in four parts. The first is driven by the complex range of challenges to traditional paradigms of space, time and cities, especially those faced by planners and city-makers. Secondly, I draw my analysis of the two case studies based on SCOT and the specific historical conditions of each case. The third part concentrates on the analysis of what has been found in Newcastle and Antwerp in terms of visions and interpretations to the relations between ICTs and cities, towards an integrative urban-technological strategy. Finally, in the conclusions, I briefly put the previous parts together in discussing the strategic approaches for ICTs of Newcastle and Antwerp and their relative advantages.

2 PARADIGM CHALLENGES: UNDERSTANDING ICTS AND SPACE

To comprehend the very concept of space, there is a need to first understand what the space is made of. According to Santos (1997) in *A Natureza do Espaço* (the nature of the space), space is an indissociable, but also contradictory, conjunct of ‘systems of objects’ and ‘systems of actions’. In other words, this is what makes the space a multiple and heterogeneous entity: objects and actions, fixes and flows. The space is thus neither only physical nor only social, but the two always together:

Systems of objects and systems of actions interplay with each other. On one side, systems of objects drive the way in which actions are done and, on the other side, systems of actions lead to the creation of new objects or affect pre-existent ones.

That is the way the space finds its dynamism and changes itself. (Santos, 1997: 52)⁵

ICTs were added to the conglomeration of systems of actions and objects which together are considered to make space a couple of decades ago. Information and communication technologies are increasingly considered part of the sum of actions and objects that make up our daily lives. At home they are in the living room, the study and the kitchen. They are at work, on our desks, on our laps, and on our way to work. They entertain us. We even wear them. So, to understand space, we need to understand ICTs and their influence on urban lives.

ICTs and their effects are extremely difficult to pinpoint, partly due to their invisibility. Unlike transportation and other traditional types of infrastructure, ICTs rely on underground or covered networks of fibres optics, radio signals, microwaves and satellites.

These particularities mean that everything associated with the relation between ICTs and cities tends to be conceptually complex and vague. Historical neglect towards the study of these relations and changes in the way space is perceived, provoke a paradoxical complexity/vagueness. This, in turn, generates and disseminates extremely disparate interpretations of and theoretical approaches to the subject of telecommunications and cities.

⁵ Translated by the author from the original text in Portuguese.

In addition, and partly as a consequence, there is currently a significant challenge to urban planning and governance (Bonnett, 1999), as these areas experience an arduous transition from the modernist industrial city, with its rules and methods of control, to the post-modern networked city and its mobile, fast and invisible elements.

The difficulty pinpointing ICTs' effects and infrastructure make their relation to cities a very 'slippery' phenomenon from a theoretical and empirical point-of-view. Urban scholars and, especially, city-makers find it enormously problematic to specify the precise characteristics of the new networked city. This is, in part, due to the lack of physical and visible elements in ICTs, and because of the new possibilities for services and infrastructure in the local context. In sum, this slipperiness stems from the invisibility/intangibility of ICT developments, and the advent of new systems of infrastructure and services.

Pragmatically, this sometimes results in local authorities and planners experiencing problems raising the proper resources or support for more proactive initiatives. This is because, when trying to justify high investment on ICTs, they cannot always show improvements statistically. The demonstration of a cost/benefits relation is not very straightforward to demonstrate in the case of investments in telematics developments.

Positive or negative aspects of a new park, bridge, road, or council house development could easily be noticed by planners, local authorities and by the population. The amount of money invested or spent on these types of urban development can be very clearly calculated. It may also be easy to determine the most direct environmental, social and economic impacts of some of these initiatives.

In contrast, developments regarding telecommunications are perceived only if they involve physical changes like digging up roads for cable installation, or putting up new street-equipment or buildings especially designed for the use of ICTs, etc. Sophisticated infrastructures (like satellites, radars, wave-generators, etc.) and the flows produced by ICTs (such as microwaves, electromagnetic signals, and above all information) are usually silent and unnoticed by those who run and use the cities, accustomed as they are to the visible and 'noisy' stuff of the industrial city.

