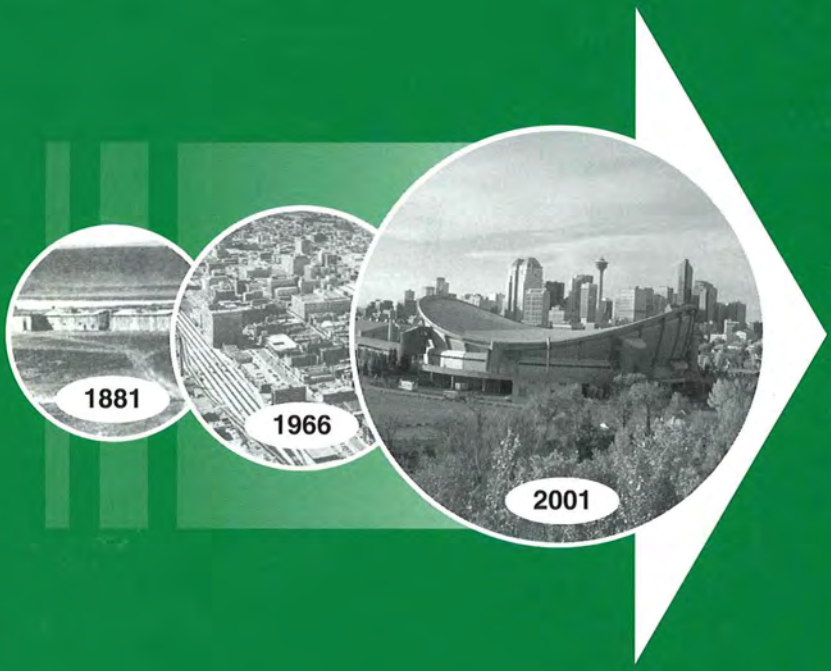
Monitoring Cities: International Perspectives

Edited by

Wayne K. D. Davies
and
Ivan J. Townshend



IGU
UGI
International Geographical Union
Urban Commission

Monitoring Cities: International Perspectives

Edited by

Wayne K. D. Davies
and
Ivan J. Townshend

International Geographical Union
Commission on Monitoring Cities of Tomorrow

International Geographical Union, Urban Commission
(with Department of Geography, University of Calgary; and
Department of Geography, University of Lethbridge)

Monitoring Cities: International Perspectives

Editors:
Wayne K.D. Davies
Ivan J. Townshend

© International Geographical Union, Urban Commission

Full Members of the Commission
Prof. Gerhard O. Braun, Free University of Berlin (Chair).
Prof. Willem Ostendorf, University of Amsterdam (Deputy Chair).
Prof. Yuji Murayama, University of Tsukuba (Secretary).

Prof. A. Bopda, Yaounde.
Prof. W.K.D. Davies, Calgary.
Prof. A. Horn, Pretoria.
Prof. I. Kim, Seoul.
Prof. C. W. Matthiessen, Copenhagen.
Prof. I. Schnell, Tel-Aviv.
Prof. N. Spence, London.
Prof. X. Yan, Guangzhou.

Honorary Members of the Commission
Prof. L.S. Bourne, Toronto.
Prof. D. Pumain, Paris.
Prof. J.-B. Racine, Lausanne.
Prof. D. Shen, Nanjing.
Prof. R. Sinclair, Detroit.

Cover images:
Pictures of Calgary on the front cover show changes through time: Fort Calgary in 1881; Downtown, mainly low-rise, in 1966; Downtown, high-rise offices and Saddledome, in 2001.

First Published: Calgary and Berlin, December 2002.
Printed in Canada by Graphcom Printers Ltd., Lethbridge, Alberta.

ISBN 0-88953-259-1

≡ 10 ≡

ATTITUDES TO ICT ADOPTION IN SPANISH CITIES: Challenges for Local Administrations in Spain

Manuel Valenzuela[1] and Carmen Vázquez[2]

[1] Department of Geography, Autonomous University of Madrid, Spain
[2] Department of Geography, University of Castilla-La Mancha, CUENCA (Spain)

Abstract

This study shows how individuals involved in urban development in Spain perceive the impact of the increasing use of Information and Communication Technology on the future of cities. Particular attention is paid to the ways that these key actors in the urban development process assess the specific opportunities and risks in the adoption of new technologies, the strategies they use to meet them and the way that they integrate their visions for the future into concrete urban planning strategies. The study is part of a wider EU research project called TeleCityVision

Introduction

Cities have always been regional centres of innovation in the relatively balanced urban system of Europe and new technologies have always been important in job growth. In the contemporary world, the rate of technological change and its potential effect on the differential growth of cities in urban systems, as well as upon intra-urban structures, means that the adoption of new technologies can no longer be left to chance. In order to keep pace with competition from other cities throughout the world it is essential that European cities continue to develop new innovative technologies and to anticipate the changes that they will bring. This will not only ensure increasing socio-economic development and employment in the future, but will also help to maintain and nurture their citizens, especially through the provision of welfare and education. Yet the effects of new innovations on cities, especially those linked to the spread of the new Information and Communication Technologies (ICTs), is far from fully understood. Although there have been many studies of the spatial diffusion of new innovations in urban systems, there are relatively few comprehensive analyses of the ways in which new technological innovations are perceived by decision makers in cities, the effects they will bring, and how the innovations will be adopted. These problems led several teams of researchers in Europe to co-operate in the TeleCityVision Project, funded by the European Union through the Fourth Research Framework. Coordinated by BIS (Berlin) the research group consists of seven other teams in different countries: COMTEC (Dublin, Ireland), STS (Trondheim, Norway), ESI (Amsterdam, The Netherlands), ETSI-UAM (Madrid, Spain), ICCR (Vienna, Austria), THEMA (BesanÇon, France) and ZTG (Berlin, Germany). The main objective of the "TeleCityVision Information

Society and Urban Development in Europe"' project is to investigate how the increasing use of the Information and Communication Technologies (ICT) affects the development of cities in Europe (Bratzel and Dienel 1999). To obtain a basis for European comparison of cities and regions, as well as a background for the selection of case studies, the spatial structure and development of the European urban system and the current trends of ICT and urban life were investigated in a first step. This was carried out by a structural analysis of national urban systems in the countries engaged in the project: France, Spain, Germany, the Netherlands, Ireland, Austria, and Norway (Berlin Institut für Sozialforschung -BIS-, 1998).

The starting point of the research is the assumption that the expansion of new Information and Communication Technologies (ICT) will continue to accelerate in both the economic and the private sectors. Indeed, it has been argued that these new technologies could lead to some fundamental changes in city structures and in the relative development of cities in urban systems.

> The functions of central places, today fulfilled by cities for their respective regions, could become less important in the future. Whether or not the workplace or home, public office or service, shopping or recreation areas, is easy to reach by car or public transportation might well become less and less relevant: even today, a variety of functions can easily be fulfilled virtually, via telecommunication networks. Cities need to reckon with an exodus of both innovative companies in production and services, and a high-skilled affluent population group: new communication possibilities make urban structures obsolete to these enterprises in deciding where to locate. On the other hand, the influx of economically and socially weaker groups, who continue to rely on the central infrastructures provided by cities, will continue or strengthen.
> (Berlin Institut für Sozialforschung -BIS-, 1998, 3)

This study reports on part of this TeleCityVision project by focusing upon the results from Spain. It was designed to show how the individuals involved in urban development, especially those in public institutions, perceive the impact of the increasing use of information and communication technology on the future of cities. Particular attention is paid to the ways that these key actors in the urban development process assess the specific opportunities and risks in the adoption of new technologies, the strategies they use to meet them, and the way that they integrate their visions for the future into concrete urban planning strategies (BIS Technical Annex 1998, 2).

