TeleCityVision (TCV)

Information Society and Urban Development in European Comparison

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Final Report

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Abstract

The TCV-Telecityvision project has been investigating by means of comprehensive social research how the increasing use of information and communication technologies (ICT) affects the development of cities in Europe. Two hypotheses were examined in detail. The first one aimed to assess the various and heterogeneous degrees of knowledge and acceptance levels of urban administrative and political actors concerning the potential of ICT on urban development. The second one looked at the different approaches, tools and institutional changes of cities to use ICT and to react appropriately to the requirements placed by the information society on cities and to use the opportunities for innovation.

The outcomes of the project could be qualified in terms of domestication and urbanisation of ICTs: Concerning the first hypothesis the perception of ICTs with regard to their meaning to urban development as seen by three types of urban actors shows a differentiated model of adaptation and of efforts to bring into play ICTs on an urban level. Urban politicians are quite enthusiastic about ICT. They express optimistic and sometimes ideologically framed wishes on the interrelation between urban development and ICTs. The type of economic developer, working within communal administration offices, perceives ICTs as a chance to innovate the economic situation of the city. Availability of ICT is a prerequisite of urban and administrative modernisation. Economic developers mainly dispose of latest ICT equipment and in some cases they seek to employ ICT to improve communication by networking with external and internal stakeholders. The third player in this field, members of urban administration working within the field of urban planning and urban development are the one who are supposed to reflect on the socio-spatial interrelation between technology and the city. However, we did not find much evidence that the urbanisation of ICT is really an issue in the perception of urban planners. In this respect we have to underline our observation that there exists a knowledge gap with regard to the urban and mainly spatial applications of ICTs.

The examination of the second hypothesis showed that there is not so much difference between the European countries in terms of how the process of ICT application and diffusion is going on. However we found significant differences with regard to various city types and hereto related ICT policies. It seems that the process of domestication and urbanisation of ICTs as expression of the employment of ICT-policies is not so much influenced by cultural factors. We have to emphasise that it is the type of the city as a special socio-spatial configuration which plays the decisive role to shape and apply adequate ICT-policies. Within the countries researched there is evidence that the big “metropolitan” European cities are all applying sound ICT policies and that e.g. declining industrial cities all over Europe are lagging behind. In terms of a modernisation paradigm we see a growing digital divide which is not oriented between north and south or east and west. It is more the European urban system as a whole wich is differentiated, segmented and reshaped by ICTs and which expresses on the other hand a new structure of digital urban divide.

1. Executive Summary

The research process

Goal of the TCV investigation was to find out how the increasing use of information and communications technologies affects the development of cities in Europe. In the relatively-balanced urban system in Europe, cities are regional centres of innovation. The positive socio-economic development of a European urban system is indispensable to securing work, welfare, and employment, and to keep pace with competition throughout the world.

Opportunities to innovate essentially depend on the strategies of actors in public institutions. The study has examined the following questions:

- How assess the actors of urban development the specific opportunities and risks in this process, and which strategies they use to meet them.
- How do urban actors perceive the impact of the increasing use of information and communications technology on the process of urban development?
- How do they integrate their visions for the future into concrete urban planning strategies?

To answer these questions the TCV project applied a range of research steps including an analysis of recent urban studies and a structural analysis of the European urban system, which were thought of as basic input for the determination of national qualitative case studies. These in turn were conceived of to explore in each participating country and in different city types the perception of ICT and did provide the research staff with further insights and hypotheses into the research area. A first examination of underlying hypotheses was done. At the same time, these work-packages contributed to compile and synthesise a trans-national comparison, reflecting trends, differences and common features regarding agency and perception of urban actors in the field of the shaping of the information society, ICTs and urban development. With regard to these studies, a questionnaire for a quantitative survey was prepared by the co-operation of all members of the consortium. From May 2000 to October 2000 the survey was conducted drawing on around 1550 urban actors within 255 cities of different size and type in the partner countries. The outcome of the survey were laid down in national reports and in a second transnational comparison. However it turned out that the survey was affected - in sense of collecting representative data – by the fact that we had in some cities quite low response rates and high response rate in others producing in this way a remarkable bias. The participants of the project tried to overcome these shortcomings by considerable

efforts to re-distribute questionnaires and to extend the period for answering until October 2000. However this effort remained unsatisfactory as well.

The results of the survey were discussed during a final workshop taking place in May 2001 in Trondheim where the participants agreed to take the quantitative data collected as indicating tendencies of individual perceptions of different urban actors in varying types of European cities.

Finally, the project was successful to organise an international conference taking place in Berlin on December 3-4, 2001 with around fifty participants stemming from research organisations, urban administrations, private companies, representatives from mass-media. At the same time the conference served as contribution to the dissemination of project findings and as interdisciplinary hearing with regard to the presented research efforts and outcomes. The project has contributed to several conferences and some of the partners have already published some of the results. The consortium agreed to prepare a report drawing on the different thematic aspects of the project and suited for publication in 2002.

Summary of project results

The analysis on literature on urban studies clearly showed that there is growing awareness amongst scholars and urban actors on topics which reflect the interrelation of information society and urban development. Since the path-breaking work of Manuel Castells "Informational City" and the writings of William Mitchell on the "City of Bits" and "E-Topia" scholars from different fields of urban research have contributed to gain more insight into a socio-spatial and socio-technical process which can be characterised by being to a good deal invisible and highly accelerated. A very systematic approach covering various urban fields such as housing, culture, safety, planning etc. has been presented by Graham and Marvin in 1996, a contribution which can be judged as a new way of how to look at two interwoven field of urban research: Social space and technology. However, and with regard to the research agenda within the participating country we have to point to the fact that the discourse on urban issues is not so much driven by a clear focus on ICT. There is growing awareness among urban scholars that considerable urban changes appear in nearly every national urban system. Urban effects of socio-spatial as well as socio-econmic changes are broadly discussed, new theoretical models concerning the questions of how the new economy shapes space are invented in order to explain processes of peri-urbanisation and fragmentation etc.. But research addressing the interrelations of the technical, the social and the spatial implications are neglected so far or are restrained to more or less deterministic assumptions. If we want to understand how the information society will be shaped in the city – a prerequisite for the development of ade-

quate policies – we have to look at the processes of informatisation driven by the actors, their visions and strategies in dealing with ICT.

There is a clear lack of empirical data within the various field of applications which made it quite difficult to the consortium to cross-validate the results of the quantitative survey with other data. Due to the fact that the emerging character of ICTs and hereto related applications produce a growing uncertainty on how to assess and judge on ICT the consortium could not maintain the assumption to deliver representative data in a statistical sense. Thus, the results have to be understood in a way that they mirror the perceptions of urban actors and taken as such the data can serve as a sound basis for statements on the actor's perceptions, strategies and actions. These actors are not experts in the observation of the Information Society. But they are experts with regard to urban planning, urban economics affairs and urban politics. Thus, one can gain insights into their expertise on problem perception and on their assessment of the effects of ICT in their professional field.

Going more into details with regard to the perception of the interrelation of ICTs and urban development on the national level, we can state e.g. in *Austria* in 1999 that "the combination of advanced information- and communication technologies and urban development and planning is a fairly new topic in the scientific debate in Austria" (ICCR). The mainstream of publications and studies is focussing on technological opportunities with regard to various fields of urban interest addressing telework, telematics and citizen information systems. The scope and size of possible ICT-applications concentrates on Vienna and on the shaping of new opportunities for regional and rural development. However, a comprehensive discourse has not yet taken place and "publications were dominated by future trends, but hardly provided any results" (ICCR, 9).

This citation can be taken as somehow symptomatic for the research outcomes not only of the literature review but to some extent of the whole project: There exist - spread all over Europe - various projects and approaches how to try to get along with ICT on an urban level. But there is only little approved experience to be found to this end. A consented model or guidelines comparable to the leading character of the Charta from Athens for urban planning are - corresponding to our findings - neither available nor is there any evidence that they will emerge in the near future. It can be argued that due to the pervasive, complex and networking character of ICT in nearly all fields of urban, economic and social activities that it is quite likely that this issue will not emerge at all. On the other hand and as shown in the quantitative survey, the individual perceptions of urban actors towards ICT do not vary considerably, neither on a national nor a European level. But they differ with regard to both to existing professional milieus and to specific city-types. Furthermore it turned out that the judgement on the benefits of ICT seem to vary to a certain degree corresponding to different national cultures.

On the other side and with regard to the European level, the results show a considerable convergence and similar patterns of perception and understandings of various urban actors of the ICT issue all over Europe:

Administrative staff such as urban planners from the more spatial oriented planning departments tends to judge quite sceptical. ICT is seen as a normal force beneath others which shape the urban fabric: ICT is perceived within the context of tertiarisation and the service economy. ICT is not likely to be the future motor of urban development. Some reluctance towards the positive effects of the new economy are stated.

Economic administrative actors who are more struck by the effects of globalisation - are more positive of ICT as these technologies obviously facilitate access to global and local markets by the means of communication and information.

Politicians show much more positive attitudes towards the ICT issue. They are more enthusiastic and more fascinated by the promises of ICT. There is much more belief in ICT: ICT is the slogan of the day, ICT is a cheap policy for politicians to support, ICT is seen more as a promoting tool than a working tool, and self images often surpasses reality. Politicians sell ICT as a solution for social, economic and other problems of the civil society.

However, ICT plans as far as they do exist do not mirror all the problems addressed. They are too technocratic/-deterministic and in a certain sense not comprehensive but more one-dimensional. There is a lack of visions, knowledge and creativity as for the matching of problems with possible ICT-applications.

Comparing these different perceptions of how to implement or assess and judge on ICT, we have to emphasise our observation that the attitudes towards ICT are more shaped by professional milieus and different technological styles which are prevailing in these milieus and by the symbolic meaning of ICT within each professional field. This can be understood in terms of instigating improved models for urban ICT-policies which should negotiate these perceptions in order to produce a more commonly shared vision of ICTs.

With regard to an *interurban level* of networking and co-operation, we found a quite contradictory assessment of ICT: Cities do welcome ICT to enable co-operation with other cities to build up city networks and the like. However, there is a strong fear that the ease of information access may augment competition and will produce strong counterproductive impacts.

There exists a commonly shared vision of respondents of all professional milieus that ICT will trigger more positive effects on interpersonal communication and efficiency of administrative work rather than on space, social, ecological or participatory-democratic issues. ICT cannot solve problems, but can contribute to solve them, e.g. recruiting new firms

and inhabitants. Administrative actors tend to confine ICT as an instrument for economic promotion but they do not care much about the benefits of web-based application such as training and e-learning etc. To this end we have to mention that the Internet is seen as a private subject or a private space dominated by players which are quite far away from urban affairs. Again and as already mentioned before, this widespread attitude of labelling ICTs like the Internet as a more privately and individually used universe indicates that there is only little concern to reflect on how the Internet could be applied in a meaningful and more societal manner for public objectives which meet the needs of the citizens.

In search for explanations for the existence of this picture we may point to the fact that within an evolving field of informatisation and networking caused by a more and more accelerated and diffuse technological development the duration of time to learn how to select, integrate and shape these tools and instruments in order to modernise the mainly urban society has to be extended. We have to be aware of the fact that there is more than one best way to modernise cities by means of ICT in order to get prepared for the future. The project of domestication and urbanisation of ICT has just started and we can state until today – corresponding to different national cultures – that the urban field is more similar to a test-bed for diverging and multifaceted applications which are still in the making. Urban actors with various socio-cultural backgrounds have to explore with much more effort how ICT can be employed in a useful way. Politicians have to understand that it is not enough to conceive of ICT in a more or less ideological way. Much more efforts are needed to understand how social and cultural activities can be supported by ICT. To this end, the social organisation and use of ICT has to be researched more permanently and in a much more detailed way. Furthermore, ICT plans, programs and policies on an urban level should not be restrained to a mere and somehow ideologically framed ICT-policy. They should be understood in a more critical way as a contribution to a modernised cultural and social policy or should help to modernise the mainly urban society itself.

Discussion on the policy implications

Until today there is no clear view how the benefits of ICT could fit into a theory of urban modernisation. On the contrary, the rhetoric of ICT seem to reflect the ideology of modernisation by promising a lot but by not really producing tangible results which contribute to innovate the process of urban development. Bringing down to earth within a social research perspective the reality of how ICTs are used, perceived and promoted by urban actors we can start an initial discussion on the policy implications of the research outcomes.

The first thing to do in order to respond to the challenges of the Information Society with regard to urban development is to stimulate the existing discourse on ICT by reflecting in a more pragmatic way how ICT can contribute to solve existing urban problems such as segregation, ghettoisation, mobility, safety, traffic jams, air pollution, housing problems etc. It is obvious that such a discourse needs a clear orientation in terms of shared visions and values for the European city of the future. Even more important is the fact that the global competition between cities coerces a kind of structural challenge to each city to innovate, to modernise and to rationalise in order to be ready and fit for the big, medium or small-sized enterprise to come, bringing work and money to the city. So, if there is a need to modernise why not beginning by examining the question by which means a better solution to existing problems can be reached taking into account that ICT can help to manage this challenge? As there exists already some knowledge on this issue cities are challenged to co-operate and to find standards on how to overcome those problems.

A second big issue of the discussion can be identified by looking how the potential of ICT with regard to urban problems is conceived of in different professional milieus. As shown above and due to a socio-functional differentiation and diverging orientations within the professional milieus which frame the perception of urban problems and opportunities given by ICT, a need for a more comprehensive restructuring of urban problem solving is evident. The consequences to manage this objective are intertwined with a more integrated perception of urban problems. Urban planners are more concentrating on local issues whereas the department of economic promotion is looking more to national or global issues. Connecting both perspective means e.g. to understand that investors are not only looking for optimised spaces for business and services but also for a adequate infrastructure, for excellent and easy administrative services, for good living and housing conditions etc. On the other hand, it would be not satisfactory at all, if such an integrative approach would only target the needs of new investors. It is equally necessary to explore further chances for the whole population of the city by addressing in a more systematic and collaborative planning approach the questions how the challenges of the Information Society can be overcome by providing access to information, communication, education, training and culture and how the solutions of the problems of the city can be supported by ICT. Comprehensive plans and programs which are tackling these challenges on a urban level are rather an exception. It would be quite helpful if urban politicians would promote the role of ICTs not only in terms of ideologies but if they would care about better financing the ICT-equipment of public institutions or to build up and moderate an exchange forum for urban actors to reflect on the urban condition within an Information Society.