Since a great deal of work on urban studies traditionally relies on 'physicalities' – visible and tangible things like the physical space and traditional infrastructures –, invisibility seems to be a very common embedded challenge to the paradigms that underpin the contemporary organisation of urban space:

Urban studies and policy tend to be dominated by a concern with the visible, tangible and perceivable aspects of urban life [...] Given this visual preoccupation, it is easy to diagnose the virtual invisibility of telecommunications in cities as a key reason for the curious neglect of telecommunications issues in cities. (Graham and Marvin, 1996: 50)

Thus, if it is hard for scholars and researchers to 'touch' and 'see' ICT applications and infrastructure, it is even harder for planners and local authorities to overcome this paradigm of invisibility and intangibility. For those who deal daily with traditional urban problems – like traffic congestion and the maintenance of transportation links, problems with water or electricity supply, or urban violence – it may be too difficult to understand the complexity and virtuality of electronic networks carrying no more than invisible signals from one computer to another. It may be even more difficult for them to predict the real economic, political, social, cultural or spatial consequences of the introduction of such new technologies to the functioning of cities.

Due to this invisibility, networked ICT infrastructures are usually taken for granted. In addition, changes in the standards of national telecommunications monopolies in the past have made it difficult for local authorities to intervene directly on this issue. Perhaps as a consequence of this, some commentators have noted a tendency for planners and policy-makers to overlook ICT matters.

These challenges directly contribute to city-makers' lack of awareness about virtually every aspect of ICTs. The fact that connections are rarely made between ICTs, land use and transformations of urban form means that city-makers are often unfamiliar with many aspects of urban technological development. Consequently, city-makers are as unable to see telematics applications and infrastructure as they are to take action about them.

2.1 Challenging urban planning and governance

As ICTs affect the way space, economy and life style are understood, they also influence the way cities and municipalities are managed and governed. City-makers have played an important role in shaping and controlling cities since late nineteenth century when urbanism established its roots, both as a science, and as a vital practice for urban life generally.

However, the practice of planning has been too much attached to industrial ideas of space and cities from the mid-20th century. The bases for urban planning have a strong relationship to modernism and the industrial city. As new notions of space and time have influenced every aspect of contemporary society, perhaps they should likewise influence the way urban space is governed and planned.

Places may nowadays be functioning in different ways within and between cities, but planners are still using concepts, methods and policy instruments developed during and for the modernist period of industrial cities. Planners and planning departments are increasingly losing their importance within contemporary public administration, as exaggerated reliance on technical and design practices continues to fragment the public treatment of space.

This process is being affected in such a way that only urban design, transportation and infrastructure issues are entrusted to planning departments, with little or no consideration of social and cultural implications. Koolhaas and Mau (1995) argue that planners and, in fact, urbanism are outdated, and that both failed to keep pace with the rapid modernisation of urban space. Ultimately, they argue, planners simply cannot cope with the complexity of the contemporary city:

The transition from a former position of power [during the industrial and the modernist era] to a reduced station of relative humility is hard to perform. Dissatisfaction with the contemporary city has not led to the development of a credible alternative; it has, on the contrary, inspired only more refined ways of articulating dissatisfaction. A profession persists in its fantasies, its ideology, its pretension, its illusions of involvement and control, and is therefore incapable of conceiving new modernities, partial interventions, strategic realignments, compromised positions that might influence, redirect,

succeed in limited terms, regroup, begin from scratch even, but will never re-establish control. (Koolhaas and Mau, 1995: 965)

This seems very contradictory when compared with the important role that planners should be playing. In fact, the point is that, while hardly working on their daily activities, planners have been acting more as technicians than as social scientists because of limited resources, restricted conditions and a general unawareness of the concepts and consequences linked to the development of ICTs in cities.

‘Proactive’ planning initiatives related to ICTs, tend to appeal to the ill-grounded utopianism of technological deterministic approaches. This, in turn, tends to create more distrust and scepticism from other municipal departments and civil servants about the involvement of planning in urban-technological strategies.

Distinct departments in the city have, obviously, different notions about ICTs and their influence on urban affairs, which leads to a weakened planning department that forms a smaller part of an administrative structure that may itself be fragmented.

So perhaps planning and planners are not to blame; alternatively, no-one may be to blame. Can organisational fragmentation in fact be traced to the variety of visions and interpretations? Can such variety be the cause of the fragmentation of the very notions of space, time, technology and governance themselves, reflecting on the process of policy-making?