Methodology

In order to obtain a comprehensive coverage of attitudes to the effect of new ICT technologies upon cities it was necessary to select people to interview from a range of different cities of various sizes and occupations in Spain. In 1999, Spain contained 39.3 million people, with 77% living in urban areas, compared to an

urban proportion of only 51.8 % out of a total of 28 million in 1950. The first stage consisted of choosing the cities to survey. The Spanish urban system has a basic hierarchical structure, dominated by the two large urban agglomerations of Madrid and Barcelona, each composed of over 3 million inhabitants. Virtually all the high-ranking political and economic functions of Spain are concentrated in these cities. Madrid hosts the national government and about half of the headquarters of the 500 leading enterprises in Spain, whereas Barcelona hosts a further 25 percent of these headquarters. The Northeast sector of the country is the most dynamic economic area, embracing—in addition to Madrid and Barcelona—important regional cities like Bilbao, Valencia and Zaragoza. Moving away from this area, the economic structure becomes poorer.

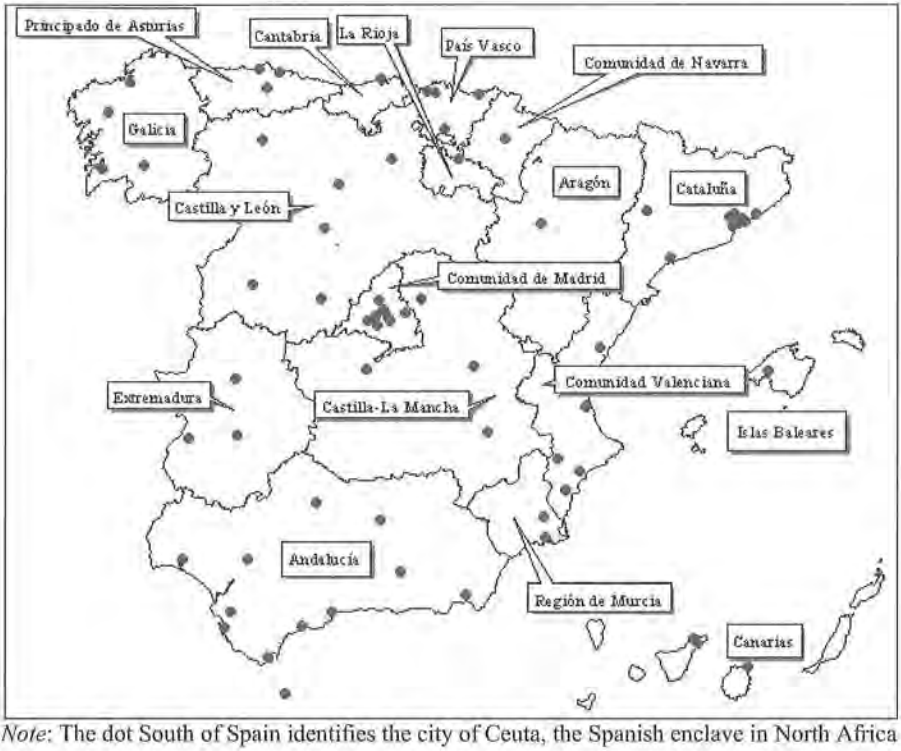
What does seem important to stress is the fact that most Spanish cities are still relatively compact and have high densities compared to cities of northern and western Europe, and certainly North America. So there is a concern that the impact of greater mobility and the new technologies could mean that Spanish cities could experience rapid pressures for de-concentration.

People from fifty eight different cities of various size groups throughout Spain were interviewed: the two largest centres, Madrid and Barcelona; four centres that exceeded 500,000 inhabitants, namely Valencia, Sevilla, Zaragoza and Málaga; fifteen cities between 200,000 and 500,000 inhabitants; twenty three centres over 100,000 inhabitants; ten cities between 50,000 and 100,000 inhabitants; and four cities between 30,000 and 50,000 inhabitants. Figure 1 shows the cities chosen were deliberately distributed around all the regions of the country. The map also includes ten more cities initially included in our research project, all of them exceeding 100,000 inhabitants, but discarded in the quantitative survey stage.

The number of people interviewed in each city was proportional to the population figures, with a maximum of thirty questionnaires allocated to the two biggest cities and a minimum of ten questionnaires to the smallest centres. In all 164 individuals were interviewed. The individuals selected for interview were all involved in urban development, and were either politicians or had technical qualifications in a wide range of occupations affected by the application of ICT—such as planning-urban development, economic development, transportation, environmental experts, people from other municipal departments engaged in the application of information technologies. Table 1 shows the distribution of these people in various employment categories.

It can be seen that over half of the people interviewed were heads of their departments, and one-quarter were sub-unit heads. This means that the survey was dealing with key decision-makers in the various departments; these were people who can reliably assumed to be both informed about ICT impacts and able to help their adoption in the various Spanish cities.

Figure 1.
Cities Used in the Survey



Note: The dot South of Spain identifies the city of Ceuta, the Spanish enclave in North Africa

Table 1.
Administrative Positions of the Respondents

Types	Total number of interviews	Percent	Cumulative Percent
Department Head	90	54.9	54.9
Head of a Sub-unit	35	21.3	76.2
Municipal Employee	16	9.8	86.0
External Consultant	4	2.4	88.4
Politician	19	11.6	100.0
Totals	164	100.0	

Source: TeleCityVision survey data, 2000.

The Major Research Findings

In a report of this size, it is not possible to include the detailed tables of results from the answers to the various questions. These can be found in the full report (TeleCityVision. Spanish National Report, 2001). This survey simply summarizes the principal findings associated with each of the questions and the differences that were found among respondents from different occupations and city sizes.

The Expected Development of Cities through the Introduction of ICT

It was hardly surprising that most of the interviewed people were optimistic about the future of their cities, given the bias associated with their own perception of the image and importance of their city. For example, when they are asked *which of the following developments do you expect in the future,* almost all forecast an increase of the importance of their cities, mainly linked to the potential attraction of new service companies, the processes of co-operation and competition between their city and other cities, as well as the effectiveness of their local environmental protection schemes, leading to an increasing inflow of people. Such predictions must be compared with the theses of different scientists as far as future urban population allocation is concerned. For example, Precedo Ledo (1996) made two predictions: first, that the growth of the central cities will be inversely proportional to their size, the rate of increase goes up while the size diminishes; and second, that "the metropolitan areas and the cities located in less developed regions are the more dynamic, unlike those located in the industrially developed regions".

Another question asked the respondents: *how do you assess the influence of ICT on these developments?* When the answers were compared with those received from the first one it was possible to estimate the extent to which they over- or under-estimated the impact of the Information Society on the process of urban development. In general terms, the interviewed participants, often called 'actors' in this type of survey, attached great importance to ICT for changes linked to the 'importance of urban places', especially for the bigger cities. The respondents thought that ICT would help these cities in their competition with other centres, add to their potential in attracting service companies, as well as maintaining a strong central business district. In short, the changes were anticipated to primarily affect tertiary activities and urban marketing.

However, most of the people interviewed also thought the influence of ICT would be rather positive, providing greater effectiveness for environmental protection. In addition, most people thought that traffic had not sufficiently profited from the ICT potential to monitor and smooth urban traffic. On the other side, the capacity of ICT to attract new residents, to control people's mobility, and to produce such physical and social trends as sub-urbanization and socio-spatial segregation was also clearly underestimated.