Our last and very basic point addresses the situation within the professional milieus researched. We found that the quality of equipment and use of ICT varies considerably between city types and different professional milieus. In our understanding of this fact it is

quite likely that there is not only need to agree on visions and values or to advance models of more collaborative planning. There is an equal need to give more time to the professional staff to explore and understand the challenges of the Information Society, to get more experienced and knowledgeable about what ICT is good for in the actual situation and which direction and role they may take for future development. It has taken quite a long time until urban actors did understand the impact of the automobile on cities. First they were fascinated by those technologies like LeCorbusier or Walter Gropius just to name a few renowned urbanists. Since some years it turned out that the overall impact of the automobile contributes to a good deal to a fundamental and somehow insane change of the urban structure. Task force groups and integrated planning approaches are looking for better solutions to get along with the anarchic growth of this sector. It is quite likely that the ICT sector will produce similar difficulties if we do not take the chance to look within a more critical and human centred perspective on alternatives of ICT-solutions which are in line with the idea of the European city. But this requires that the professional staff will get the chance and the means to actively participate into this process of social shaping of cities and ICT.

A final remark has to be dedicated to the discussion on further research concepts. Reminding the difficulties we faced to conduct a quantitative survey on a European level we have to state that further research on the issue of the information society and urban development should be done by concentrating more on in depth case studies on different city types. Such an approach would enable us to see with much more precision to the emerging practices and pragmatics of how ICT are perceived, shaped and used. Additionally, case studies would allow for a more realistic assessment and reconstruction of the social shaping dimensions of the driving forces of ICT and would provide more insights to the specific and unique solutions which to be found and applied within the range of the European urban system. As stated above, the urban Information Society which is mainly based on socio-technical networks is still in the midst of a quite early stage of development where several roads for future development seem to be open. To get to know these roads in detail may be a fascinating task for the future.

2. Background and Objectives of the Project

The findings presented in the following chapters grew out of the research project TeleCityVision, funded by the TSER-Programme of the European Commission. The project "TeleCityVision – Information Society and Urban Development in European Comparison" brought together seven research institutes from across Europe[1] and different scientific disciplines.[2] The empirical study aimed to lead to a better understanding of the processes prompted by the shift from an industrial to an informational society as the use and importance of information and communication technologies (ICTs) increase for urban work and communication. In a socio-scientific perspective we assumed that processes of informatisation are not determined by the development of new technologies, but shaped and negotiated by social actors (see Bijker et al. 1989; Weingart 1989).

A central goal of the investigation is to uncover and explain both the potential for, and barriers to, innovation and development. The research project thus aims to support the goal of the overarching structural policies for Europe, with their intention to promote the harmonious development of the different European regions. Encouraging technological development and the expansion of information and communications technology, including the array of services in this area, through both national governments and the European Commission, represents a decisive contribution to positive economic development in Europe.

The research team assumes that the expansion of new information and communications technologies will continue to accelerate in both the economic and private sectors. In this process, the significance of spatial structures will undergo fundamental changes. 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 facility, 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 highly-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 economi-

[1] The project partners were: Berlin Institute for Social Research, Germany; COMTEC at Dublin City University, Ireland; CTS at Norwegian Technical University of Trondheim, Norway; ESI at Free University of Amsterdam, THEMA at University of Franche Comté, France; ETSIT at Polytechnical University of Madrid, Spain; Dept. Geohumana at Free University of Madrid, Spain; Interdisciplinary Centre for Comparative Research in Social Science, Austria/France and ZTG at Technical University of Berlin, Germany

[2] such as Social sciences, geography, economic sciences, spatial planning

cally and socially weaker groups, who continue to rely on the central infrastructures provided by cities, will continue or strengthen.

Even today the consequences of suburbanization processes, as well as ever sharper competition to attract and keep businesses, itself a result of economic globalization and European restructuring and liberalization, present cities and their surrounding regions with grave problems. These difficulties go hand in hand with the general financial crisis in public spending. To our mind, active policies for dealing with the creation of virtual spaces, where urban developers consciously incorporate such spaces in the urban-planning process, could ensure that this development is a positive one for the communities. The spread of the information society could bring not only problems, but also opportunities for improving economic development.

In the European context, it is possible to direct the expansion of information and communications media to meet specific objectives in the constellation of periphery and center in the European Union. Cities in the "less-favored regions" enjoy the same footing as existing centers in terms of their potential access to the information and communications network. Nonetheless we do not know which cities or regions will, in the end, use these possibilities, or which urban-development concepts will be tied to this decision. Presumably this will be closely related to the geographic and economic situation of the cities.

The actors in urban development can be divided into three general groups: 1. public authorities, 2. businesses, and 3. private households. In our study, we focused on the actors in public authorities, particularly the administrative staff within the executive and policy-makers within the legislative. With the ever growing significance of ICT, many experts expect to see greater social differentiation, perhaps even a split in urban society into information-poor and information-rich (e.g. Castells 1997). City administrations and political decision-making bodies face a particular challenge as they struggle to guarantee urban development that is fair to all social groups. The strategies developed by public authorities for dealing with ICT will have a decisive impact on the shape of cities in the information society. City administrations are not objects of a technology-determined development, but rather designers of this process – whether they decide to act or not.

Graham and Marvin have written, “Urban planners, policy-makers and governors are on the ‘front line’ in dealing with the effects of economic globalisation and restructuring; social and spatial polarisation and its associated knock-on effects on unemployment, poverty and crime; the crisis in urban environments and transport and infrastructure; and the physical restructuring of cities” (Graham/Marvin 1996; p. 338). They go on to pose a crucial question: “How can those responsible for planning, managing and governing cities come to term with threats and opportunities posed by telematics?” (Graham/Marvin 1996; p. 338). It thus seemed important to keep in mind Ogburn’s observation (1964) that the diffusion of technology is always accompanied by a cultural lag. The lag suggests, as Fisher and Wright (2001) outline, “that the effects of a technology will not be apparent to

social actors for some time after it is introduced to a society. As such, much of the discourse concerning the Internet [and ICT in general, F.H./B.F.] is ideologically charged, filled as much with the hopes and fears of individual authors as with the reality of the mediums [sic] effects." The notion of cultural lag may be misleading if we disregard the fact that there are various cultures or professional milieus, hence not only one but many cultural lags within any one administrative body or city. Cultural lags always imply that some time will pass until the technology is understood, domesticated or urbanised.

Another goal was to discover differences between what Rogers (1983) called the 'innovators' and 'laggards' in the process of the diffusion of technology – in our case the diffusion of technology in the city via the visions and agency of social actors.

For this reason we thought it was necessary to understand and to analyse how the actors themselves perceive the process of informatisation. What is their own acceptance of ICT? Which strategies do they use in dealing with and applying ICT policies? We will need to answer such questions in order to make necessary changes in future employee training measures and project realisation efforts. Lüdtke has described the challenge as follows: "As seen by the actors, the functions of technology are diffuse in terms of the goals, use values, and secondary effects they pursue and experience, and thus compatible with differing and inconsistent structures of meaning" (Lüdtke 1994; p. 160). Goal of this study is to recognise and distinguish among such structures of meaning. Perhaps these "differing and inconsistent structures of meaning" could explain divergent patterns of behaviour across a variety of urban areas, cities, and European countries.

The project was based on the following working assumptions:

The Actor's Perception Thesis:

Differing levels of knowledge and different perceptions of the interrelations between ICT and urban development among the administrative actors lead them to apply different and sometimes unsuitable strategies.

The Strategy Adequacy Thesis:

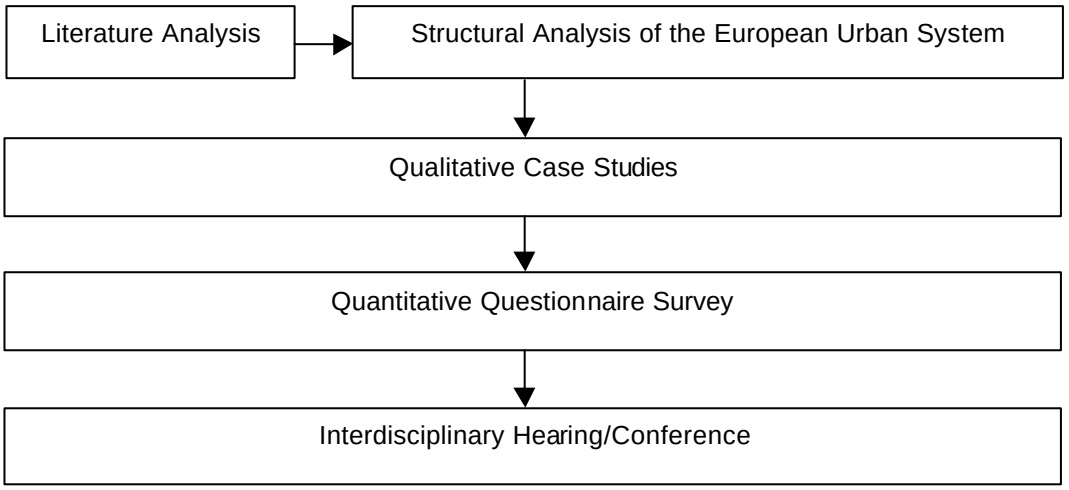
In order to be able to react appropriately to the new demands placed on cities by the information society, and to harness innovation opportunities of ICT, particular ICT policies depend not only on the location and structures of the city, but also on employee knowledge, perceptions, and acceptances.

The research project was subdivided into four steps. Based on a structural analysis of the European urban system, we chose differently-structured cities in each partner country for case study (23 selected cities). Key to these case studies were qualitative interviews conducted with individuals involved in urban planning, economic development, and the

upper legislative organs of the city. After a phase of data-based theorising, the research team checked the hypotheses generated from the case studies in a quantitative investigation. The quantitative questionnaire survey covered 239 cities with a total of 1560 cases.

In a final step, the results were presented to an interdisciplinary group of scholars for their comments and evaluation.

Work packages of the TCV project



The empirical work draws on four levels of comparison: personal attitudes towards ICT, municipal departments, city types as related to city structure, and European countries. The transnational comparison finalised each empirical step of the study.

3. Scientific description of the project results and methodology

3.1 Literature Review

The literature review was conceived to describe the state of the art on information society and urban development. The project consortium agreed to focus the review on the topics listed below:

- publications on the issue ICT and urban development in the national context
- publications on the general trends in urban development in the national context drawing on most recent and most renowned articles and books
- publications on the issue ICT and urban development in European cities
- publications on the development of the European urban system (it should focus on the national publications but also include the known titles from other countries or in other languages)

However, due to the interdisciplinary approach of the project, we have to mention that the topical guideline above has been changed in some cases and according to the disciplinary perspective of the participants. Additionally we have to remark that in Ireland research on information society and urban development has been neglected for quite a long time. Our Irish partner therefore proposed to refer to the few existing works within the description of the structural analysis and the case study related to Ireland.

In the next sections the review outcomes are summarised per country. A bibliography per country is to be found in Annex....

Austria (Sociology)

The combination of advanced information- and communication technologies and urban development and planning is a fairly new topic in the scientific debate in Austria Generally, the existing publications are dominated by the discussion of the technical opportunities of ICTs in various fields that are related to urban development processes, such as telework, citizen information and participation, traffic control and other telematic applications. A general theoretical, political or sociological discourse has not yet taken place apart from some publications with the topic of “global villages” in common.

Among those few publications, the topic ICT is more strongly put into context with regional and rural development. In the field of urban planning and ICT, a concentration on the city of Vienna is noticeable. In the urban planning context, ICTs are mainly discussed as facilitators in the interaction with the citizen.

The discussion clearly was stimulated in the late eighties and early nineties by the introduction of new technologies, whereby various forms of ICT were seen as the driving forces for new socio-economic development, both in a regional and urban context rather than as tools. The publications were dominated by future trends, but hardly provided any results. The topic was adopted both by the social and the technical sciences.

France (Spatial Economy and Urban Geography)

The discussion on information society and urban development in France is embedded into a more general discussion related to theoretical assumptions of the New Urban Economy which provides a more or less static and quite general view on urban processes. Opposite to these reflections there exists a broad discussion and research tradition within the area of urban geography which undergoes today a shift to a more dynamical approach relating cities to urban systems or to urban networks whereas ICTs play a decisive role within the shaping of “intervening opportunities” produced by a dense urban network. Taken as such ICTs are conceived of as mediating variables within a whole set of city building factors.

In urban geographical thinking the current development of the French cities is not so much described by reflections on ICTs but strongly marked by an urban expansion which manifests itself in the appearance of a transitory zone between the urban core and the rural areas. The term 'periurbanization " translates the difficulty to clearly define these intermediate spaces. However, one notes the strong presence of commercial and even industrial zones which develop away from the traditional centres, in particular near major highways.

The consequences of this evolution are getting more and more visible: in addition to the consumption of space, significant individual traffic flows are generated. However : while the low building density does not encourage the servicing of these areas by public transportation, the public policy has completely neglected the development of public transportation. Some studies have been trying to find solutions in order to reduce the use of the car by political means such as densification or widening pedestrian zones in the cities, reducing the number of parking spaces or creating new systems of public transportation. As a result, certain cities have reintroduced the tram or other systems (light rail) and for peripheral zones, public transportation is being developed on a by-request basis. Other ideas are directed rather towards land planning and with regard to an “emergent city approach” striving for developing solutions that are based on the socio-economic reality of the inhabitants of zones.

Finally the dysfunction observed in these spaces is also related to the territorial divisions which were almost never modified in France, contrary to other European countries which

were affected gradually by administrative reforms. New methods of inter-community management supported by ICTs are currently proposed to gather the community in order to jointly affect an orientation of the policy of installation.