The consequences of such a fragmentation may be on the one hand a failure to understand the city in the light of the transformations brought about by the development of ICTs, and, on the other, neglect of the complex economic, political, and social and cultural relations present in the urban space on the part of planners.

The contemporary city has new elements that need to be considered in the arrangement of urban space. Planners and planning officers are still trying to catch this momentum. Commentators like Koolhaas and Mau (1995) maintain that new methods, instruments, organisation, and indeed a new urbanism have to emerge to cope with the complexity, flexibility, and new concepts inherent in contemporary urban space:

If there is to be a ‘new urbanism’ it will not be based on the twin fantasies of order and omnipotence; it will be the staging of uncertainty; it will no longer be concerned with the arrangement of more or less permanent objects but with the irrigation of territories with potential; it will no longer aim for stable configurations but for the creation of enabling fields that accommodate process that refuse to be crystallized into definitive form; it will no longer be about meticulous definition, the imposition of limits, but about expanding notions, denying boundaries, not about separating and identifying entities, but about discovering unnameable hybrids; it will no longer be obsessed with the city but with the manipulation of infrastructure for endless intensifications and diversifications, shortcuts and redistributions – the reinvention of psychological space. (Koolhaas and Mau, 1995: 969)

3 THE SOCIAL CONSTRUCTION OF URBAN TECHNOLOGY

The comprehension of such contradictory coexistence of complexity and vagueness is a key stage in the process of overcoming the historical neglect of ICTs by the public sector. So how could this be explained theoretically? The concepts embraced by Social Construction of Technologies (SCOT) theory are seen as crucial here.

This theory is important because it demystifies the idea of aseptic technologies, of technical elements without more important and intrinsic roles in society. The idea is that of technologies or a set of technologies (or ‘artefacts’ as they are called by Bijker, 1987; see also Bijker, Hughes and Pinch, 1989) with a range of complex social, economic, political and cultural roles, that is to say, a socially constructed development of a certain technology.

In other words, introducing new technologies to be absorbed by society implies considering all sorts of interactions and manoeuvres by what Bijker (1987) calls ‘relevant social groups’, so that these technologies would occupy their space in time (in terms of practical use). In socio-technical terms, this process is regarded as the stabilisation of a certain artefact, where society has come to a consensus about the meaning of this artefact and has, thus, incorporated it in a series of social activities.

For instance, in terms of urban technology, the introduction of a new initiative or project – in terms of regulatory policy and effective implementation – by local authorities would necessarily involve a number of disputes, political and social interactions, along with the technical development. These ‘games’, according to SCOT, happen all the time and everywhere related to the artefact to be introduced. Thus, this new initiative would involve disputes inside and outside the local authority’s sphere: among politicians to launch the idea, for example; among officers and civil servants; between all of the groups, and among the general public and third parties involved.

Another concept borrowed from SCOT which can be very useful here is that of ‘interpretative flexibility’ (Pinch and Bijker, 1989). This concept offers an explanation for why so many ‘languages’ are spoken by actors within the events of a socio-technical process, generating complexity and vagueness.

Interpretative flexibility deals with the variety of visions and interpretations given to a certain artefact within a given social context. In the example mentioned above, thus, politicians, officers, civil servants, and the population would have their own idea of what the initiative being implemented might mean in terms of shape, characteristics, functions, use, consequences etc. Even within each of these groups, there might be another range of interpretations. According to Pinch and Bijker (1989), each interpretation of an artefact depends on how a ‘problem’ and respective ‘solutions’ are realised by different actors.

If the development of urban-technological strategies (such as building the virtual city) was considered, being socially constructed, as an artefact, the ways in which social actors understood and acted upon this development would become extremely relevant to its acceptance and power of endurance.

Possible questions about the interpretative flexibility of such a strategy would be: What does this strategy mean for the different social actors involved? What does it mean for officers and their departments, for politicians, citizens, and third parties etc.? What are the problems and solutions to be dealt with by the different actors? How can the dominant social group cope with such a variety of visions for delivering a single strategy? In the end, is the strategy satisfactory to all sectors involved? Does it fulfil the variety of interpretations?