These general visions or attitudes can be supported by the predictions of several urban scholars. For example, it has been claimed that the major cities at least have become key dynamic staging points in the global chains of activity (Borja and Castells 1997). They are places with a ceaseless flow of people, money, commodities, ideas, information, and cultural influences. As a result, the cities are

home to the institutions associated with these flows, and are also centres of influence within the chains (Amin and Graham 1999).

However, when the opinions were disaggregated by size of urban place, some differences in the responses were found. Respondents in medium and smaller cities held rather different opinions to those in the bigger nodes. People in small towns were the most reluctant to predict that their centres would increase in importance, whilst their politicians and people working in the Mayor's advisory office were the most optimistic among those interviewed.

Curiously, when the importance of large cities is examined, the responses from people living in cities housing between 50,000 and 99,999 inhabitants and those with less than 50,000 inhabitants forecast the large ones to suffer a decrease in importance. In all these size categories the people in the planning and urban development departments were the most optimistic and politicians the most pessimistic. Most municipal employees held rather conservative positions about the prospect of rank-size urban performance.

People were also asked to estimate the extent of *competition between their own and other cities*. The role of ICT in the process of urban competition or 'urban marketing' was emphatically emphasized. One of the basic conventional beliefs of new neo-liberal practices is that, although cities must compete individually, they can also compete better if they gather in networks. These strategic alliances act in two ways: either through how cities learn about each other's successes and failures, or by the way they mount new initiatives (Thrift 1999). While the prospect of competition among medium and small cities represented a position of moderate concern, similar to those expressed by people from economic departments, the politicians interviewed were the most conscious of competition between cities.

The *potential of the city to attract service companies* was assumed to be positive in most cases. The influence of ICT in this development also deserves greater attention. All these opinions confirmed the neo-liberal position: cities must compete, and compete hard, to secure a better position in the global urban hierarchy. Kanter (1995) succinctly expressed the issue as follows:

> Cosmopolitan companies have the world as their playing field and they choose the world's best places. Communities must determine how to attract support and to keep it in order to ensure a viable economy and quality of life that will link local to global success.

This means that cities must become rather like individuals fostering their workplace careers: they must constantly educate themselves; they must make themselves attractive; they must work on the assets they have and try to develop others; and they must maximize their potential. Then, if they are really lucky, they will be able to make their way to the 'top of the heap', becoming one of the world's 'best cities' (Thrift 1999). The results of the Spanish survey showed that: people in small cities were the most pessimistic about achieving success at this point; people in economic departments kept a conservative profile; whilst the heads of sub-units and politicians were the most optimistic.

The *potential of the city to attract industrial enterprises* did not receive a great deal of attention by the local actors. In this case, the influence of ICT as an attractor of industrial enterprise was also a low-profile finding. The reason seems to be not the lack of ICT potential to attract industrial enterprises, but the reluctance of our interviewees to label their cities as industrial centres either now or in the future. The opinions of our respondents suggested that industrial enterprises that use new ICT innovations will locate in different places, perhaps leaving urban places altogether. Existing cities may not be the first choice locations for the new enterprises.

Contrary to the previous question, people in medium and small cities had the highest expectations about their ability to attract new companies in the future. This is a vision typically expressed by the respondents who were politicians, while people in economic departments displayed more cautious forecasts of development for their own cities.

Another dimension is introduced by a question that asked people about the *potential of their city to attract new residents*. At this point, the answers revealed a certain reluctance, which can be explained by the new territorial order being created by the advance of post-industrial society. These changes suggest there is likely to be a decrease in the spatial inequalities of living standards, because of the diffusion and decentralization of population, activities, and ideas, whilst population growth will decrease. These changes should create wider and more integrated organizational structures, as well as more efficient communication channels and networks.

The influence of ICT on the recovery of a compact city and increasing population densities seems to be poorly assessed. Alvin Toffler, in *The Third Wave* (1985), proposed a vision of a different future, where half-empty office towers are replaced by the return of 'cottage industries' based on the new technologies—similar to those of the pre-industrial age. This view is very different to those expressed by our informants. In addition, Toffler did not anticipate the influence of ICTs upon the recent renaissance of cities in terms of becoming desirable residential areas. The most optimistic views about the potential of their cities to attract new residents were expressed by politicians, as well as by the respondents living in small cities. Those from medium-sized cities and from economic departments expressed moderate expectations; however, people from the planning-urban development fields, and those occupying the position of head of a sub-unit, were the most negative in their opinion about their city's ability to attract new residents.

Questions were also asked about the *importance of the central business district* of cities. In general, the responses showed that most local informants were doubtful that the CBD would increase in importance in the future. Indeed, it seems that the people interviewed in Spanish cities did not support the idea that the strengthening of the CBD in the future depends more on the spatial essence of cities—in the stretched spaces of relational proximity, what has been called the "thickness of co-present interaction" (Boden and Molotch, 1994). This is not a term that is easily comprehended. It seems to imply that the intense and enduring face-to-face interactions within urban space, the features that have always been the focus of central areas, will still occur. But it will co-exist with new flows of communication, as well as greater contact with the broader city and with other centres, not

necessarily those in the same region. People from the medium and small cities in the survey were quite sceptical about this trend, whereas respondents from planning and urban development departments, as well as politicians, thought that central areas would undergo a more dynamic development. On the other hand, people in economic development departments and municipal employees did not think there would be any radical changes in the central areas due to the impact of new ICT innovations.

The answers given to the next two questions were a surprise to the research team. Contrary to current trends, the participants in the survey did *not* forecast any increase in *sub-urbanization* and *socio-spatial segregation* in Spain. These opinions seem to overturn the often-expressed view that ICTs will allow a growth in more distant relationships and contacts, which will replace the traditional fabric of face-to-face social, economic, and cultural exchange that sustains cities and urban life. In other words, it has often been hypothesized that both economic activities and city residents could use the new technologies to decentralize their activities away from cities, as long as they are only 'one click away' from other people, and are accessible via 'online' television and computer screens? The people who responded to this survey in Spain clearly did not accept that this would occur. In addition, the respondents believed that socio-spatial segregation would stabilize, and could even diminish. Nevertheless, the new IC technologies do not appear to have anything to do with an improved socio-spatial integration. Changes in these patterns rely more upon housing and employment policies than upon ICTs to solve the socio-spatial segregation problems of Spanish cities.

People from medium cities thought that suburbanization would be minor. In contrast, people surveyed in the small cities were split between the belief that there would be either no change in socio-spatial segregation, or only a moderate change. Curiously enough, it is people in the planning-urban development departments who showed the greatest support for a reversal of existing patterns in the future, whereas those employed in economic departments were the ones most attached to the idea that increasing suburbanization would occur.

Those surveyed were also asked about a number of specific problems in cities. The majority of the respondents believed that *traffic*, the first problem mentioned in the questionnaire, will only increase at a rather low level in the future—an idea, of course, that can be considered consistent with the idea of recovering a 'compact city' by avoiding greater suburbanization and levels of commuting. The majority opinion was that ICTs would *not* significantly affect these processes. If we trust the results of the questionnaire, it points to the opinion that people in medium sized cities think there will be an increase in traffic. On the other hand, people in economic development departments foresee only a moderate increase in traffic.