Germany (Sociology, Political Sciences., Urban Planning)

In Germany different scientific disciplines deal with the subject of information society urban development. Among them are sociology, geography, architecture, spatial planning, economics, science of transportation, communication and politics. There exists a rich theoretical framework and some interesting hypothesis of how to assess the interrelations between technology and the city. On the other hand there is a remarkable lack of empirical studies on the mentioned interplay between technology, space, social patterns of interaction and urban planning. According to some scholars this lack is created by the "hidden dimensions" or the "invisibility" of the changing technological forces as well as by a somehow distorted understanding of the economic, technological and social forces of urban development. Nevertheless, the literature reviewed on this topic shows that there is an emerging interest, a well defined outline of problems and some interesting ideas and research agendas of how to asses the impact and the interrelations of technology and space. On the other hand only very little empirical research-outcome is available showing the influence of technology on urban actors and space and vice versa.

The Netherlands (Urban Economy and Planning)

ICTs are widely accepted as a potentially beneficial technologies which could improve welfare and contribute to economic growth without jeopardising the sustainability of the environment. The concept of “information society” and other similar labels stimulated many visionary reports, plans and some research. The promises of ICT range over many aspects of society. For example:

- The transition to an information economy, which lead many economist to support and encourage the development of ICT as a tool for attaining economic development.
- The substitution of travel by telecommunications
- The improved access of peripheral areas to central places and services by means of telecommunications
- The realisation of the urban benefits of ICT by providing adequate infrastructures and services to private households, firms and public institutions.

The transition into an Information Society led also urban planners in the Netherlands to seek for new conceptual framework to urban planning. The city of the future will be a

network-city where applications of ICTs support many aspects of the urban activities and services and where the traditional model of development of the industrial city based on the dichotomy of centre and periphery will become obsolete.

The network-city requires the development of new concepts and strategies for the design of future urban setting. An interesting design studio experience is currently taking place in the Netherlands, at the faculty of Architecture of the Delft University of Technology under the initiative of the Spatial Planning Group and the Dutch Ministry of Spatial Planning, Housing and Environment (VROM). The project suggests some new planning concepts for different planning hierarchies, from the office building of the future and alternative residential setting, up to possible development at a wider scale.

These projects try to combine the urban planning with ICTs expected phenomena such as tele-working (adds new function to the home), tele-centres, the "network-office", where the office is no longer the only location from where work activities can be performed. Another project suggests new strategy for urban extension and relations between urban and rural areas.

Another Dutch governmental ICTs policies that relate to the stimulation of Information Society application and have indirect effect on the urban system through urban activities, concern with ICTs policies in education, government services, health services and tele-working. As these policies try to encourage and stimulate the use of ICTs applications, it suggests new activities pattern and different urban dynamics.

The next contribution differs considerably from those presented by all other partners. Our Norwegian colleagues, facing that there are only minor publication activities on information society and urban development, stressed the question how the discourse on this topic is going on in Norway. The summary below reflects some of their findings covering to some extent the state of the art of the actual debate.

Norway (Sociology)

In search of a discourse on IT and urban development, we found that, to the extent urban planning discourses addressed ICTs at all, they addressed them in terms of long-standing discourses on job acquisition, planning tools, or transportation and ecology. And even within these established discourse themes, we found very little on ICTs. Our analysis focuses on *White Papers*, *contract research reports, academic thesis, and articles in jounals in the urban planning field.*

White Papers: are official government statements of proposed policies. They tend to be presented with some fanfare via press conferences and receive some media attention around the time of their release. The two White Papers which address ICT issues both represent continuity in the general cultural and political defensiveness towards urban culture and urban problems and consistently argue for using ICTs to achieve and main-

tain decentralization in production and population. Small towns and rural communities are to be given priority; large cities are to be discouraged.

Contract research reports: Not all the reports were available through library loan or traceable through library search systems. Though brief, these reports represent a fairly demanding genre to read. Methodology discussions, data tables, and "data-crunching" analyses all presume some research training on the part of the reader. And as readers with research training, we found some of them to be fairly unconvincing in their methodologies and analyses.

Thesis: In some ways, the work that offered most promise of stimulating urban planning debate was Nøstvik's M.E. thesis. The thesis is quite thorough in its discussions of urban form, commuting, and distance work. Thus it would provide a solid basis for informed debate. In spite of its academic purpose, it is popularizing in style and easy to read. It is also an attractive book, in the style of much architectural literature, with a "painterly" layout and illustrations on every page. But, being a mere thesis, it is only available in one or two library copies and lacks the authority of a published book or government report.

A*rticles from journals in the urban planning field*: these represent the discourse that has been engendered as well as being potential turning points in that discourse. This brings us full circle – what we see is a handful of articles which introduce ICTs into the margins of established themes in urban planning discourse, without changing the current directions of that discourse. In other words, we see a discourse reproducing itself in spite of the introduction of some new information.

Spain (Sociology and Urban Geography)

The Spanish literature review on current trends in Spanish urban development covers five main areas: the *settlement network*, drawing on modifications of the urban system during the post-industrial transition; *population and social problems*, focussing on both the dynamics of the Spanish urban population and the Spanish population allocation patterns which finally are leading to a combination of socio-economic spatial segregation and dysfunctional segregation derived from the age structure. The third issue deals with *urban structure and morphological changes* covering various aspects of the crisis of the city and dealing with tertiarisation, gentrification, fragmentation, marginalisation and the renucleation of work, housing and leisure as enabled by telecommunications. The *economic background* is a further subject of the review and addresses questions related to urban changes triggered by the appearance of the new economy and its cousins the global or internationalised city. Finally, the literature on *interrelations between ICTs and planning* are reviewed showing that the discussion about ICTs and urban and regional

planning have been neglected and that there is only little awareness to this emerging field of socio-technical changes.

Conclusion: The literature analysis shows a heterogeneous picture of studies undertaken so far to come to terms with the interrelations of urban development, information society and ICTs. There is advanced knowledge concerning the explanation and description of urban change within the European urban system in the field of more classical urban studies. There are some contributions which deal with globalisation effects triggered by the new economy and by processes of tertiarisation, de-industrialisation, peri-urbanisation, inner city crisis etc. However, studies concerning the interrelations of technologies and especially of ICTs and the city are only coming up very recently and in highly specialised field. There is a considerable lack of empirical data concerning the ongoing process of informatisation of both the city and the planning process. There is a special need for more in depth case studies on cities which correspond to the dynamic character not only of the varying spatial forms emerging by the challenges of the new economy but also by the new forms of living and working caused by the more or less hidden dimension of the informatisation process.

3.2 The Structure of the European Urban System

The pivotal objective of the EU-Project „TeleCityVision. Information Society and Urban Development in Europe“ is to investigate how the increasing use of information and communication technologies (ICT) affects the development of cities in Europe. The project pays special attention to the perceptions and strategies of administrative actors in European cities. 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 with respect to ICT and urban life are investigated in a first step. For this purpose, a structural analysis of the national urban systems in France, Spain, Germany, the Netherlands, Ireland, Austria and Norway is carried out.[1] Keeping the results of the different national urban systems in mind, this chapter compares national urban systems and their relation to ICT and urban development, focusing on the following questions:

- What are major structural similarities and differences of the investigated urban systems, which are able to explain different ICT developments?
- Can we identify national or regional patterns of urban and ICT-development?
- Can we, on the other hand, identify a European pattern of urbanisation, which is different form urban systems out of Europe? Can the relative importance of national versus international trends and factors be assessed?

In order to answer these questions, we have to identify the different categories for comparison. In a first step, some features of the current state of national urban systems are presented, focusing on socio-economic trends and on patterns of the legal and institutional framework. In a second step, the spatial development in European cities and regions is delineated, paying special attention to the possible impacts of ICT. The patterns of interaction between ICT and various aspects of urban life in European countries are summarised in a third step. In a fourth step, a typology of European cities is outlined to provide a basis for comparison. Lastly, some hypotheses about the future development of the European urban system are presented, keeping in mind the enlargement and integration processes of the European Union.

3.2.1 State and Development of the European Urban System

Current State of National Urban Systems in Europe

For assessing the impacts of ICT on urban development and the perceptions and strategies of public actors in European cities, it is necessary to have a look at the current state of the urban system in Europe. There are different criteria along which the characteristics of the European urban system are outlined. For the purpose of this study, we mainly focus on demographic and socio-economic factors, but also on the legal and political framework of urban and regional planning. As the project partners described each national urban system in more detail, we will

[1] See Gillon/Caro/Frankhauser 1999; Lorente/Valenzuela/Vázques 1999; Cohen/Nijkamp 1999; Helten/Fischer 1999; Lagran 1999; Flynn/Preston 1999; Tronner/Pohoryles 1999.

confine ourselves in the following to merely outline the main characteristics of the *European* urban system.

Social-Economic Trends of Urban Agglomerations in Europe

Some spatial economists outlined economic maps of Europe which are based mainly on assessment of factors concerning competition and location qualities. Criteria of these spatial assessment models are regional economic structure, geographic location and accessibility (infrastructure, centrality), and location quality (qualification of the workforce, universities, housing, vacant industrial and commercial areas). Using these traditional approaches of regional science, it is possible to identify growth regions (see Krätke 1995: 133; Schätzl 1993: 18 ff.; Sternberg 1993, Chesire/Hay 1989; Chesire 1990; Hall/Hay 1980).

Growth Regions in Europe

Many studies have dealt with the stability of economic discrepancies between and within EU countries. Though the gross domestic product (GDP) per capita (measured in Purchasing Power Standards) in 1995 is above EU-average (EU-15: 17.277) in Norway, Denmark, Austria, Germany and France, economic power is distributed unevenly within these countries. Comparing economic strength of EU regions, Dunford (1992) finds that half the regions with most economic power situated in Western Germany, while the others are in metropolitan regions of France, England, the Netherlands and Denmark. The poorest regions are located on the periphery of the EU and include virtually all regions of Greece and Portugal, large parts of Spain and Southern Italy. Though the difference between the ten richest and the ten poorest regions (NUTS 2) remained virtually the same between 1980 and 1990, some regions had rather high rates of economic growth per capita, especially Ireland, the south-east of Spain and some regions in Portugal (Schätzl 1993: 21 f.). But on the whole, regional disparities have not changed substantially during the 80s. They also exist in the „richer" countries like Germany, Italy and France. In Germany and Great Britain, there is economically a South-North-divide whereas in Italy, there is a sharp North-South divide.

In Europe there are two strong zones or axes of economic growth, which comprise the richest regions in Europe (see figure 1; Dunford/Kafkalas 1992: 24 ff.). The North-South axis, which is called the „blue banana", expands from South-England to the Randstad in Holland, the Rhine-Main and Rhine-Neckar region, and ends in North-Italy. It comprises established and aspiring metropolises like London, Frankfurt, Stuttgart, Munich and Milan as well as old industrial regions like Manchester/Liverpool and the Ruhr-area. The second economic field of force is the East-West-axis, called the „Sunbelt region", which is younger and less unfolded still. It reaches from the Toscana in North-Italy and South of France to the East of Spain, including metropolises like Barcelona, Valencia, Lyon-Grenoble, Nice, and Milan (Schätzl 1993: 22; Eurostat 1996: 211; Krätke 1995: 132; see also Chesire 1990).

Figure 1: The European axes of economic growth[2]

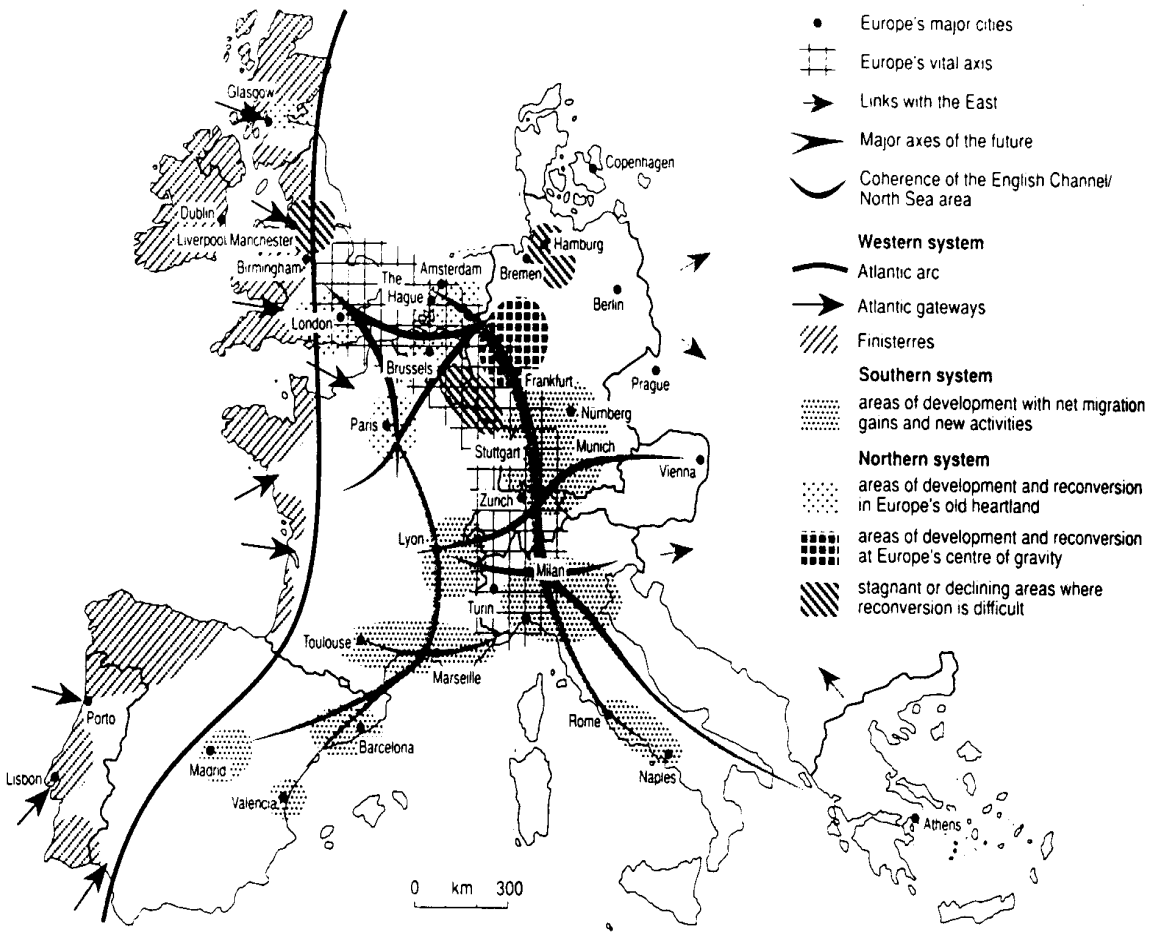


Figure 1.4 Europe's major axis

After the re-unification of Germany and the opening of Eastern European borders, new economic axes could develop. Due to the envisaged integration of Eastern European states like Poland, Hungary and the Czech Republic into the EU, new developing axes could mature, stretching from Paris to the Ruhr-area and to Berlin and Warsaw, from the Ruhr-area to Leipzig and Prague, or from Munich to Vienna and Budapest. City regions like Vienna, Prague and Budapest are said to have a bridge-head function. With the integration of the Scandinavian countries a new North-South axis in the East of Europe could evolve, stretching from Stockholm over Copenhagen, Berlin, Prague, Vienna to Budapest (Dunford/Kafkalas 1992: 24 ff.; Krätke 1995: 136).