The confusion, complexity and vagueness of the concepts related to ICTs and their impacts on the notion of space seem to be directly connected to the enormous amount of interpretations of ICT initiatives by different actors. As long as they do not understand what ICTs are, they will also have a different vision of what ICTs can be used for. Accordingly, Pinch and Bijker (1989: 41) argue that 'different social groups have radically different interpretations of one technological artefact'.

In the specific case of virtual cities or urban-technological strategies, this would mean a diverse range of virtual cities, or a number of alternative strategies; one for each social group or one for each conjunct of problems and solutions. Why, then, is the concept of interpretative flexibility relevant to the attempt to explain the dilemmas of urban-technological developments in this context?

A proper answer to this question must come from the two case studies of Newcastle and Antwerp. In general terms, however, interpretative flexibility helped us to map out the variety of major interpretations of the virtual city and ICT initiatives in these two cities. Social actors and technological entrepreneurs (the people who lead the idea of a certain implementation) can be identified in order to identify distinct visions and discourses. This shows how a possible dominant model may or not prevails over other visions to result in a single strategy. So, what would be the outcome of such dispute of different interpretations?

A decisive aspect of the challenge to understand virtual cities and the network society is the recognition of local strategies for the use, implementation and management of ICT developments. In other words, to fully comprehend the virtual cities phenomenon, we need also to understand urban-ICT strategies (and to discern between their different levels of implementation: local, regional and national). Yet, I suggest that special attention has to be given to some crucial dilemmas involved with the promotion and social construction of such strategies. Uncovering these dilemmas and barriers can be useful for further policy implementations that may be more integrated (in terms of traditional urban and ICT policies), more efficient and more adapted to the diversities of different localities. In this sense, the way local authorities manage interpretative flexibility and a possible democratic construction of urban-technological strategies has proven to be one of the most influential dilemmas.

In order to find out more about the way local authorities organise themselves to consider different visions of the city into a city-wide strategy, I draw my analyses upon a cross-country study of two European cities. The first is the city of Antwerp in Belgium, handpicked by its well developed and acclaimed projects, initiatives and policies dedicated to ICTs. On the other hand, in order to show some contrasts, the city of Newcastle upon Tyne in the U.K. was chosen because of its similar conditions to the average of the medium-sized cities in Europe where two distinct realities coexist: a convergent willing and relative success on the implementation of ICT initiatives on one side; and a coordinated struggle for the reaffirmation of their national and international economic relevance in times of industrial decline on the other.

3.1 Newcastle: a case of fragmented structure

Newcastle upon Tyne is a city characterised by the struggle of its local authorities, development agencies and population against the decreasing number of jobs and quality of life that affects the whole North East of the country. In recent times, as with most cities in this region, Newcastle and its economy were dominated by heavy industry, especially coalmining and ship-building.

This dependence of the city's economy on heavy industry has had a long-term effect on its image, and on citizens' confidence in the local authorities' ability to reverse the economic crisis in the region that followed industrial decline. Newcastle has entered enthusiastically into the race for competitive advantages to attract people to live in the region, with particular emphasis being placed on incentivising clean, high-tech industries to relocate themselves in the North East. The recent history of Newcastle has been driven by this, a fact which is reflected in the development of ICTs, which has tended to rely on regeneration projects, and initiatives to rebuild the image of the city.

The constant attempts to rebuild the city's image are a feature of urban renaissance and urban regeneration discourses that have in turn provided strong motivations for the implementation of ICT initiatives. This sense of renewal stems from the economic development premise that Newcastle has to get rid of its image of a depressed former industrial city with poor quality of life, in order to advance as a new city of the 21st century. Champion (2002, p.90) identifies this process of redefining the economic basis of the city and region as one affecting the British urban system as a whole since 1950:

'De-industrialization, involving a massive shake-out in manufacturing and mining employment, with the biggest relative effects impacting on the places that had the greatest specialization in these sectors, most notably the larger towns and cities in northern Britain.'

The urban regeneration discourses, ideas and strategies emerged with full force during the 1980s and 1990s as an attempt to 'rebuild' cities and re-arrange local economies. The ideas embedded in urban regeneration proposals brought about a strong sense of renovation. With the advance of information and communication technologies, the convergence of media, and the development of other new technologies, this will for renewal seems also to have been renewed. ICTs are a great motivator for regeneration projects, and may be used to attempt to trigger shifts in the local economy. The use of ICTs for boosterism is apparent in the local actors' discourses and perceptions as a vision of urban regeneration.