The general opinion about the two next problems identified, the *flow of goods* and the *flow of people (mobility),* was that both would be characterized by increases in the future. Curiously, however, it is difficult to see how the respondents can believe that they will be able to control the traffic congestion if the flow of goods and people increases. Moreover, the perception of the influence of ICT on these developments is somehow unclear. Do the surveyed population perceive of

ICTs as a way to control or to increase the flows? However, it does seem that there is a difference between flows of goods and people, for the respondents seemed to believe that goods traffic would be more sensitive to ICTs. Indeed, the attitudes of the surveyed population seemed to reinforce the idea that, rather than simply being replaced by the new technologies, transportation demands at all scales would increase in parallel with the increasing use of telecommunications. Both interact with each other in complex ways, with a general shift towards a highly mobile and communications-intensive society (Graham 1997). However, differences were found between the surveyed groups. People in medium and small cities mainly supported the idea of a moderate increase in both flows of goods as well as people, an opinion shared by people in economic development departments. In contrast, the politicians surveyed support a quite controversial vision of a sustained increase in all types of traffic.

The last question in this general section focused on the *effectiveness of environmental protection in the city*. The problem seemed to create great expectations, in the sense that theories of urban sustainability underlay the idea that the environmental protection would increase and be more affective. In general, the influence of ICT was seen as being rather positive in achieving greater environmental protection. The results showed that only small cities contained a meaningful percentage of people who were hesitant about an increase in this type of development in the future.

Programs and Plans to Improve ICT in the Cities

A meaningful percentage (41.3%) of local informants gave positive responses to the question that asked whether their cities had a formal strategy plan or program on ICT adoption. Among them, 90% (60 questionnaires) were able to define the specific contents of such schemes.

However, when the respondents were asked whether *this strategy, plan, or program reflected a series of urban problem that were subsequently listed,* their answers showed a lack of consistency. This was not only between the general problems of the city underlined in previous questions, such as traffic congestion and the problematic real estate market, but also the targeted goals of their ICT plans. However, there was consistency in one area. Respondents generally thought that the first issue to be dealt with by any ICT strategy plan or program was that of reducing the problem of *unemployment*; the second one was of reducing the *negative image of the city;* and the third was that of solving *traffic congestion*. The lack of demand for some forms of labour in an increasingly globalized economy seemed to be a generally recognized issue, which could lead to the social exclusion of those people without jobs. So the need to foster social cohesion through employment has become a key dimension of local policy. One component of this policy has been the development of intermediate labour markets (ILM). The EU framework for action in this area comes from the 1993 White Paper on *Growth, Competitiveness and Employment*. This document identified the three main components of an employment strategy: first, the promotion of 'pro-active' employment policies; second, through local economic development building on the strengths of the local area and the encouragement of 'small and medium enterprises'; and third, through

new jobs in the environmental sector. These approaches are seen as primary sources for innovation, growth, and job creation.

The second problem identified in the survey was rather surprising. The respondents identified the need for IC technologies to be used to modify or eradicate the negative image of their city. Although this was the second ranked concern, it was a relatively minor one, since only 3.6% of our informants recognized a serious problem of negative image of their cities. This could be resolved by a serious urban marketing strategy.

As far as the various administrative sectors are concerned, the results of the survey were ambivalent; most people in economic departments felt that they did not have any formal strategy plan or programme on ICT development, whereas those actors working as heads of department give the opposite answer.

The next question asked the local actors whether *ICT issues are integrated in any way into the urban master or development plan?* The results here were even more disappointing. If only 41.5% of our informants identified the presence of a formal strategy plan on ICT in their city, those giving a positive answer to the integration of ICT issues into the urban master or development plan hardly reach 39.5% (66 questionnaires).

This low level of opinion about the utility of ICT in current planning means that local actors would be unlikely to provide any reasonable evidence, or even views, about the relations between ICT and urban physical form. During the last few decades much of the debate about telecommunications and urban form has focused on two possible forms of spatial re-structuring (Fathy 1991; Graham and Marvin 1996). One approach has been to argue that telecommunications would dissolve the need of physical proximity between people and services, leading to the inevitable dissolution of the city and the creation of new forms of home-centred life. The second possibility has been based on what amounts to a re-centralization of a few cities, which would increase their power and importance. It is argued that the new telecommunications technologies would only be adopted by the most important urban centres, and would be used to reinforce their own centrality. This would make them the new controllers of information flows. At present, it is difficult to make any firm predictions about what will happen.

In the Spanish case, the role of ICT within the urban master or development plan seems to be mainly restricted to functioning as technical and specialized tools during the urban planning elaboration and management stage. ICT does not seem to be used in the application stage, or the planning process itself, such as identifying expected and/or desired urban development through the use of urban models.

The next question went one step further in an attempt to analyse the possible connections between ICTs, urban physical planning, and urban problems. It asked: *to what extent does the master plan provide any concrete ICT measures regarding a set of specific urban development problems?* There was a the lack of consistency between the main general problems of the Spanish city (the traffic congestion and the problematic real estate market), the problems selected as targeted goals by the ICT strategy plans (unemployment, negative image of the city, and traffic congestion), and those highlighted as the most important problems in this

question (budget deficit and ageing population). It must be noted that in Spain the master plan is a tool devoted to physical planning, and its main function is to classify land as far its legal status, uses, and densities are concerned. Therefore, why do the ICT measures provided by the master plan not focus on physical developments, or at least on both of the two main Spanish urban problems? At the moment we are unable to give a reasonable explanation. People in large cities supported the idea that ICT issues are integrated into the urban master/development plan, while those in small size cities provided the opposite answer. Following a similar pattern, planning-urban development departments display a positive answer, while economic development departments are much more negative.

Local actors were also asked about the existence of ICT projects in their municipalities: I*s your municipality currently running any projects, such as RDT-projects, pilot studies etc. on ICT?* The responses showed there were very few local initiatives in this area. In most medium-sized cities the public sector does *not* play a sufficiently active part in encouraging the use of ICT. As a result, the introduction of, as well as the deployment of, information and communication technologies is largely dependent upon personal initiative and enterprise. This finding led to the proposal of several different initiatives to help speed up the adoption of new technologies.

- First, new policies should be devised to increase the knowledge and the use of ICT by local actors through a multimedia, multilingual approach,
- Second, new policies should involve local actors in the exchange of information on 'Best Practices in ICT Applications', so as to inspire and motivate local actors to actively participate in the Information Society. This would replace the current situation where they often passively awaited the imposition of policies and initiatives. The adoption of a multilingual and multimedia systems approach would also remove linguistic, cultural, and social barriers.

This means that municipal governments and urban development agencies are currently engaged in a race to cope with the radical transformations that are underway in the economic composition and functioning of modern cities. Telecommunications and telematics are now involved as key 'generic technologies' in the attempts of cities to encourage innovation and to compete in all stages of the production process and across all economic sectors. One of the most important results is the way that new telematics-based ways of organizing and covering space and territory have developed, leading to new diversified prospects for cities, and increasing their role as centres of economic activity.