[2] Source: Dunford/Kafkalas 1992

The models of a banana belt or other axes of growth imply, however, that the importance of national states is decreasing, while the interrelations between rich regions seem to become more relevant (Dunford/Kafkalas 1992: 14-17). The axes of economic growth are transnational and thus beloved by proponents of the European Union.

Regional and Urban Trends in the TCV-Project Countries

Focussing on the 7 European countries examined in the TCV-project, the high degree of diversity concerning social-economic structures is especially striking (see table 1). GDP in Norway (NOR), Austria (A), Germany (D), the Netherlands (NL) and France (F) is above EU-average, whereas in Ireland (IRL) and markedly in Spain (E) it is well below EU-average. Population figures in these countries range from 3.5 million in Ireland to more than 80 million in Germany. Whereas Ireland and Norway have only one city with more than 500.000 inhabitants, France and Germany have 7 respectively 12 cities of this size.

Table 1: Structural Features of the Urban System in selected European Countries (1995)

Country	**Pop.**	**GDP**	**Regions**			**City Structure**	
	(in Mio.)	**per Capta**	**NUTS 1** Level 1	**NUTS 2** Level 2	**NUTS 3** Level 3	**No. of cities > 500.000 inh.**	**percent of pop.**
Austria	8	19.426	3 (Gebiete)	9 (Länder)	35 (Regionen)	1	20 %
France	58	18.511	8 (Zeat) 1 (DOM)	22 (Régions) 4 (DOM)	96 (Dept) 4 (DOM)	7	25 %
Germany	81,5	18.892	16 (Länder)	40 (Reg.-bezirke)	543 (Kreise)	12	15 %
Ireland	3,5	16.357	1	1	4 (Planning regions)	1	26 %
Spain	39,2	13.213	7 (Agrupacion des comunidades autonomas)	17 (C.A.) 1 (Ceuta y Mellila	50 Provincias 1 (Ceuta y Mellila	6	?
Netherlands	15,4	17.913	4 (Landsdelen)	12 (Provincies)	40 (C.O.R.O.P.-Regios)	2	9 %
Norway	4,3	21.518			19 (counties)	1	10 %
EU-15	371,6	17.277					

Source: Eurostat 1996: Jahrbuch '96; structural analysis of the various case studies of the TCV-project

Keeping this diversity in mind, the following text tries outlines some socio-economic features of the urban system in these countries. Demography, economic and social structure and infrastructure will be emphasised. In the information society, physical infrastructure or spatial accessibility still seem to remain an important factor for economic growth and development of cities (Häusermann 1997: 98; Sassen 1996: 60; see chapter 2.2). Unfortunately, national

statistics on urban systems in different countries are often based on different definitions, which makes comparison sometimes rather difficult.

France is a markedly centralised country. It is characterised by the dominant size of its capital Paris (9,3 Mio. inhab.) and the lack of other cities with more than a million inhabitants. A special feature of its urban system is an over-representation of small and medium-sized towns. More than 16 percent of the population live in towns with less than 20.000 inhabitants. More than 80 percent of employment is concentrated in urban areas (consisting of an urban centre, incorporating rural communes or urban units where at least 40 percent of the active population travels to the urban centre to work). The national urban system in France is also marked by intense economic specialisation. The economy is dominated by Paris, which can be classified as a global city. Practically all financial services and the broadest range of high-graded business services are located in Paris. Industrial cities, especially automobile and mechanical construction are mostly situated in the North and North-east of France, whereas naval and aeronautic construction is mainly situated in coastal areas, far from Eastern borders (e.g. Toulouse). The coastal areas of the south-east of France are marked by an over-representation of office workers and government employees. There is a great gap of income between Paris and the rest of the country. Incomes are relatively low in the South of France and in small towns, notably in the south-west, where the population generally copes with a lower level of qualification. Remarkably, Paris and the Isle-the-France regions are the parts of France with the youngest population. France is one of the forerunners in Europe equipped with a dense high speed rail network (TGV) connecting Paris and various large towns in France as well as Belgium (Bruxelles) and Netherlands (Amsterdam), Western-Germany (Cologne) and Northern Italy (Milan) (for more detailed information about structural analysis of urban system of France: see Gillon et al. 1999).

Germany is a markedly decentralised country consisting of 16 federal states and 4 metropolises between 900.000 and 3.5 Million inhabitants. About one third of the population lives in 84 cities with more 100.000 inhabitants. After 1949, an economical south-north divide evolved, which has been superimposed by a markedly west-east divide since reunification. GDP per capita is lowest in the east, highest in urban agglomerations in the South (Frankfurt, Munich, Stuttgart), but also in Düsseldorf in the West and Hamburg in the North of Germany. There, GDP per capita partly is three times higher than in East-German counterparts, but it is also still remarkably low in Berlin, which is the largest and most densely populated city in Germany. The West-East disparity is still more significant if one looks at the rate of unemployment, which is about 9 percent in the West and about 15 percent in most of the cities in the East. The German urban system is characterised by a kind of economic specialisation, whereby some cities take over specific functions which expand to the whole agglomeration. There are old industrial cities like Bochum and Gelsenkirchen in the West, media cities like Cologne, financial cities like Frankfurt, cities dominated by chemical industries like Ludwigshafen and Leverkusen, and automobile cities like Wolfsburg. Especially cities in the South of Germany, like Frankfurt, Stuttgart and Munich, have benefited from the ongoing process of tertiarisation. Although Germany lacks a real „global city“ - according to Krätke classification (see below)-, it has several European metropolitan city regions like Frankfurt, Munich, Hamburg and Berlin. The German Deutsche Bahn AG spends a lot of money on upgrading its high speed rail network, which connects virtually all of the large agglomerations.

Germany also has a dense motorway network which is still being expanded, especially in Eastern Germany. However, the degree of motorization is among the highest in Europe exceeding 510 cars/ 1000 inhabitants (for more detailed information about structural analysis of urban system of Germany: see Helten/Fischer 1999).

The Netherlands is the most densely populated country in Europe, but only two cities have more than 500.000 inhabitants, namely Amsterdam (720.000) and Rotterdam (590.000). Discussing the Dutch urban system, it is important to distinguish between the Western area, known as the Randstad, and the remainder of the country. The Randstad is an area which has been urbanised for centuries and containing the four largest cities (Amsterdam, Rotterdam, The Hague, Utrecht). Referring to its size of 6,000 square km, the Randstad can be compared to Greater London and Paris. Half of the Netherland's economy is located in the Randstad, comprising 46 percent of the GDP and 47 percent of the total number of employees. The shares of wholesale trade, transport, business, and financial services employment are higher in the Randstad, compared to the country as a whole, whereas the share of agriculture and industrial employment is lower. A high rate of more than 74 percent of the total employees work in the service sector (EU-15: 64%), only 24 percent in the industrial (EU-15: 30%) and only 1.6 percent in the agricultural sector (EU-15: 5%)). The Netherlands have an extensive rail network, comprising of more than 2,800 km, especially in the Randstad region, but also a dense highway network. Schiphol airport, near Amsterdam, is a high ranking international airport. Furthermore, the country has the highest car density per square km in the world, the density is highest in the Randstad. On the other hand, car ownership is about 370 private cars/capita, which is low compared to the EU-average (430 cars/ 1.000 inh.) (for more detailed information about structural analysis of urban system of the Netherlands: see Cohen/Nijkamp 1999).

Austria is a rather decentralised country in terms of legislation and administratively, comprising of 9 federal states. It has one big city, the capital Vienna, with more than 1,6 Mio. inhabitants. Characteristically the largest centres (between 50,000 and 500,000 inhabitants) comprise only 11,6 percent of the population, but 50 percent of the Austrian population lives either in Vienna or in rather small cities between 3,000 and 20,000 inhabitants. Though the urban system of Austria is fairly balanced, three regional clusters can be distinguished: First, the most dynamic regions in terms of job creation are along the east-west corridor, which includes 30 cities. Second, the Mur-Mürz corridor comprising 11 cities, which have all been affected by structural changes in the economy, particularly those marked by steel and coal mining. Third, the northern regions of Lower Austria, which is an agricultural area, contains 26 cities. These cities suffer from decrease of the agricultural sector and from there peripheral position close to the former iron curtain. Austria has a highly developed road and rail network, each federal capital city (except 1) has its own airport. The most advanced transport link can be found along the Danube corridor, which links - among others - the metropolitan areas of Vienna, Linz and Salzburg (for more detailed information about structural analysis of urban system of Austria: see Tronner/Pohoryles 1999).

Norway is politically and economically dominated by its capital Oslo. Oslo is the largest city comprising 502.000 inhabitants within the municipality, respectively 741.000 in the urban agglomeration. 4 further cities contain between 100,000 and 239,000 inhabitants. The Norwegian

economy has a marked service orientation, mirrored in the fact that 77 percent of the employees are working in the service sector. Production-oriented services are mainly situated in urban regions like Oslo, Trondheim, and Bergen, household-oriented services on the contrary are spread over the country. Resource-based industries are localised in agricultural areas or in the periphery (mining towns). The traditional industry is also mainly localised in rural areas (production of consumption goods). Though having a problematic geography in terms of infrastructure, Norway puts a lot of emphasis on connecting the peripheral to the central areas, which includes extending and upgrading road (in the city and in the country), railway, airport as well as telecommunication infrastructure. The most important project of the previous years was the new airport Gardermoen, near Oslo, which implied the development of connecting roads and a new high speed railway line between Oslo and airport. The railway network is widespread especially in the South-eastern part of Norway, but speed is low. Furthermore, Norway is one of the most developed countries in the world in terms of telecommunication infrastructure, which is rather evenly distributed around the country (for more detailed information about structural analysis of urban system of Norway: see Lagran et al. 1999).

Ireland is politically and economically rather centralised. The national urban system is dominated by the capital city Dublin, containing about 950.000 inhabitants (Greater Dublin Area), which in turn accounts for over a quarter of the Irish population. In the Irish economy the service sector accounts for half of the GDP and 62 percent of the total employment. 27 percent of the people are working in the industrial sector and 10 percent in the agricultural sector. A high proportion of financial and business services is concentrated in the Greater Dublin Area. Nevertheless, Dublin's dominance in the Irish urban system is especially grounded in its political and administrative role. Also Dublin is the hub of the national road, railway and telecommunication network. However, Ireland's infrastructure is dominated by road. It possesses an extensive system of public roads, having roughly twice as many km of road per capita compared to Belgium, Denmark and France. In comparison, railway network is far less developed. Ireland has four airports, of which the Dublin one accounts for about 80 percent of the total passengers.

Spain is the least wealthy country within the TCV-project, its GDP amounting to 70 percent of the EU-average. The Spanish urban system is organised in a hierarchical way. Defining a two-headed system, Spain is dominated by the two big urban agglomerations of Madrid and Barcelona which both comprise over 3 Mio. inhabitants. In these cities, virtually all high-ranking political and economic functions are concentrated. Madrid hosts the national government and about half of the headquarters of the 500 leading enterprises in Spain, whereas Barcelona hosts further 25 percent of headquarters. The North-east of the country is the most dynamic economic area, embracing - next to Madrid and Barcelona - important regional cities like Bilbao, Valencia and Zaragoza. Moving away from this area, the economic structure is less developed. Public infrastructure projects still concentrate on highway building programmes. All Spanish cities are facing the needs of an increasing car mobility. Especially in urban areas efforts were made to upgrade and extend the public transport network.

Summary

In summing up these structural characteristics, one has to concede that there is a high degree of socio-economic diversity of urban systems both between and within the countries in consideration. Some countries like France or Ireland have economically and politically/administratively rather centralised urban systems, whereas others, like Germany, are rather decentralised, features which are also mirrored in the legal and institutional framework (see below). It will be an interesting question, whether these different organisational principles matter for the process of ICT and urban development. Another differential of relevance concerning the European urban system is that some cities are located within important economic growth regions whereas others are located more in the economic periphery of Europe. When selecting cities for case studies in each country, this aspect has to be taken into account. Thereby it is of relevance whether economically respectively geographically peripheral regions can perform relatively better in the information society than their central counterparts, where (spatial) distance plays a minor role ostensibly (Are there „winners" and „losers" of ICT concerning geographical locations?).

Legal and Institutional Framework of Urban and Regional Planning

Corresponding to the outlined economic and functional disparities of the various national urban systems, the legal and institutional framework of urban and regional planning in Europe is quite diverse. A brief summary of the various characteristics of urban and regional planning is presented in table 2 below. As indicated above, there are, on the one hand, rather centralised systems like in France, Norway or the Netherlands, in which the central state authorities are major actors of urban and regional planning. On the other hand, there are decentralised national planning systems like in Germany and Austria, in which federal states have major responsibilities whereas the national levels play a rather limited role. But in every planning system the municipalities have major responsibilities for land use planning within their territories.