ICTs were and are still the 'product of the moment' for cities, so Newcastle had no option but to adopt a proactive discourse. The economic development agenda based on regeneration has always been the most important focus for the council. It was therefore natural that telematics technologies should become a major player in the game of local boosterism following the entrepreneurial imperative.

This impetus continues today under the umbrella of the City Council's Going for Growth initiative. Ideas of renewal, renaissance and regeneration are exactly what the 25-year strategy Going for Growth is based on. ICTs are a very small part of the whole project, and ICT projects are scattered through various initiatives and parts of the council.

These projects and visions are also, in fact, reflected in the fragmented way in which ICTs are implemented by the City Council through its management structure of six directorates. Projects, apart from bigger cross-division ones such as Going for Growth, are usually defined and carried out internally within the directorates and divisions. ICT projects are no different. They are, therefore, developed almost in isolation across the divisions of the council. This means that projects are developed without attention to mutual interaction. In this way, even costs, benefits and budgets for ICTs are extremely difficult to pinpoint.

To try and generate an overview of this situation, the council has implemented what is called the E-Services Panel, which is made up of City Councillors and directors of some divisions. It is aimed at the discussion and approval of ICT projects. However, the analyses and deliberations of this panel tend to follow predominantly economic factors rather than social, cultural or even spatial ones. In the end, the panel becomes dependent on priorities setup by other departments, and tied to the management structure of the city itself.

The management structure of the city (as with many others in the UK), follows a 'silo' distribution model, so that the resources and targets are vertically distributed between the six directorates and their respective divisions. There is thus no global budget established especially for ICTs.

Each one of the six directorates has its own projects related to the use of ICTs for different purposes, each therefore has its own separate budgets. These are, in turn, part of one departmental budget. Karen Brown, Coordinator of the Virtual Newcastle Initiative, expresses her concern at not having an ICT-dedicated agency and points out the contradictions of the silo structure:

'I think that the notion of one organisation looking at the best uses of resources doesn't exist in Newcastle. This may be caused or linked to the political organisation of local authorities in the UK and the silo structure of the funding structure.'
(Brown, 2002)

The historical approach to ICTs, and their symbolic meaning as an investment attractor points towards continuity in terms the way telematics technologies are developed as part of entrepreneurial and business-focused strategies. If this general historical perspective prevails, Newcastle is likely to continue to figure in the crossfire of fierce competition among urban centres.

Finally, what I want to make clear is that all the historical and local aspects discussed above – mainly of economic relevance – directly contribute to the shape of the social construction of ICTs in the city of Newcastle.

The fragmented and dispersed way in which these technologies are scattered across the structure of the council is the result of a situation historically and socially constructed. The process of re-imagining the city was crucial on relating ICTs with the entrepreneurial imperative, place-marketing strategies and a business-focused vision for the future of the city.

3.2 Antwerp: an integrated and centralised strategy

Antwerp, at the heart of Flanders, is one of the biggest cities in Belgium, with one quarter of the Flemish population, and is strategically positioned at one of the corners of the region so-called Flemish Diamond.

Apart from its economic importance for Flanders and Belgium, the city has also become synonymous in Europe with innovation, and with the successful implementation of ICTs, being a founder member of the steering committee of TeleCities. It is undoubtedly the most advanced city in Belgium to make extensive use of ICTs for public administration.

Local authorities in Antwerp regard ICTs as a central issue for the future of the city, and have created a specialist agency dedicated to ICTs, Telepolis.⁶ This semi-independent agency is responsible for the coordination, use and implementation of ICT initiatives in the city, the modernisation of the city administration, the management of infrastructure and contracts related to ICTs, and for urban-technological policy-making.

The early development of ICT initiatives in Antwerp – particularly infrastructure – was heavily influenced by the political and administrative restructuring of local authorities in Belgium. The regional devolution process of the early 1980s triggered a process of intensive introduction of ICTs by the city administration in Antwerp. This was mainly due to a merger of nine neighbouring localities into a sole municipality, Antwerp.

In the late 1970s, the Belgian government decided in favour of the amalgamation of cities with less than 5,000 inhabitants, reducing the number of municipalities in Belgium from 2,359 to only 596. Because of its much larger size compared to other Belgian cities, Antwerp managed to postpone the amalgamation until 1983.