Another question focused on the scope and scale of Spanish ICT policies: *Is there a formal strategy plan, action plan, or program on ICT or the Information Society at national or regional level?* The responses to this question illustrate why Spain appears to be among the latecomers when compared to other countries in the trans-national comparison. Only 14.5% of Spanish informants recognized the existence of a plan at national level, whilst 25.6% thought there was a regional plan. This implies that there is a communication gap between the administrations at a

national-regional level and those at a local or city level. The results mean that the dissemination policies of our national administration in this crucial area can hardly qualify as efficient. Two key questions need to be posed. Why is the Spanish ICT policy so underdeveloped? Why are the levels of knowledge and awareness among the local administrative actors so poor? Virtually nobody who was interviewed quoted the most recent national initiatives, such as the PISTA (*Promotion and Identification of Advanced Telecommunication Services* initiative. The General Communications Secretariat (SGC), the responsible organization for Telecommunications in the Spanish Administration, has the task of identifying and implementing the new opportunities created by the Information Society, so as to reach all the economic sectors and be accessible to the greatest number of citizens. The PISTA initiative is intended to promote the use of new services and advanced applications in telecommunications.

The goal of the PISTA activities is to impulse the effective introduction of multimedia services, overcoming the obstacles derived from an insufficient approximation of the technology *to* the real users. The great PISTA innovation from previous similar projects promoted by the European Union, or by the Spanish Administration, rests in the definition of the needs and applications of services, whose pilots are outlined to be developed. It has been adopted by groups of users, who are committed to use the developments thereafter to satisfy the specified needs.

The next question went one step further, in order to reveal the influence of national or regional plans upon local policies: *does this national/regional plan have any influence on the activities of your municipality?* Bearing in mind the responses to the previous questions, it is not surprising to find that only 23.5% thought that there was an influence. As far as the scope of this influence is concerned, these respondents first mentioned the *organization/co-ordination of local ICT activities*, and followed this by *financial support*. It is possible that the need for financial support has been under-estimated. If we trust the statements of different authors, the funding from governments and other institutions in this area is overwhelmingly of a 'pump-priming' nature, maintaining the existing level, not implementing major changes. Thus, the problem for any local community initiative is finding ways of sustaining it after the initial funding ends. Indeed, the success of an initiative can often be judged by seeing what happens to the project once the funding ends.

City networking seems to be a key element of the new institutional infrastructure and is an important part of the new neo-liberal practices. The value of the practice was assessed by the following question: *identify the networking activities of your city in the field of ICT, i.e. co-operation with other actors.* The answers revealed that the most frequent network activities are *disciplinary networks related to certain departments*, followed by *regional city-networks*. Without any doubt, the Spanish cities have to begin to network more.

Though they must compete individually, cities can also compete better if they gather in networks. These networks are particularly prevalent in Europe, since as Barry (1996) noted: "to participate in Europe, at whatever level, is increasingly a matter of being "on the network". Today there are many inter-city co-operation and association programs, from town-twinning at the lowest level, to various European Union initiatives aimed at creating special networks of European cities.

The Perception of Urban Life Improvement by using ICT

The shift from a welfare state, based on bureaucratic administration and professionalism, to a 'managerial state,' has arisen, in part at least, from the application of business ideas and new technologies to public administration (Clarke and Newman 1997), although they face subtle resistance from the local bureaucracy in Spain. Respondents in small cities, as well as those who were heads of department, agreed with the hypothesis that ICT will change the policy-making process. However, municipal employees disagreed. After the results were cross-tabulated with city size, department and function, it was found that people in small-sized cities, respondents working in planning-urban development, as well as people classified as head of a sub-unit, strongly agreed that implementation of policies would be more efficient with the use of ICT.

Most informants were in agreement with the view that: ICT will improve communication within our city administration. A similar positive response was obtained from the next statement: ICT will improve the ability of our city administration to serve the citizens. Finally, there was an even more enthusiastic endorsement to the statement: ICT will improve citizen access to useful information. These results seem to reinforce Hepworth's (1991) ideas about the emergence of a 'municipal information economy'. To function successfully, urban government relies on the effective use and communication of information about citizens, land plots, buildings, infrastructure networks, and service delivery networks. This means that networks of interlinked computers and computerized equipment offer radically new capabilities for managing and improving the organizational fabric of municipal government. The result is a major re-structuring of the welfare-oriented service structures built up in local government under the post-war 'Keynesian boom', one taking place right across the developed world (Pinch, 1989; Pickvance and Preteceille 1991).

The cross-tabulations of the results by city size, departments and functions, show that people in medium-size cities, those working in the Mayor's advisory office, politicians, and municipal employees, all strongly agreed with the idea that ICT improved communication within their city administration. They also emphasized that it provided their cities with a greater ability to serve citizens. On the other hand, people working in economic development departments only moderately agreed with these statements.

Three additional statements were posed as questions: ICT give the administration better access to public opinion; ICT will lead the administration to take greater account of public opinion in forming policy; and ICT will increase citizen participation in the policy process. The answers to these questions displayed an amazingly different valuation amongst the people interviewed. Their appreciation of the value of ICT decreased proportionately with the degree of citizen involvement. This may imply that the respondents to the questionnaire consider that citizens of their cities are not mature enough to engage in planning and the management of democratic processes. Alternatively, it is possible that they think that ICT innovations are more of a barrier than a bridge to achieve citizen involvement in urban policy. It is possible that the grass-roots movements are more linked with socio-economic and political frameworks than with technological

innovations. The results suggest that the Spanish local actors or respondents still resist the idea that ICT may extend political participation through innovations in 'electronic democracy', so that bringing 'power to people' is still some distance away. Curiously enough, it is the people in small-size cities, as well as people working in politics, who agreed with idea that ICTs will lead government administrations to take greater account of public opinion in forming policy. Those respondents working in economic development departments, as well as politicians, clearly disagreed with the idea.

The idea that telematics may help to overcome, or to deepen the barriers produced by social inequality, is also far from being fully accepted by our informants. Their opinion was sounded out through two statements: *ICT provide all segments of the population with an equal access to education, employment and social services*; and *ICT will increase the gaps between poor and rich*. The first statement can be used as a control question to confirm the previously mentioned influence of ICT on socio-spatial segregation. In this case, the coincidence of opinions is quite clear. The informants attached a low value to the use of ICT in the framework of social integration strategies, and they were not technologically determined. In addition, the answers showed that the role of ICT in the social polarization process was amazingly under-estimated, something that is inconsistent with the way that most current theories argue about the uneven consequences of globalization.

Instead of ICT leading to a total *substitution* of current practices and actions, some theorists suggest that new communication technologies are being subtly *integrated* into older urban structures and ways of doing things, rather than replacing them. *This creates a process of urban evolution rather than urban revolution.* The answers given to the second of the next two statements reinforce this thesis: *ICT enable people to get better access to professional services without living in a city*; and *ICT enable people to get better access to urban cultural life without living in a city*. The great variety of social and cultural activities that overlap to comprise urban life are spatially expressed, and *give their* particular identity to a city. They are expressed in physical forms, such as in ethnic and social clustering, the creation of specialist centres, and the continuous construction and reconstruction of new social and cultural spaces (Amin and Graham 1999). People in the small-sized cities believed that ICT would enable people to gain better access to professional services without living in the large city. Municipal employees showed only a moderate degree of agreement, whereas the heads of sub-units enthusiastically agreed with the statements.

However, if the potential of ICT to reduce mobility was negatively assessed, the attitudes to the next question, about *whether ICT will improve the quality of social relationships,* were even more negative. Most local respondents in Spain expressed the view that the new technologies would *not* improve relationships. This is contrary to the opinions of researchers such as Howard Rheingold, who, in his book *The Virtual Community* (1994), defended the concept of a new 'breed of people' using the Internet to find increased social interaction.