Urban and regional planning in the European countries in consideration is also based on rather different regulatory traditions. One can distinguish between more active styles of planning and more passive or market-oriented styles of planning. The Netherlands for instance have a marked proactive orientation towards physical planning of the country, whereby soil is seen as a scarce resource. The land market is strongly regulated by public actors of different administrative levels, which also participate themselves in the land market. Regional and urban planning has a rather medium and long-term focus and is based on overall effective planning goals. On the other hand, Ireland and Norway have no such planning traditions. Until the 80s, spatial planning there was rather passive and market-driven.

The various countries also have different institutional capacities for integrated spatial planning of urban regions. In Germany, for instance, conflICT often arise between the core city and suburban communities in urban planning matters. Urban regions run into institutional planning blockades: Each municipality is interested in attracting private investors in order to increase municipal income through taxes. Offering more attractive spatial and financial conditions, suburban communities attract private investors at the expense of core cities. These investments often produce external costs (e.g. ecological problems). Furthermore, suburbs are functionally dependent on core cities,

which pay for social and technical infrastructures (education, culture, streets). Since every municipality is institutionally responsible for land use planning in its territory, co-ordinated planning of urban regions is difficult to achieve. City regions in Germany for instance often lack institutional capacities for city transcending planning.

Table 2: Heuristic classification of national systems of urban and regional planning in selected EU countries

Country	**Basic Elements of the Legal and Institutional framework** ? centralised/ decentralised (actors and central laws)	**Regulatory Traditions in Urban Planning** ? active/ reactive style ----- short term/ long term perspective	**public / private relations, participation** co-operative/ conflictive
France	? centralised system: minister of the interior responsible for territorial administration; representatives of the ministries on every territorial level: Regional Director, Departmental Director, Managing Director (local level); ? Region (since 1982) develops regional planning; General Council (Dpt. Level) e.g. responsible for rural land planning; ? Commune responsible for land use planning/ zoning, building permissions	? active approach of urban development and land-use regulation: milestones are the decentralisation law of 1982 and the new concept of spatial planning of 1995 focussing on equal opportunity for all citizens and balanced development of the whole country. ? national guidelines and principles for localisation of transport infrastructure, large scale development of public facilities. Regional plans are developed in each region	Since 1999 possibility of fixing private contracts in agglomerations which simplifies inter-municipal co-operation by creating an institutional framework: agglomeration as a public entity with the power to impose taxes directly on the inhabitants in order to finance its activities
Germany	? decentralised system: federal states as main actors in spatial planning (Landesplanung), on a regional level states can set limits for settlement areas (since 1988); ? communes are - by constitution - responsible for land-use planning; ? regional planning by co-operation of communes based on the givens of the federal states;	? rather active approach - long regulatory tradition on urban planning; but urban planning instruments are based on growth and expansion. These are inadequate to address decreasing population in core cities and suburbanisation processes	participatory traditions in planning
Netherlands	? rather centralised system: ? small own tax base of municipalities; high dependence on central state subsidises but economically less dependent on investors ? municipalities are responsible for land use planning	? proactive approach, long tradition of spatial planning; land considered as a public good, public actors play a major role in the land marked: philosophy of „rule and order“: controlling development through influencing location, intensity and timing. Land use policy is associated with broader social policy ? Long/medium term planning: Strong national planning since 1960s: Reports on Physical Planning in the Netherlands ? Main instruments: housing policy; subsidies for new construction and renovation; quotas in the allocation of these subsidies	co-operative style of interaction, participatory approaches in planning

Austria	? Urban/regional planning lies within the responsibility of the nine federal states; co-ordination and guidelines by the centrally initiated - but not legally binding - Austrian Spatial Planning Concept (1991) ? Spatial planning in a local context is assigned by constitution to the communes	? active approach towards spatial planning: limits of settlement areas, binding construction permits on local land use plans ? medium/long term planning perspective: co-ordination of different levels; spatial development concepts (time horizon: 10 years) in seven federal states	opportunity to bind land-use dedications to civil agreements
Norway	? centralised system: overall responsibility for planning lies within the state government (Ministry of the Environment, Ministry of Local Government). ? Most of the decisions on detailed planning are made in the municipalities. County levels co-ordinate the planning processes in the municipalities and make regional plans ? State approves county and municipal plans in case of conflict.	? no long tradition of regulation, lack of ideological basis for planning: makes municipality too weak to go against marked forces; ? moderate proactive approach by central government but lack of co-ordinated and comprehensive planning strategies ? marked state influence on regional development; Central government can introduce a moratorium of up to 10 years on building projects within a region or for the country as a whole when it is deemed to be in the national/regional interest (e.g. 1999 moratorium on car based shopping centres outside city centres. ? Environmental impact assessements for building projects of a certain size	strong position of private actors, especially in small towns; consultants and entrepreneurs can present ready-made plans for consideration by the planning administration
Ireland	dispersed planning system: responsibility for physical planning lies since 1964 within the 88 local planning authorities (each planning authority has to make a development plan (land-use plans) and review it every five years. The authorities were to small and lacked financial resources and skills; absence of a regional dimension of planning	? reactive approach of local authorities: guiding private investment through granting or withholding planning permission; ? 1986 Urban Renewal Act: tax incentives to encourage property developers to build in inner city areas	clientelism; strong influence of private interests in local planning
Spain	Decentralised, locally based planning system	(to follow)	(to follow)

A relevant question to be answered in the project is whether a high penetration of ICT in cities and countries promote suburbanisation trends in Europe, and whether active styles of political regulation make a difference in this process. So far, urban regions with more active orientation towards urban and regional planning seemed to be more successful in containing urban sprawl than the more passive counterparts.

Spatial Developments of the European Urban System

For assessing the possible impacts of ICT on urban development, it is useful to take a brief look at the historical features and current trends of development of the European urban system. However, it is not an easy task to outline spatial development throughout Europe. Land use trends differ enormously between countries of different size and different political regimes, but especially in those ones with different degrees of modernisation of the economy (like Spain or Ireland vs. Germany or the Netherlands). Nevertheless, there are some similar patterns of urban development after World War II which were affected namely by „suburbanisation" and „tertiarisation". Current social and economic development in cities are strongly affected by new ICT. Thereby the European city system is marked by increasing polarisation and globalisation as well as a kind of „virtualisation" of cities. Though the effects of the new ICT on urban development are rather unknown, it is possible to outline some probable development corridors.

Suburbanisation and Tertiarisation as Dominant Features of Urban Development

Virtually all urban regions in Europe witnessed the phenomenon of „suburbanisation" mainly up until the 60s. Core cities lost large parts of their population to suburban communities. In France, but also in big cities in the Netherlands (e.g. Amsterdam) large apartment towers on urban fringes were built in the 60s and new „satellite" towns were erected in the 70s (see Gillon et al. 1999: 17-18). These were to exist independent of the city centre, thereby following a functionalist logic. While this first phase was mainly marked by construction of collective housing, it was followed in a second phase by the construction of detached housing in the outskirts of cities. Especially big cities were characterised by urban sprawl, which expanded well beyond their administrative boundaries. Austrian cities like Salzburg and Graz for instance increased by up to 60 percent in size between 1971 and 1991.

These suburbanisation trends and the dispersal of urban housing were particularly impelled by rising incomes, the desire for larger housing (more space per inhabitant), the spread of the private car, and the massive road building programmes. Whereas the „better off's" moved to suburbia, the inner cities increasingly became the living area of the poor, thus intensifying spatial segregation within urban regions. In Germany especially workers coming from foreign European countries moved into the core cities. Though some core cities were decreasing in population, the whole city regions, especially outer areas within the city border and neighbouring municipalities, were increasing.

Beginning in the 60s, the worsening of social and environmental conditions in cities and the debate on „limits of growth" in the 70s led to a rejection of the functionalist and rationalist ideas on urban planning. In many European cities, people protested against the tearing down of old inner city buildings in favour of modern blocks and highways. Rehabilitation and urban renewal of the

older parts of cities were designed to revitalise inner cities areas in Europe (e.g. Amsterdam, Vienna, Berlin). There were hopes for a re-urbanisation process in the late 80s and 90s. People began to move to the inner city again. But very often only certain population groups, like young urban professionals (yuppies), moved back to the inner city. Gentrification of former poor working class areas is a pronounced feature of these trends, causing further problems of spatial segregation. In spite of some reurbanisation, densities of inner cities areas have declined in European cities since the 1950s.

After a time-lag, industry and commerce followed the inhabitants mainly in the 1970s and 1980s and relocated on the urban fringe or in surburban communes. Additionally, car-dependent factory outlet centres and huge hypermarkets have appeared since the late 80s at the outskirts of cities, a phenomenon that can be witnessed especially in France, but also in Germany or Norway for instance. In many urban agglomerations retailers of the inner city were jeopardised by these suburban developments.

„Tertiarisation“ is a well documented common trend in European city regions. There is a structural change of the whole economy: Between 1980 and 1995 the share of workplaces in the agricultural sector declined from 11 to 5 percent in the countries of the EU, and in the industrial sector from 37 to 30 percent in favour of the share of the service sector, which increased from 52 to 64 percent (Waniek 1995: 20; Eurostat 1996: 296-98). In this respect it is important to differ consumer-oriented service from producer-oriented services whose absolute increase of employment is higher.

Waniek emphasises that the structural development exhibits enormous discrepancies between regions: Whereas employment within the ten regions with the highest growth rates of employment increased between 1980 and 1990 by more than 20 percent, it decreased by 3 percent in the ten regions with the lowest growth rates. In 1990 these regions had about the same sectoral structure as the ten most successful regions in 1980. Referring to the sectoral structure, the regions lagging behind the successful ones do this by about 10 years. The less successful regions - which were agricultural and old-industrial dominated areas - were not able to compensate for the loss of workplaces in the industrial and agricultural sector by new ones in the service sector (Waniek 1995: 24-26).

Though the similarities in urban development in Europe preponderate, there are some relevant differences, which are mainly influenced by the degree of modernisation and wealth and the regulatory styles of the various countries. First, suburbanisation in cities and tertiarisation of the economy seem to be strongly connected with economic prosperity. For instance, suburbanisation is heavily dependent on the opportunity of private car mobility which in turn must be economically affordable by private households. Thus, as suburbanisation was an earlier phenomenon in the USA compared to Europe, similarly the poorer EU countries like Spain or Portugal lagged behind the richer ones in this respect. However, they caught up with in the 80s and 90s. Then, it became more and more obvious that regulatory styles and traditions in planning are important factors in explaining differences in the degrees of urban sprawl. While virtually all urban regions witnessed suburbanisation since the 60s, cities with a more active approach towards planning were more

successful in containing urban sprawl. Thus, urban sprawl in many Dutch or Austrian cities was much lower than in Norwegian or in Irish ones.[3]

3.2.2 ICT and New Trends in Urban Development in Europe

ICT will profoundly change the development and features of the European urban system. According to many studies, ICT form the basis of a new technological revolution, that will lead to a change of the technological paradigm with comprehensive impacts on economy, society and culture (Castells 1997; Sassen 1997, Floeting 1997; Floeting/Grabow 1998). Recent studies analysing the interrelationships between ICT and the city emphasise that the new ICT will facilitate communication irrespective of time and spatial distance. Therefore the freedom of choice of location for companies and also for private households is steadily increasing. This does not necessarily mean that there will be a loss of meaning and significance of cities in general. Some authors rather assume that *on a global scale* certain metropolises will rise (or have already risen) to „global cities" in comparison to others which might get a lower or even marginal position in the European or national urban system. According to several studies ICT could promote a *hierarchisation and polarisation* of urban systems. On a regional or *a local scale* companies have increasingly more freedom in deciding where to locate. Therefore the ongoing trends of *decentralisation* and *suburbanisation* will probably be reinforced by new ICT.

European Changes of the Urban System: Hierarchisation and Polarisation

In some studies it is argued that the new ICT and the ongoing globalisation of the economy may influence the hierarchy of the national and international urban system. According to Saskia Sassen, a major advocate of this position, „centrality" will remain a key term of the economic system. On an international level there will be a concentration of large economic centres of finance and trade which she named „global cities". Important international centres of finance and trade are New York, London, Tokyo, Paris, Frankfurt, Zurich, Amsterdam etc. Between these cities, the intensity of transactions has sharply increased, especially on the financial market and in the service and investment sectors. The higher the degree of globalisation of the economy, the more a concentration of central functions in global cities takes place. There will also evolve an increasing inequity between these cities and other cities in the same country (Sassen 1996: 49-74; 1997: 120).

By emphasising this point, Castells argues - referring mainly to the European urban system - that the new international and interregional competition leads to three simultaneous processes: First, the *predominance of metropolises* - functioning globally as important knots or junctions - will be strengthened. These cities use their informational power and new communication technologies to extend and intensify their global influence. Secondly, there will be a *decline of the old and former predominant industrial regions* which failed to transform their economy according to the demands of the information society. However, some traditional industrial centres, like the region of Barcelona, are on their way by transforming their local economy to high-tech-production structure with a strong service sector. Thirdly, there will be a *rise of new regions* (like the French Midi, or

[3] For more detailed analysis of suburbanisation trend in the countries under consideration in the project: see Gillon/Caro/Frankhauser 1999; Lorente/Valenzuela/Vázques 1999; Cohen/Nijkamp 1999; Helten/Fischer 1999; Lagran 1999; Flynn/Preston 1999; Tronner/Pohoryles 1999.

Spanish Andalusia) or even countries to dynamic centres of economic growth attracting capital, investors and humans and thereby creating a new economic geography (Castells 1997: 112).

Similarly, Krätke argues, that the polarisation of cities in the European system will take on a new quality. The European city hierarchy will be dominated by an evolving metropolitan network comprising of „global cities" and a couple of closely related European city regions. A middle position is taken by cities which have central function in their regional economic framework. At the bottom of the European city hierarchy, there are, on the one hand, cities specialising on low qualified production functions, depending on the metropolitan centres, and, on the other hand, cities separated from European production relationships which are virtually forgotten. These cities form the periphery of the European city system (see Krätke 1995: 144-148; see also below).