With this urban amalgamation in place, the political strategy immediately adopted by the local authorities was the decentralisation of public services and administration across nine city-districts. The argument was that one city council alone could not deal with a newly-created municipality that had grown overnight from about 150,000 to about 500,000 inhabitants, with few new resources added.

Behind this argument were concerns over the growth locally of the extreme right wing party, the Vlaams Blok, which increased its percentage of votes from 17.7% in 1988 to 33% in 2002. This situation, apart from justifying the political decentralisation, also forced the democratic parties to form a coalition in the city council and districts to ensure a strong opposition against the Vlaams Blok, which was called the *cordon sanitaire* (Van Assche, 2002). Decentralisation was thus the only way around political and

⁶ In October 2003 a merger between Telepolis and the IT department of the city of Ghent created Digipolis. The two biggest cities in Flanders joined forces for the constitution of an inter-municipal agency. As this happened after data collection and analyses were already finalised, the discussions presented in this paper concentrate on the role of Telepolis as a municipal semi-independent agency.

financial problems that had arisen over night, and was envisaged by local authorities as an adjunct to the establishment of the *cordon sanitaire*.

From the beginning, ICTs were seen as an enabler for the profound administrative changes involved in decentralisation. Bruno Peeters, the Alderman for Communication, Governmental Organisation and Decentralisation at that time, argues that:

‘Without ICT we would never have been able to have [accomplished the political and administrative reform]. It was done in six months; the decision was made in only two days by the city council, and was accepted by the ministries and by the union within three months [referring to the creation of the informal councils].’ (Peeters, 2001)

ICTs worked for Antwerp as an integrative instrument because of their capacity to improve communication between different departments of the city and between ‘district houses’ (the political and administrative headquarters for a given district). Telepolis is the physical and institutional result of the evolution process of Antwerp’s urban-technological approach, and it is Telepolis that provides Antwerp’s differential in terms of strategy. It is a unique case of a strong and relatively independent public body being created to deal exclusively with ICT issues. The creation of a central agency like Telepolis is not a common phenomenon in the recent history of urban-technological developments in Europe, although it is being emulated here and there on a small scale.

Therefore, in Antwerp, some social groups have tended to envisage ICTs functions and capacities as a means to enable the ongoing political reforms of the region and the country. Thus tremendous efforts have been and are still being made to establish a solid and integrated urban-technological strategy – together with its physical and institutional enabler, Telepolis – in order to facilitate the settlement and absorption of the new political structure.

Politicians and civil servants in favour of more in-depth use of ICTs in public administration set out to sell their idea by organising an ICT strategy incorporated by a public ICTs agency. The idea was to integrate as much of the city administration as possible in order to facilitate political decentralisation. The strategy resulting from these twenty-year social and political changes was the establishment of the ICT-agency (Telepolis) and a mutual commitment from the city administration and this agency in terms of budget and services.

In order to maintain this structure and therefore stabilise the urban-technological strategy, every six years (the period for local elections) a political agreement is discussed by the councillors, aldermen and mayor, to establish general functions and missions for Telepolis. One alderman is designated to deal with Telepolis and the political agreement, while the college of aldermen tracks accomplishment of the general goals established by the agreement. Internally, Telepolis also produces an annual operational plan that is meant to match the requirements agreed politically (defining projects, initiatives and priorities for the entire year). This process illustrates the dialectic exercise that is the merger between traditional policy-making and ICTs policy-making.

Finally, it should be stressed that the specific political and social configuration in Belgium and Antwerp contributed a crucial element to Antwerp’s proactive approach to urban-technological strategy. This is not to say that the devolution and the subsequent local political decentralisation processes were the only influences on Antwerp’s history as regards ICTs development. However, these particular facts played a significant role in the constitution of the current integrative strategy.

4 MANAGING VISIONS: A STRATEGIC VIEW OF URBAN TECHNOLOGY

Despite being way ahead other cities like Newcastle, the approach in Antwerp does not escape the common characteristics that affect other cases. Similar dilemmas have been found, especially those regarding interpretative flexibility and the wide variety of visions regarding ICTs and their possible impacts on cities. A striking similarity was found among actors’ discourses of both cities.