The last question asked whether *ICT will increase the work at home in the city they live in*. This received a high degree of acceptance among the people

interviewed in Spanish cities, even though current research has failed to verify this expectation. Such positive opinions about teleworking has been fuelled by the merging of four major forces: (i) the desire of communities to reduce travel trips as part of the fight against air pollution; (ii) the corporate desire to improve productivity and economics of labour, by reducing stress and the necessity of commuting; (iii) a personal desire to control stress and time; and (iv) the rapid proliferation and acceptance of electronic communication within the business community. An increase in telecommuting in the future is generally considered likely as well as positive, but the actual magnitude of this trend is far from clear at this point.

The Influence of Urban Actors in the Spread of ICT

Different views of the interrelationships between ICT and urban development came from the perceptions of the urban officials who were questioned about the diffusion of ICT. The answers to this series of questions reveal that our informants believed that the most powerful lobby is composed of *private-sector ICTs,* such as Telecom and other companies, followed by *other private investors*, such as banks. Also, the informants clearly agreed that multinational corporations have encouraged the trend towards liberalization and privatization in national telecommunications policies (Irwin and Merenda 1989). Indeed, it is the corporate consumers who are in the vanguard of those who criticize the high costs and obsolete services delivered by national PTT monopolies. The result is that IC technologies are beginning to obtain benefits from a shift from national public telecommunications monopolies, to an integrated and globalized telecommunications 'marketplace' that is directly targeted to meet their needs.

The interviews also showed that the second major influence on the adoption of ICTs was considered to be the *urban municipality*, followed by the *regional authorities.* However, it does seem that acceptance and inclusion of the changes induced by technological development, especially those related to information technologies, would be easier if the citizens were informed of the effects of the technologies within their own communities, and if their points of view on the subject are considered. This means that a debate on these alternatives should be held at the earliest possible stage. Experience shows that the most successful experiences occurred from the initiatives developed by local or regional authorities.

Those interviewed were also asked to rank a series of suggested improvements that could occur by the use of IC technologies, linked to the following question: *as far as your municipality is concerned, to what extent do you agree with the following statements?* This approach tried to provide another way of deriving views about the interrelation between ICT and the urban development, by focusing on the probable influence of urban actors in the spread of ICT. The responses showed that the statement given the first rank dealt with the utility of ICT in urban networking and urban competition, as well as the desire to improve citizen-municipality relations.

The second-ranked response related to aspects of economic development, such as the role of ICT in attracting new enterprises. This was followed by the question about whether ICTs would help make the political-administrative process

more transparent for citizens. Finally, the last places were occupied by the following statements: *that ICT could be deployed in urban planning to improve planner-citizen communications; ICT was too much specialized for the 'unqualified standard' citizens; and ICT-activities had the capacity to influence private sector decisions*. Although arguable, we guess the low ranking of these possibilities mean that the Spaniards interviewed had little confidence that ICT would produce such outcomes.

When the types of ICT strategies and ICT projects were analyzed, 56.7% of the informants assumed that their cities were implementing a systematic and comprehensive ICT policy, while 69.3% thought that ICT policy focused on specific areas, problems, or needs. But when attempts were made to identify the *details* of policies, from questions such as *what is the scope of Spanish ICT policy*, or *identify the goals pursued by the various cities*, only disappointing responses were obtained. These findings pose a number of further questions: Do the Spanish local actors who were interviewed really lack any clear idea about the real problems or needs of their cities, and the way that IC technologies can help manage these urban areas? Are they influenced by the speculations of 'futurists' and 'utopian' theories? Or, are they simply affected by delusions of 'grandeur'? One or more of these influences must have affected opinions, given the contradictory results found in the survey. Only the people interviewed in small cities firmly believed that their local administrations are trying to improve ICT infrastructures, whilst municipal employees moderately agreed with this view. Respondents from the Mayor's advisory office held the opposite opinion; politicians and heads of departments also clearly disagreed with the view that the most remarkable goal of their cities was trying to improve ICT.

At the beginning of the research, we thought that several issues that were used as questions in the survey would top the local agenda, namely: *promoting municipality services via telecommunication networks*, *supplying municipality information via telecommunications networks, such as internet, teletex, telephone and so on*, and *improving telecommunication infrastructures*. This did not prove to be the case. All these issues received low ratings by the people interviewed. So what has happened to the commonly supported view that ICT will improve citizen access to useful information? It leads us to question how the cities can fight the growing unevenness and fragmentation of urban social and economic life if they fail to closely monitor infrastructure developments within their territories, and the technological and political foundations for them (Graham and Marvin 1996). Moreover, the increasingly obsolescent and congested infrastructure networks that exist at present do not fulfil and support the demands created by the new forms of production and organization. Thus, they have contributed towards a wider financial crisis in the public provision of infrastructure services. In response, many local governments have simply divested themselves of responsibility in the provision of the key infrastructure services, through the privatization and liberalization of the infrastructure sector.

The third and fourth ranked goals respectively were associated with two other possible effects of ICT: promoting or supporting teleworking programs; and promoting research about ICT and its effects on the urban systems, environment,

transport, society, etc. Here the goals seem to be more like good intentions than realities. Nevertheless, we must agree that almost every municipality has felt the need to exploit the employment creation opportunities offered by the new information society and to develop the ability of workers to find a job. However, within the present context it is difficult to split what might be called the creation of policies for a 'new information society' from employment policies.

Apparently, the first goal that the respondents emphasized to be pursued is that of *promoting or supporting tele-medicine*. The second place goes to the *promotion or support of tele-education*. These two goals could be labelled as highly unrealistic approaches and even over-ambitious, given the opinion expressed by one expert. Anyway, following the hypothesis of some urban scholars, local governments, given their limited resources, must concentrate on low-cost initiatives within their capacity. This should not extend to major investments in technological infrastructure; rather, supporting the application of telematics services should be the main policy focus (Keating, 1991).

Within municipal departments, opinions about such ideas are clearly split. Those in the Mayor's advisory office enthusiastically agreed with Keating's views, whereas people in economic departments were far more cautious. On the other hand, municipal employees strongly disagreed, which seems to mean they would support major investments by municipalities.

Further down the priority list, the respondents identified the need to promote or support computer availability in public places (schools, community centres, etc.) and to promote ICT use in the planning process. The inequalities in access to telecommunications networks are important because they influence the ability of people to participate in any meaningful fashion within a modern information-based society. For some social groups the availability of computers in public places is the only opportunity they have to get in touch with the new virtual space. This problem has been recognized by some cities where Civic Networks (or Free-Nets) have been created in several different sized cities, such as Tarragona, Barcelona, Terrassa and Cuenca etc. These provide a network of free-access sites for low-wage social groups. The need to promote ICT in the planning process through GIS or other applications was relegated to an eighth-place position by the respondents. This is probably a consequence of its high level of specialization, even within the local administration. However, it must be noted that there are a number of factors that influence access to ICT, namely: technology and service availability, accessible prices, access to technology in a non-discriminatory way, and the acquisition of knowledge necessary to use those technologies.

The next two goals in the priority list were: using ICT in transport planning (intelligent road signs, online traffic information, etc.); and promoting or supporting ICT training (courses for different society groups, programs in schools, courses for municipal employees, etc.). If we compare the answers to these issues with the low valuation that traffic congestion received—given the provision of ICT measures within the master plan—we suggest that transport planning may operate through an isolated management structure, one that is separate from the physical planning of urban areas. The topic of ICT training is basic in order to guarantee the access to Information Society tools. Most scientists and policy-makers agree that public

policies for an information society have to be based on the same series of basic principles on which life in Europe is based: improvement of access to information; progress in democracy and social justice; support in finding jobs; creating opportunities for permanent learning; the capacity to increase sustainable growth and employment; the need to attain and increase equal opportunities among men and women; the fostering of social inclusion and help for people with special needs; and the necessity to improve the quality and the efficiency of public administration.