Regional and Local Changes : Decentralisation and Dispersal of Locations

Concerning the impacts of ICT on a local and regional scale, empirical evidence is rather small (Floeting/Grabow 1998). Some experts think it most probable that ICT will *reinforce the existing spatial trends of urban development,* which would mean further decentralisation and suburbanisation of locations. Overall the increasing flexibility of locational choice of companies will have considerable impacts on cities. The development within sub-areas of cities is expected to evolve in different patterns:

- There will be disparate developments in inner cities areas. On the one hand, certain inner city locations (especially of higher ranking cities) will be strengthened at the cost of other cities because companies will concentrate their central functions to one single location covering a larger area. On the other hand, some locations will be suffering a loss of significance, if - supported by telematic processes - reorganisations and spatial separations of working processes are taking place, and more expensive inner locations are given up in favour of less expensive suburban locations.
- In relation to core cities, there has been a strong trend of suburbanisation of services over years (see above) which will be supported by ICT applications, so that suburbanisation trends won't be weakened presumably. Suburban centres might be the winners of these processes of decentralisation. However, there is a danger for these suburban centres, if the subordinated, high-standardised economic functions are relocated abroad, e.g. by off-shore teleworking.
- Residential areas may also be strengthened as workplaces because of increasing teleworking. Here are new potentials for models of mixtures of urban functions. Having the relatively slow diffusion of different forms of teleworking in mind, this processes will lead to only marginal changes in the next few years (Floeting/ Grabow 1998: 25).

Some studies emphasise that higher locational flexibility of companies will on the one hand reduce the capacity for planning of cities and communes. But on the other hand locational flexibility does not mean that qualities of locations of cities are getting less significant. Adversely, just because the spectrum of possible locations enlarged, regional qualities of locations are of special significance. Some authors underline that physical accessibility, the potential of well-educated employees, milieus of innovation and the image of a city are of utmost importance (Floeting 1997: 219 ff.).

So far empirical evidence seems to be too rare to assess differences between cities/regions concerning impacts of ICT penetration on urban development. Generally it is assumed that large and high-ranked European cities - which might be the winners of ICT - are probably reinforcing suburbanisation trends. Contrarily, small towns in rural areas - not connected to a prospering city - might lose because ICT penetration will be slower there. To assess similarities and difference

between urban regions in Europe, it is necessary to investigate the current penetration of ICT in the EU.

ICT and various aspects of Urban Life: European Trends

If the new ICT are the basis of a new technological revolution that will have impacts on social, economical and cultural life, it is important to know about the current trends and intensities of ICT use in Europe. The data base concerning ICT and cities or regions is only rudimentary developed and differs sometimes considerably among the various studies and surveys (see case studies; surveys of Eurobarometer 1997 and ISPO 1999). However, some recent and rather comparable data of ICT in the EU-countries is available on a national level provided by the European Survey of the Information Society (ESIS 1999). Basic indicators are equipment rates of telephones and cable and satellite TV sets, the number of PCs, internet use and internet servers as well as providers. These data give an idea of the rate of penetration of ICT infrastructure and ICT use in the EU countries, especially for private households. Unfortunately, Norway is not integrated in most of the EU data. But data provided by the Norwegian project partners indicates that Norway can be counted to the ICT-„forerunners" along with the other Scandinavian countries (see Lagran 1999). After outlining some European trends based on data provided by EU reports, the study proceeds in a second step by a preliminary assessment of the trends of ICT applications such as teleworking in the countries in consideration.

ICT in EU-Countries: Basic Indicators [4]

Telephone lines

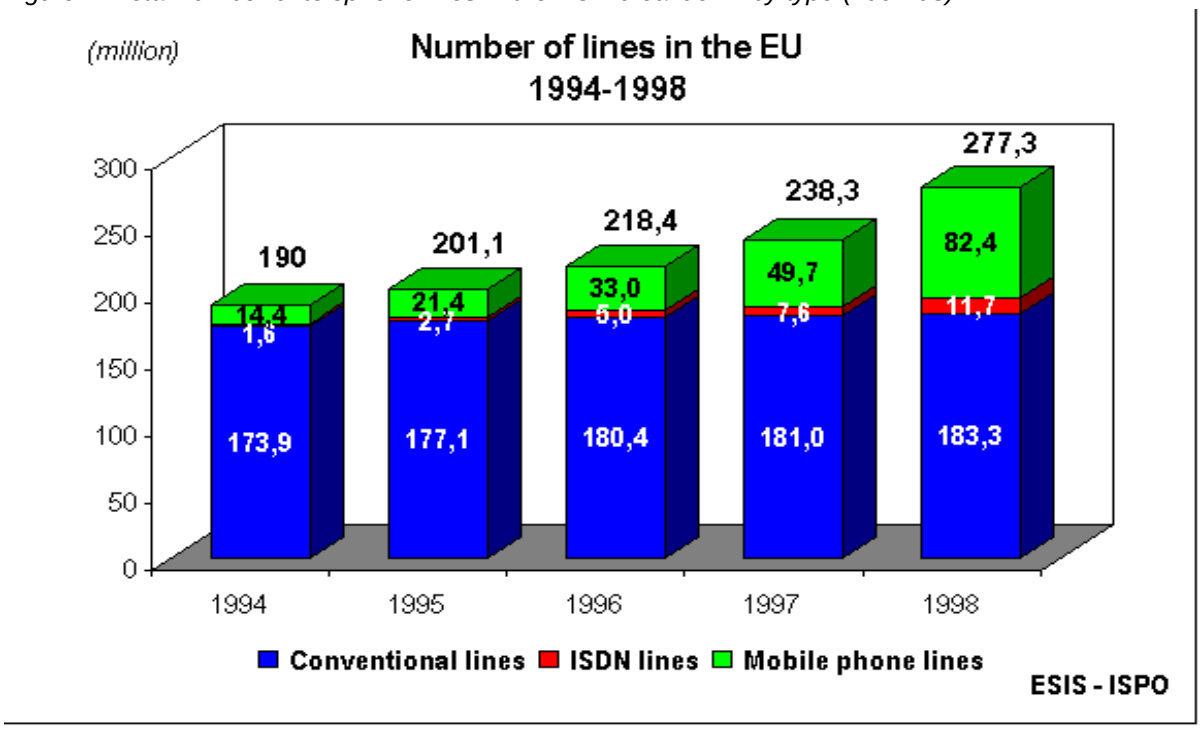
Within the EU the total number of telephone lines (conventional, ISDN, mobile) can be estimated at 277.3 million by the end of 1998 (see graph 1). Between 1994 and 1998 the total number of lines per 100 inhabitants (inh.) has risen from 51 to more than 74. This increase is mainly due to an growing use of mobile telephones. The number of mobile phones increased between 1994 and 1998 from 3.9 to 22 lines per 100 inhabitants. Nevertheless, conventional lines are still dominant. In 1998, nearly 50 percent of the inhabitants of the EU have a conventional telephone line. But the share of ISDN lines is also rising in the EU: Now, more than 3 percent of the inhabitants of the EU have ISDN lines (see graph 2).

However, the lines are not evenly distributed within the EU. By looking at the number of telephone lines by country in 1998, one can see that there is still a marked gap between the highest and the lowest distribution in Europe. Five countries are - in part significantly - below EU average (74.4 lines per 100 inh.). These are the least favoured countries of the EU - Spain, Ireland, Portugal and Greece - but also Belgium and Germany (66,5). Sweden and Finland (over 100 points), but also Luxembourg and Denmark have the highest rates. Nevertheless, there is an important catch-up process. Whereas the average annual growth of the total number of phone lines in Europe was 16,4 percent between 1997 and 1998, it has been almost 24 percent in Austria and Ireland, almost 25 percent in Italy and more than 35 percent in Portugal (see Figure 3).

[4] The following text draws heavily on the data provided by European Survey of the Information Society (ESIS 1999).

This catch-up effect does not derive from conventional lines. The number of conventional lines continues to show great disparities within the EU (see Figure 4). In fact, the growth rate of conventional lines has been zero or even negative in absolute values in some countries (Belgium, Germany, Netherlands). Catch-up is linked to the very high progress of mobile lines all over Europe. The growth between 1994 and 1998 almost amounted to a 55 percent average per year. In some countries, this growth has been much more important, in particular in Ireland (+116%), Spain (+105%), Portugal (+101%), Belgium (+92%), and France (+89%). Though the equipment rates of mobile phone lines has risen considerably in all countries, the gap between the least equipped country (Greece) and the best equipped (Finland) is still important, summing up to 43 percent. Finland (57%), Sweden (43%), and Italy (35%) widely remain above the EU average of 22 percent (see Figure 5). Concerning ISDN lines, the growth also has been very high within the EU (1994-98: 63%). Here are also great disparities between countries concerning equipment rates: France, Germany, Netherlands and Luxembourg are above the EU average (3 %) while Greece and Ireland are rather behind (see Figure 6).

Figure 1: Total number of telephone lines in the EU - breakdown by type (1994-98) [5]



[5] *Source: ESIS 1999*

Figure 2: Number of lines per 100 inh. in the EU (1994-1998) [6]

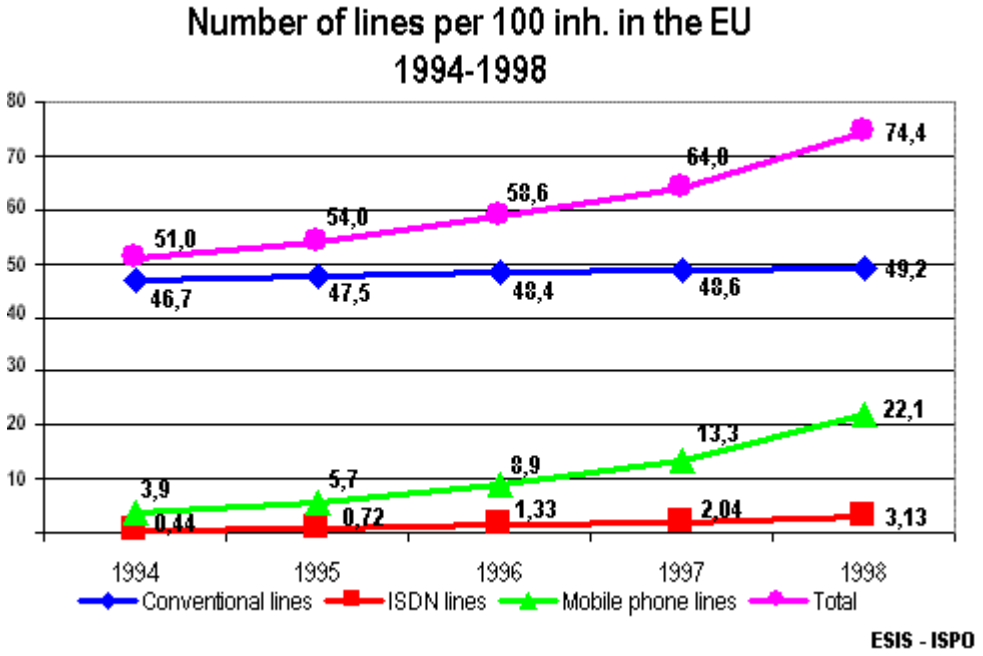
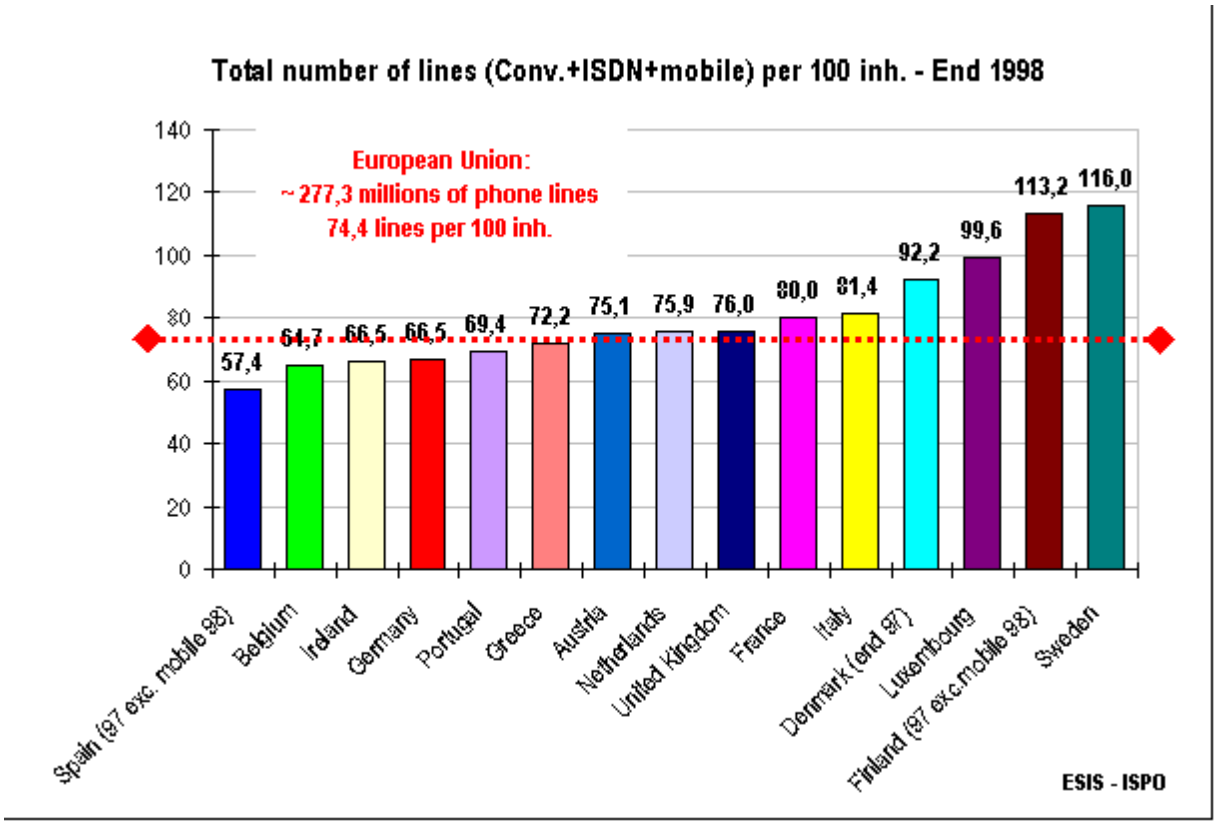
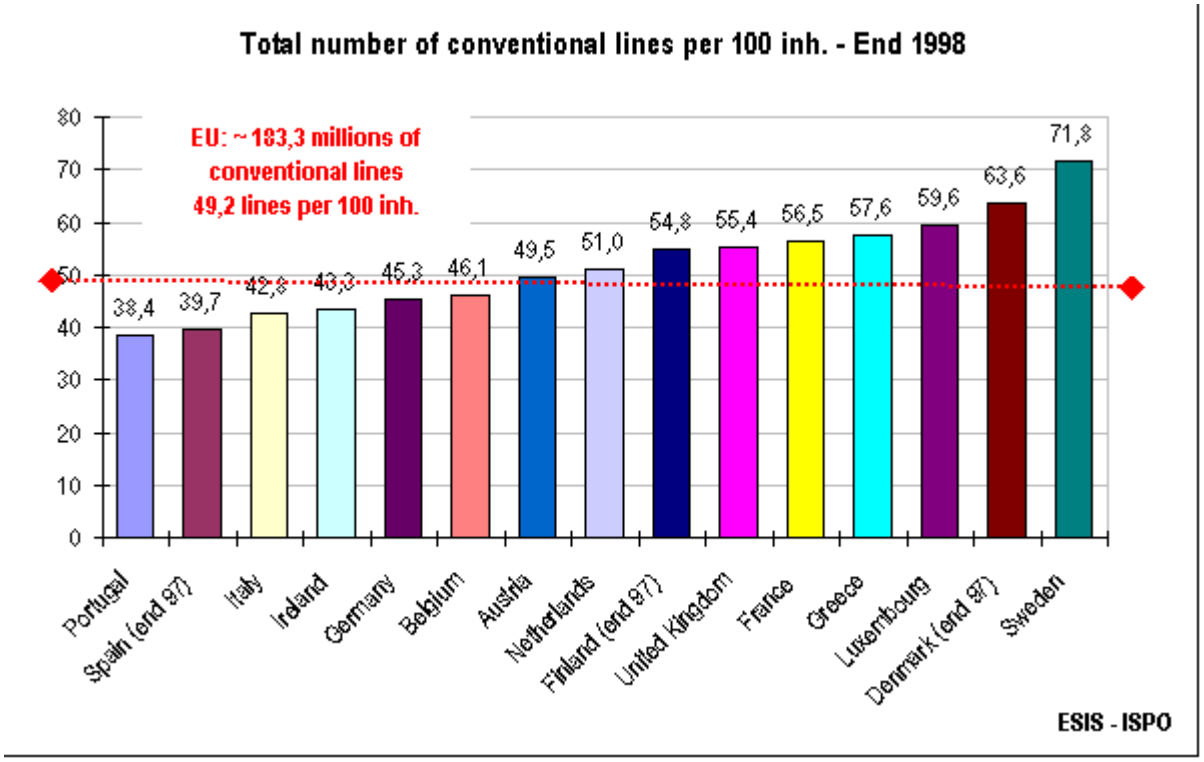