The major difference then is the way these aspects and the visions that give rise to them are articulated and incorporated by groups inside local government for transformation into actions. What I want to sustain is that there are some dominant aspects within actor’s discourses that go against the apparent cohesion of the strategies, and so, present some possible conceptual barriers for future developments.

To analyse social groups’ discourses, twenty-nine key actors within and outside local government were interviewed between 2001 and 2003 for both cases. Priority was given to the following groups: representatives of the most directly involved departments or divisions of local government, officers and civil servants involved in related projects, officers from the planning departments, politicians, regional development agencies, members of the regional and the national government, and representatives of the private sector involved with relevant initiatives.

What appeared to be considered dilemmas and barriers confronted by Local Authorities as they seek to integrate urban and ICTs policy-making, were classified according to three major groups. First, and perhaps most importantly, there is a simultaneous conceptual complexity and vagueness involved with the introduction and application of ICTs to deal with urban issues. In this case, interpretative flexibility represents the most influential dilemma confronting local authorities as they attempt to develop an urban-technological strategy. While a plurality of visions may be beneficial for a democratic construction of initiatives, it may prove difficult to handle and translate into strategy.

Apart from interpretative flexibility, two other groups of dilemmas for the development of urban-technological integrative strategies can be related to a range of intra and extra-local aspects. They were identified as endogenous and exogenous influences to the urban-technological development. Interestingly, both cases seem to be influenced, on different levels, by three major endogenous and three exogenous elements. The identified endogenous elements are: internal administrative and political disputes within local government; integration, coordination and control over the implementation of projects and initiatives related to ICT; and private sector influence on the public administration. And the three exogenous elements are: political and administrative conflict with upper level governmental stances; the increase of regional competitiveness (especially among European Union State Members); and the entrepreneurial imperative.

Back to the first and more influential group of dilemmas (the blurriness of ICTs and cities), a strong presence of elements typically linked to technological determinism was verified on most of the interviews carried out. A parallel divergence between actor's discourses and reality was also evident. There is a general imprecision about what ICTs, their related initiatives and policies can represent for the city in terms of an urban strategy. Once again, interpretations and the subsequent ways in which the local authorities and policy-makers address issues related to ICTs play an important role in defining how these new technologies are socially constructed in the city, and even regionally and nationally.

The local society in both cases has different perceptions of how the set of technologies that form ICTs might be defined, let alone an urban-technological strategy itself. The search for a common basis for interpretations is inherent to the strategy. Everything is part of the complex local socio-technical development of ICTs. This implies the existence of groups, actors, interests, coalitions, dominant visions, initiatives, and strategies which interact to form local government's current approach to ICTs.

Interpretative flexibility is thus something normal, necessary and inevitable in the process of developing technologies. The distinctiveness of the cases of Newcastle and Antwerp lies in the ways that divergent visions are translated to other groups, incorporated and finally implemented. Independently of the stages of development each of these two cases are, it was possible to identify five dominant aspects in the key actors' discourses:

- The organisational aspect, where ICTs are referred to simply as a tool to modernise back-office activities, as well as a way to deliver services more quickly and efficiently (and also customised). The e-government agenda is prominent here, as is a strong vision of the administration as a corporation.
- Tackling the digital divide. Here, as with the organisational aspect, ICTs are used to modernise practices and methods primarily in education, with the discourse of solving problems like ICTs illiteracy, and tackling the digital divide.
- The aspect of substitution ('physical replacement'), where ICTs are seen as a set of technologies capable of replacing physical dislocations with remote interactions/consultations/negotiations.
- The aspect of planning involvement. This is particularly noticed where the planning department participates on the process of incorporation and implementation of ICTs policy-making only marginally. The vision from planning officers has proved to be limited in terms of spatial impacts of ICTs upon the urban environment.
- The propaganda aspect. It is characterised by the symbolic vision of ICTs as clean, modern, and high level technologies (invoking much of the science park culture). In this way, ICTs are referred to as a technical fix to urban problems (Graham and Marvin, 1996) and as an attractor of social, cultural and economic developments and quality of life.

Perhaps the most important question to be asked here is: are these aspects and the visions they influence incorporated by the initiatives which are implemented and prevail?