Municipalities and Intelligent Urban Development

It is widely accepted that the application of new ICTs to cities can provide outstanding benefits. Indeed Graham has argued (2000, 16-17) that the adoption of IC technologies has been used by policy-makers as the most efficient way of obtaining quick results in five different areas.

- Strengthening urban economics.
- Regenerating deprived areas.
- Incorporating urban spaces as privileged platforms for investment.
- Fighting against social polarization.
- Restructuring urban public services, given the possibility of financial shortages deficits.

Although there may be a consensus among urban scholars about such advantages, empirical confirmation of these ideas is still weak. In addition, it is worth noting the reservations recently expressed by Margaret Grieco:

> there has been a rapid emergence over the past two or three years of new technology use in the government, both as an information mechanism and also in terms of delivery services.....(but) ....the scale of *intelligent* urban development is fairly limited.
> (Grieco 2000, 1721).

In view of this situation, it seemed important to investigate the extent to which local political bodies had made sufficient efforts to influence the spread of ICT in their cities, especially for governance and local administration. The results of our research, undertaken in collaboration with our European partners, led to even less optimistic findings than those described by Grieco in her study of the spread of ICT in Singapore and in UK cities. In Spain, the Web coverage of local authorities is not only far from complete, but is far from comprehensive. According to data from the Ministry of Public Administration, only 18.4% of Spanish municipalities had their own Web Page by mid 2001. In addition, few local governments were equipped to consult with their citizens in a continuous and inexpensive way through the new IC technologies. By contrast, it was found that the use of ICT use was far better among neighbourhood organizations and their interaction with local government.

An important question that still needs to be answered is whether the potential benefits of globalized technology will be achieved by the efforts of local

authorities, or whether the "cities are at risk of being left behind" as Muniak (1995, 806) feared in his comments about the Clinton administration's high-tech policy in the U.S.A.—assuming the aim of a such a policy consists of supporting High-Tech economic activities wherever they may occur. Even if one leaves aside the question of the extent to which local authorities must be involved in linking urban ICT strategies as a whole with the development of cities themselves, two other issues deserve attention, namely: the provision of local services, and citizen participation. At present, there are many examples of the way that IC technologies can be used to support grass roots, local economy, and voluntary activities. Although most of the pioneering examples are still in Europe, there is a global spread of these applications. According to one recent publication, the functions of the so-called 'virtual city' can range widely:

> from simple tourist promotion and local databases, to sophisticated spaces which attempt to add coherence to all local activities on the Internet, to widen local access and skills, to open up interactive services for local debates and to develop information and communication services that feed back positively into the development of the home city. (Graham and Marvin 1999, 104-105).

Nevertheless, most of the cities, even in developed countries, are still at the mid-way point between the use of ICT for integrating citizens into administrative activities, and their exclusive use as information boards or marketing windows for the municipal government. Most of the Spanish cities analyzed in our research are still positioned at this latter step, trying to offer useful information to the citizens but lacking interactivity. However, some of the cities are making very serious efforts to climb to higher levels of use, with greater ICT diffusion among their citizens. Unfortunately, there are many difficulties that impede progress: lack of planning in the development of new media outlets (internet, cable, etc.); the lack of a unique institutional body or department responsible for information at a municipal level; and, overall, the absence of a clear idea about which functions should be targeted to achieve a virtual city. These problems represent some of the major constraints in the path of any municipality attempting to fully answer the ICT challenge and fulfill its potential. More specifically, a survey of the Web Sites of major Spanish cities—analyzing their structure, content, and the issues that are dealt with through interactive relations with local administration (still mostly tax paying activities)—did not lead to optimism that rapid and meaningful change will take place in the near future.

Nevertheless, there are some signs of progress in creating integrated communities through local urban ICT networks. Some Spanish municipalities are using their ICT systems to support the integration of their citizens into the Information Society. An active 'Freenet' movement has started in the last two or three years, and has had encouraging results. This has followed the pioneering example of TINET (Tarragona Internet), which is generally considered to be the first attempt to create a virtual community in Spain. From this starting point,

community-based electronic networks are being constructed in many different sized municipalities, from big centres such as Barcelona, to medium cities, such as Salamanca, to small places like Cuenca, as well as at the rural level all over the country. Municipal support is always present, but the local administration has not necessarily been the key agent of innovation. At a national level, the first Spanish Congress on Community Networks will be organized in July 2002, representing an important step in the diffusion of IC technologies and their use (see http://www.aerc.net/programa_cerca.pdf).

Greater relationships between most local administrations in Spain and the emerging Information Society can be seen through the medium to high levels of their web sites, as well as an increase in the numbers of people visiting these sites. Unfortunately, the Web Sites of Spanish cities do not follow a regular logic. The domains range over three addresses (.com, .org, or .es); also, they offer few links with other sites. The level of citizen participation within the municipal Web Sites is either still low, or does not exist, partly due to the simplicity of the available tools, mainly an e-mail address. Recently, some city Web Sites have started to offer wider participation, such as engagement in urban and strategic planning, or the ability of citizens to comment about various aspects of city policy through 'chat sites' on the city web. Other municipalities have introduced opinion surveys on their web sites. It is curious that the municipalities most involved in the citizen participation strategies are mostly small centres, or those with the lowest economic profiles. The decision of these municipalities to develop such functions may be a product of the fact that the smaller centres are more used to closer interaction with their citizens so the function of 'access,' between administration and citizens, is taken more seriously. Finally, it must be noted that only a handful of municipalities offer interactive services, which can often resolve bureaucratic procedures. Although few Spanish cities have progressed this far, the examples that exist do display complex procedures, with an ability to deal with taxes, other payments, building allowances, etc. At present the two best municipal Web Sites, with remarkably advanced interactive tools, are found in the cities of Barcelona and Palencia (Fundación Retevisión 2001). The websites are:

- http://www.bcn.es
- http://www.palencia.com/ayuntamiento/

Conclusions

The results of the interviews showed that key decision makers and administrators in Spanish cities believed that ICTs would play an important part in the future development of cities, especially the large centres, and in the context of the general idea of urban importance. This is why the particular advantages of ICT are stressed—features such as: the competition with other cities, their potential to attract service companies; and to maintain the importance of the CBD. In this focus on competition between cities, the role of ICT appears to be most important for the largest cities, especially among people working in economic departments, with politicians being the most conscious of all in recognizing the need for ICT.

However, not all areas of urban development or urban problems seem to be viewed as benefiting from ICT. The field of environmental protection is not regarded as benefiting from its introduction, while it also seems that the people surveyed were far from clear that traffic will be affected. Other aspects of urban development also seem to be less affected by the development of ICTs—aspects such as: the capacity of attracting new residents and controlling the mobility of people. In addition, it appears that respondents greatly under-estimate the capacity of ICTs to affect important physical and social trends, such as suburbanization and socio-spatial segregation.

Some of the answers given about the implementation of ICT policies within the surveyed municipalities need to be highlighted through an analysis of the frequencies of the various answers. There are clear differences of opinion about whether an integrated ICT policy exists in the surveyed Spanish cities; there is a polarization of answers between those who 'agree' and 'disagree', especially when considering the three levels of analysis: cities, departments, and functions. Questions about specific ICT policies led to positive responses from people in medium-size cities, planning departments, and heads of department.