Figure 3: Total number of lines (conventional, mobile, ISDN) per 100 inhabitants by country (End 1998) [7]



[6] *Source: ESIS 1999*

Figure 4: Total number of conventional lines per 100 inhabitants by country in the EU (end 1998) [8]



[7] *Source: ESIS 1999*
[8] *Source: ESIS 1999*

Figure 5: Total number of mobile phone lines per 100 inhabitants in the EU (end 1998) [9]

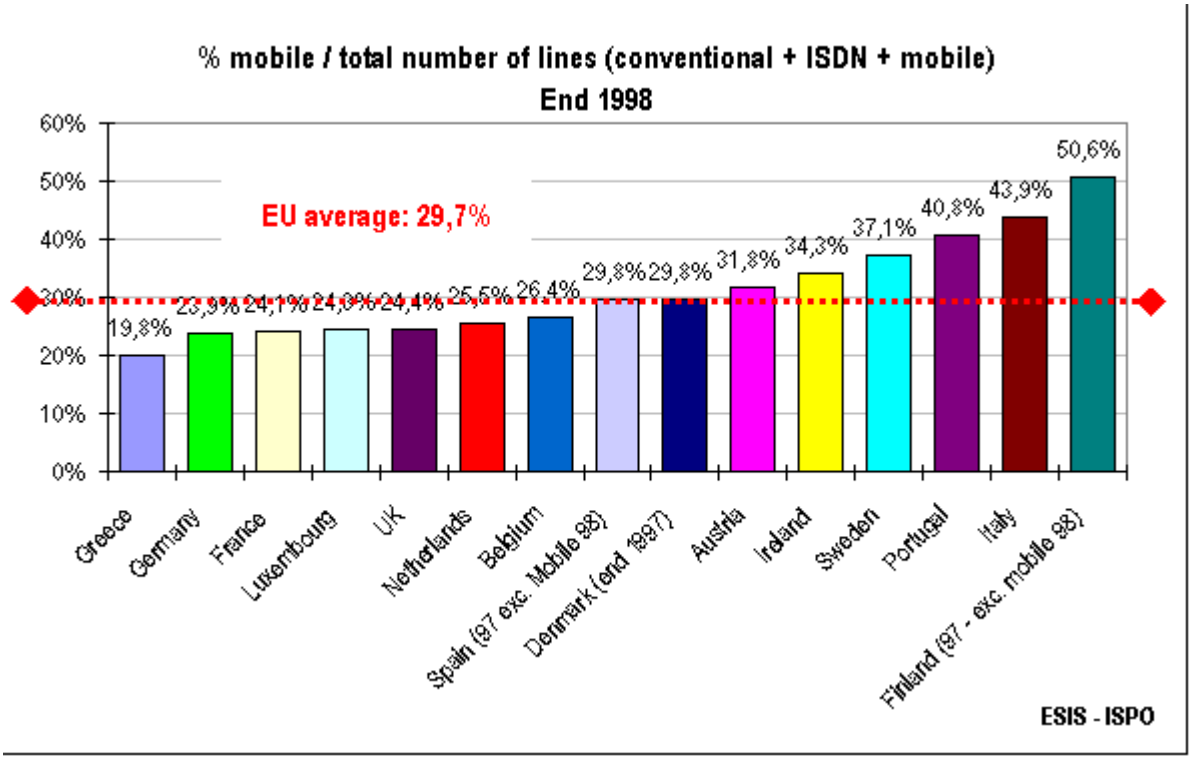
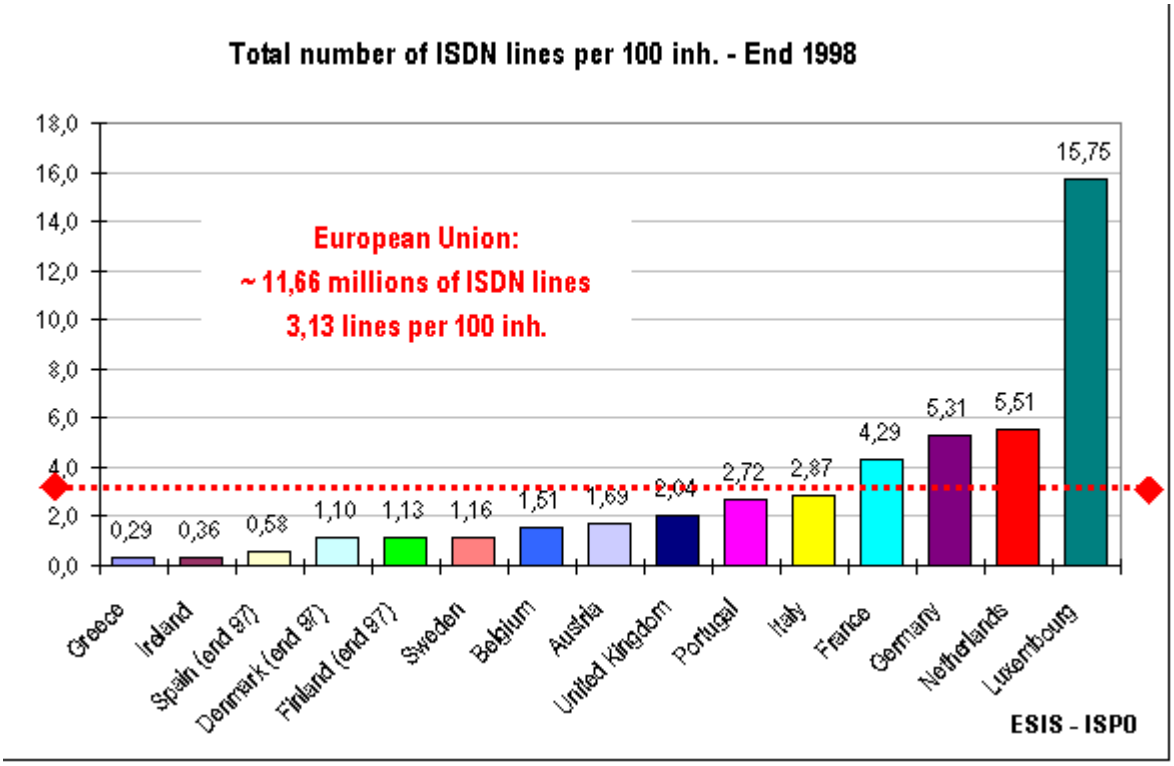


Figure 6: Total number of ISDN lines per 100 inhabitants by country in the EU (end 1998) [10]



[9] *Source: ESIS 1999*

[10] *Source: ESIS 1999*

Personal Computers, Internet, Cable and Satellite Television

Within the EU the total number of *PCs* is estimated at nearly 102 million at the end of 1998 (without Ireland/no figures). It corresponds to 27,2 PCs per 100 inhabitants. But there are great variations between EU countries. Equipment rates in Luxembourg (70 PC/100 inh.), Denmark (54/100) and the UK (47/100) as well as Norway (50/100 in 1997) are well above the EU average while some countries - like Greece (7/100), Spain (13/100), but remarkably also Italy (18/100) and France (20/100) - lag well behind. It is estimated that the share of business PCs is 55 percent and that of home PCs about 45 percent in the EU average. In some countries the share of business PC's is much above average. In the UK, for instance, 37 out of the total of 47 PCs per 100 inhabitants are business PCs (80 percent), in Germany in contrast the 21 out of 31 PCs per 100 inhabitants are home PCs (similarly Sweden) (see Figure 7).

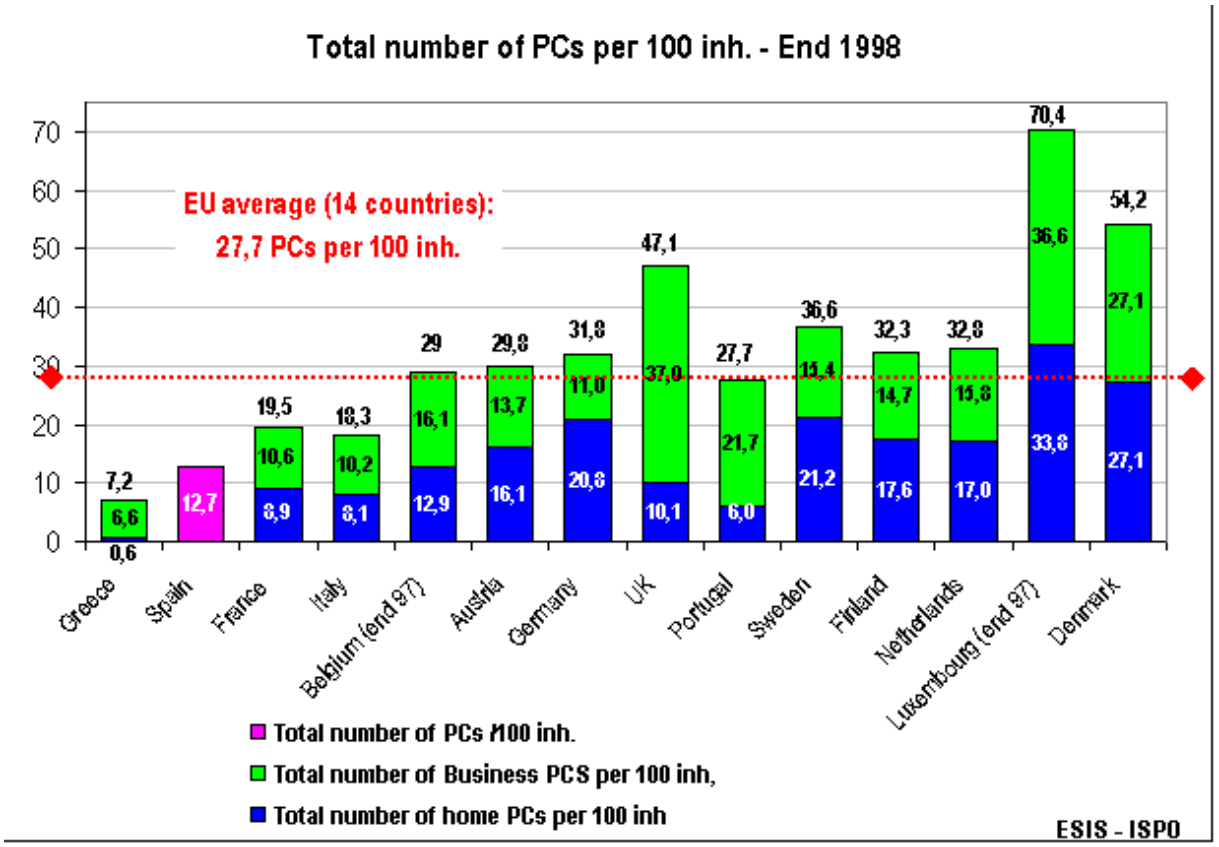
Data concerning PCs equipped with modem, there is also a great diversity within the EU even if comparability remains rather difficult. According to EU data, equipment rate is highest in the UK (66%) and the Netherlands (43%) and lowest in Spain and Portugal. Note that it is also remarkably low in France (14%, only home PCs) and Germany (16,3%) (see Figure 8). Norway can be grouped to the forerunners, because 46 percent of the inhabitants have access to the internet, about 25 percent have it at home.