Looking at the structure in which the initiatives are developed from the early stages of negotiation, Newcastle and Antwerp are very different from each other. Fragmentation dominates the scene in Newcastle, while in Antwerp, a highly integrated approach prevails.

First, in Newcastle, visions for a particular initiative are dealt with on a small scale, in terms of directorates and divisions. Interpretations representing different units tend not to collide on their way to becoming an action or policy. They are 'canalised' from the early moments inside the responsible unit, through to implementation, usually by the same unit. So, once a project is defined by a certain unit responsible for its implementation, it tends not to be influenced by other units' visions, as there is little interaction between them.

Second, in Antwerp, demand and ideas for initiatives are the sole responsibility of Telepolis. The local government and city departments need to report to Telepolis in case of a certain demand or problem related to ICTs. Telepolis will then, through its officers and technicians, study the case and promote further development. ICT initiatives are discussed between Telepolis representatives and the city departments on a weekly basis. Political agreement and Telepolis's operational plan are the formal motors for this centralised and integrative strategy.

Interpretative flexibility is thus a clear challenge for local governments' urban-technological development of ICTs. According to the cases studied, managing the diversity of visions for ICTs produces different results in terms of ways that actions are structured and put in place. This is not to say that high levels of interpretative flexibility will prevent local authorities deploying ICT initiatives. The historical and technical conditions, together with the three groups that represent possible dilemmas and barriers, form the basis for the particular social and political relations that give the current shape of urban-technological strategies in Newcastle and Antwerp.

5 CONCLUSIONS

We saw that two major similarities coexist with two contrasts in the case studies of Newcastle and Antwerp, as regards the development of urban-technological strategies. Similarities refer to the projects implemented and to the dominant aspects of interpretative flexibility; while contrasts refer to different local conditions and the shape of the strategies (the way interpretative flexibility is taken into account). We should therefore ask ourselves what is it that makes that two cases which are differently structured and under different local conditions subsequently develop such similarities in terms of interpretative flexibility and projects.

This seems to be related to urban governance as a whole. In terms of the projects, the most conspicuous ones are well-known and publicised cases of urban propaganda in the race for the 'innovative city'. It is not a surprise that cities try to develop very similar projects to compete for funds and inward investments against each other.

Economic development and urban competitiveness play an important part on determining how local authorities will approach and develop certain subjects. In this case, ICTs have proven to be a golden key 'to be in the short-list of a company that wants to invest

abroad', as De Gerssem (2003) remarks in the case of Antwerp. The discourses then could not be different, resulting in similar dominant aspects for the interpretative flexibility of both cases.

So, what would be considered a differentiator for cities in times of economic development and urban competition? I believe that Antwerp represents a much stronger case in this sense as this city includes technological development and ICTs in the agenda of urban development. Integration seems to be a better option to avoid strategies being over-concentrated on economic development.

For listening to the different departments in the city and being closely related to the city administration, Telepolis in Antwerp incorporates problems and solutions of other social groups to its own vision of urban-technological development. Although none of these groups figures as a major player within the city-wide strategy itself, they feel themselves represented by the vision of Telepolis. This is the case of the planning department, for instance. This department does not relate to the ICTs strategy in any particular way, but that they said to be considered by Telepolis on what they understand is their role in urban technology (even if it seems to be restricted to GIS applications).

The strategic model based on integration and centralisation of urban-technological policies with the support of a dedicated agency appears to offer more possibilities of realisation for the public interests on the implementation of ICT initiatives.

However, the implementation of such strategy does not, by itself, guarantee either a successful result or the austerity of the implementation and management of ICT policies, let alone real comprehension of the extension of the related phenomena. Local and historical conditions also play a decisive role in defining the urban-technological strategy.

What we can learn from these experiences is that, from new administrative methods to improvements in information and service delivery, and the conception of different regulatory policies, planning and governance practices, city-makers would need to understand the importance of a democratic construction of the virtual city to avoid the aggravation of problems like social exclusion and polarisation:

Given the opportunity presented by a new communication media and channel for delivery of services, surprisingly few governments have actually taken advantage of the potential offered by networked technologies and the Internet, beyond static 'homepages' [...] While the interactive nature of these systems presents tremendous possibilities in terms of true citizen policymaking, significant institutional and political barriers exist. (Baker, 1999: 5-6)

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