The answers about the lack of any ICT policy are positive in the case of medium- and small-size cities and in planning and economic departments. The only ones disagreeing with this statement were the politicians.

When the interviewed people were asked whether the municipal administration pursued a goal of ICT improvement by focusing on specific aspects of the new technologies, the answers were usually inconsistent. The answers to questions about implementation of tele-medicine and tele-education showed the deep contradictions between local actors, depending on their function and/or position. In general, the higher the level of responsibility of the person interviewed, the more enthusiastic was their recognition of the need for policies in these areas. Only respondents in small-sized cities clearly agreed that improvement of ICT infrastructures and information systems to citizens will be pursued in the near future.

The opinions of informants were equally inconsistent regarding the usefulness of ICT in different aspects of municipal services and departments. In the case of urban planning, the answers showed the greatest contradictions about the impact of ICT.

When those interviewed were asked if a national or regional plan had something to do with the municipal plan, only those actors with a relevant position, such as people in large cities, planning departments, and politicians, fully agreed with the statement.

This survey has explored the attitudes to the introduction of IC technologies in the Spanish urban system. Not surprisingly, there is a range of responses to the various questions. However, the most general conclusion is the fact that there was a great deal of inconsistency in some of the answers about the effect of IC technologies on cities and their administration and policies. This means that despite the importance of ICTs for future growth, there are often no clear views by public officials about the utility of these innovations, which may mean that the introduction of ICTs could be delayed. Further research on the impact of new

technologies must be complemented by policies to bring these results to the attention of decision-makers in the Spanish urban system through a major publicity scheme—otherwise these new innovations may not achieve their full potential.

References

Amin, A. and S. Graham. 1999. "Cities of Connection and Disconnection", in *Understanding Cities: Movement and Settlement* edited by J. Allen, D. Massey and M. Pryke. Milton Keynes: Open University Press, pp. 7-48.

Barry, A. 1996. "The European Network". *New Formations* 29: 26-38.

Berlin Institut für sozialforschung (Bis). 1998. *Tcv-Telecityvision. Information Society and Urban Development in European Comparison. Technical Annex.* Berlin, 16 p., *mimeo* (different papers and reports about the TeleCityVision project can be consulted in the web site: http://www.bis-berlin.com).

Boden, D. and H. Molotch. 1994. "The Compulsion of Proximity", in *Now/Here: Space, Time and Modernity* edited by R. Friedland and D. Boden. Berkeley: University of California Press, pp. 257-286.

Borja, J. and M. Castell. 1997. *Local y Global. La Gestión de las Ciudades en la Era de la Información*. Madrid: Santillana-Taurus.

Bratzel, S. and L. Dienel. 1999. *National Urban Systems and ICT in Europe: Some Comparative Remarks.* Berlin: Technical University Berlin - Centre for Technology and Society.

Clarke, J. and J. Newman. 1997. *The Managerial State: Power, Politics and Ideology in the Remaking of Social Welfare*. London: Sage.

Fathy, T.A. 1991. *Telecity: Information Technology and its Impact on City Form.* New York: Praeger.

Fundación Retevisión. 2001. *eEspaña - Informe Anual Sobre el Desarrollo de la Sociedad de la Información en España,* Madrid: Fundación Retevisión.

Graham, S. 1997. "Cities in the Real-time Age: The Paradigm Challenge of Telecommunications to the Conception and Planning of Urban Space". *Environment and Planning A*, 29(1): 105-127.

Graham, S. 2000. "Las Telecomunicaciones y el Futuro de las Ciudades: Derribando Mitos". *Revista EURE* XXVI (77): 5-23.

Graham, S. and S. Marvin. 1996. *Telecommunications and the City: Electronic Spaces, Urban Places*. London: Routledge.

Graham, S. and S. Marvin. 1999. "Planning Cybercities? Integrating Telecommunications Into Urban Planning". *Town Planning Review* 70(1): 89-114.

Graham, S. and S. Marvin. 2001. *Splintering Urbanism. Networked Infrastructures, Technological Mobilities, and the Urban Condition.* London: Routledge.

Grieco, M. 2000. "Intelligent Urban Development: The Emergence of 'Wired' Govenment and Administration". *Urban Studies* 37(10): 1719-1721.

Hepworth, M. 1991. "The Municipal Information Economy", in *Cities of the 21st Century* edited by J. Brotchie, M. Batty, P. Hall and P. Newton. London: Longman, pp. 171-178.

Irwin, M. and M. Merenda. 1989. "Corporate Networks, Privatization and State Sovereignty". *Telecommunications Policy* 13(4): 329-335.

Kanter, R.M. 1995. *World Class: Thriving Locally in the Global Economy*. New York: Simon and Schuster.

Keating, M. 1991. *Comparative Urban Politics: Power and the City in the US, Canada, Britain and France*. Aldershot: Elgar.

Muniak, D.C. 1994. "Economic Development, High Technology Policy and America's Cities". *Regional Studies* 28(8): 803-809.

Pickvance, C. and E. Preteceille, eds. 1991. *State Restructuring and Local Power: A Comparative Perspective*. London: Pinter.

Pinch, S. 1989. "The Restructuring Thesis and the Study of Public Services". *Environment and Planning A* 21(7): 905-926.

Precedo Ledo, A. 1996. *Ciudad y Desarrollo Urbano*. Madrid: Síntesis.

Rheingold, H. 1994. *The Virtual Community*. London: Secker and Warburg.

Telecityvision. 2001. Spanish National Report. *First Approach and Conclusions Following the Results of the Quantitative Survey*. Madrid Autonomous University, 119pp., *mimeo*.

Thrift, N. 1999. "Cities and Economic Change: Global Governance", in *Understanding Cities: Movement and Settlement* edited by J. Allen, D. Massey and M. Pryke. Milton Keynes: Open University Press, pp. 271-319.

Toffler, A. 1985. *The Third Wave*. New York: Morrow.

Appendix

TeleCityVision Research Team:

BIS

Berliner Institut für Sozialforschung, – Berlin, Germany.
Frank Helten
f.helten@bis-brelin.com

COMTEC

Communication, Technology and Culture Research Centre, Dublin City University – Dublin, Ireland
Roderick Flynn
Roderick.Flynn@dcu.ie

CTS

Centre for Technology and Society, Norwegian University of Science and Technology –Trondheim, Norway-
Ann Rudinow Sætnan
Ann.r.saetnan@svt.ntnu.no

ESI

The Economic and Social Institute of the Free University Amsterdam – Amsterdam, The Netherlands.
Peter Nijkamp
pnijkamp@econ.vu.nl

ETSIT

ETSI Telecomunicación, Madrid's Polytechnic University – Madrid, Spain.
Santiago Lorente
slorente@etsit.upm.es

UAM

Section of Human Geography, Department of Geography, Madrid's Autonomous University –Madrid, Spain
Manuel Valenzuela & Carmen Vázquez
Manuel.valenzuela@uam.es

ICCR

The Interdisciplinary Centre for Comparative Research in the Social Sciences – Vienna, Austria.
Ronald J. Pohoryles
r.pohoryles@iccr.co.at

THEMA

Théoriser et Modéliser pour Aménager, Université de Franche-Comté Besançon –BesanÇon, France.
Pascal Gillon
Pascal.gillon@univ-fcomte.fr

ZTG

Centre for Technology and Society at the Technical University Berlin – Berlin, Germany.
Leon Hempel
hempel@ztg.tu-berlin.de