According to another survey estimating *internet use* in the EU, great variations between Scandinavian or northern countries and southern countries are revealed. Internet use per 1.000 inhabitants (estimates for Jan. 1997) is estimated to be highest in Sweden, Finland and Denmark (120-150 users/1.000 inh.), followed by UK and the Netherlands (ca. 90). Germany taking a mid position (ca. 60) is followed with a distance by Belgium, Austria and Ireland (ca. 40). Internet use is lowest in France (25), Italy (22), Spain (20), Portugal (18) and Greece (12) (EDC-Survey 1998: 32). Concerning *internet hosts* between 1995 and 1998 the average growth rate per year was nearly 50 percent. In the end of 1998 there are almost 17 Internet hosts per 1000 inhabitants in the EU. The number of internet hosts per 1000 inhabitants is highest in Finland (90), Denmark (57), Sweden (48) and the Netherlands (40). It is remarkably low in Greece (5), Portugal (5), Italy (8), Spain (8) and France (9) (see Figure 9).

The number of *access providers* has increased between 1997 and 1998 by 30 percent to about 2790 providers at the end of 1998. The number of Access Providers has decreased in some countries (Luxembourg, Finland, Denmark, Netherlands). Today the number of access providers is estimated at 7.5 per million inhabitants in Europe (see Figure 10).

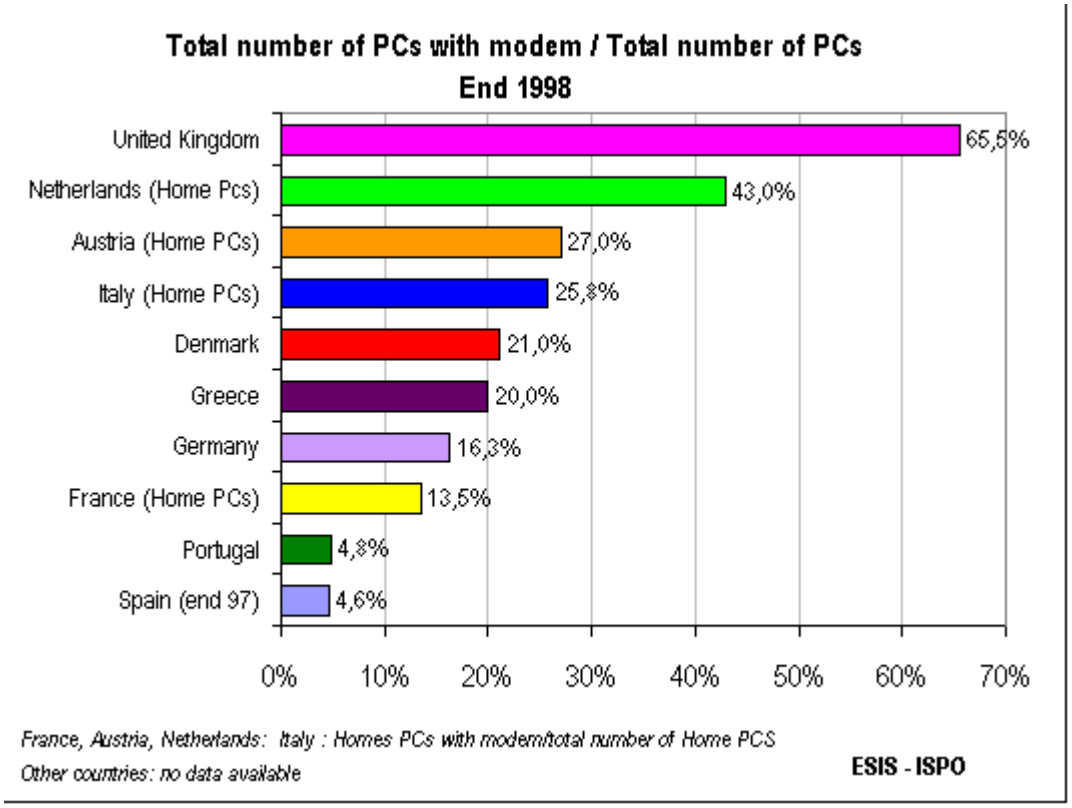
The number of households equipped with cable and/or satellite TV varies among EU countries. While in Luxembourg, the Netherlands and Belgium the rate of home cable TV subscribers (as a share of TV households equipped) reaches 90 percent and more, countries like Germany (50%) and Austria (38%) have a high equipment rate of satellite TV. Remarkably low is the rate of cable and satellite equipment in Italy, Spain, UK and France (see Figure 11).

Figure 7: Total number of PCs per 100 inhabitants in the EU - Breakdown between Home and Business PC by country (end 1998) [11]



[11] *Source: ESIS 1999*

Figure 8: Share of PC with modem of total number of PCs in the EU (end 1998) [12]



[12] *Source: ESIS 1999*

Figure 9: Internet hosts by DNS domains per 1000 inhabitants - Evolution 1995-98 [13]

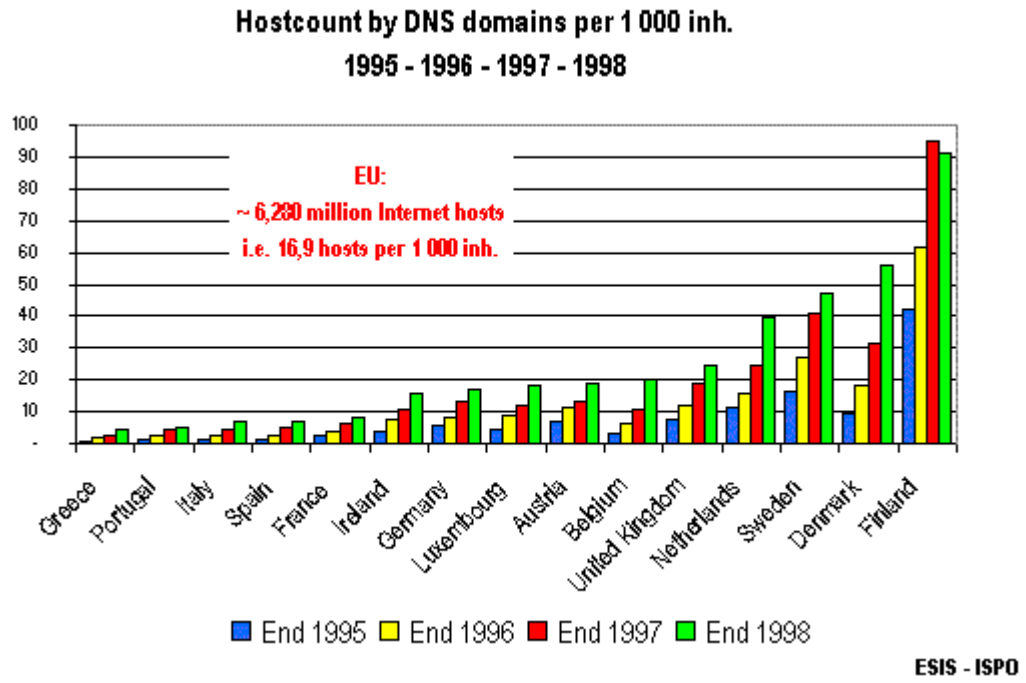
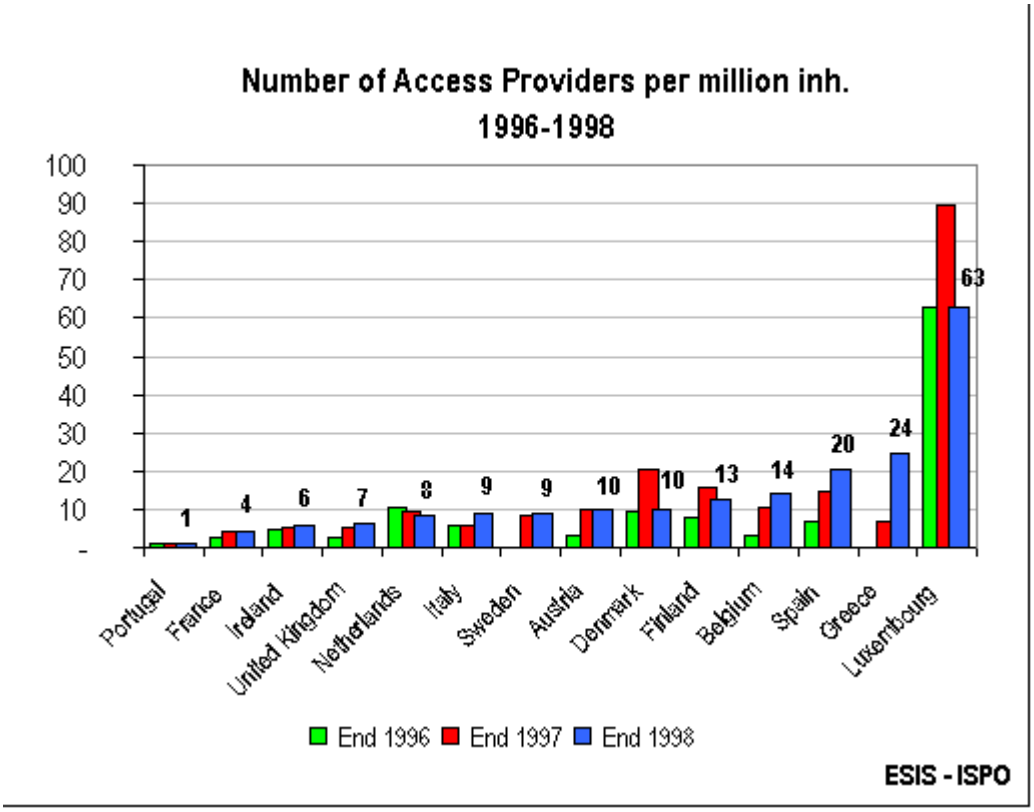
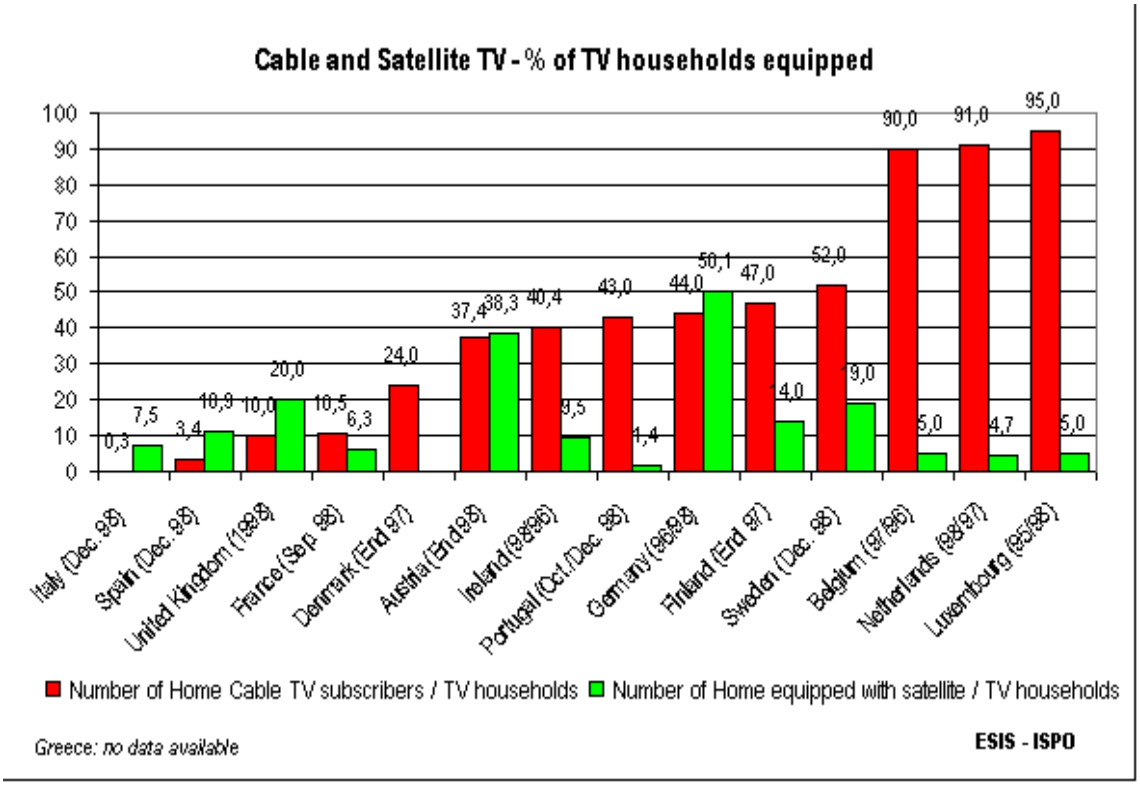


Figure 10: Number of access providers per million inhabitants by country (1996-98) [14]



[13] *Source: ESIS 1999*

Figure 11: Cable and satellite TV as percentage of TV households equipped by country[15]



„Forerunner-“ and „Latecomer-“ Countries in the EU: Basic Indicators

On the basis of this data it is possible to identity countries which seem to have better preconditions for the information society than others. Based on the above outlined ICT indicators the dominant forerunners of ICT in the EU are countries like Luxembourg[16], Sweden, Denmark, Netherlands and the UK (see Table 3). These countries seem to be well equipped for the upcoming information age. Though not comprised into the table, Norway can be classified as a ICT-forerunner too. On the other hand the dominant „latecomers“ of ICT comprise the poorest countries within the EU - Greece, Portugal, Spain, Ireland- and also France. There is a great gap between these countries and the forerunner group. The rest of the EU can be grouped into a mid position. A recent study for the European Commission investigating social and economic cohesion aspects of the information society in Europe confirmed that there are large gaps between more and less favoured regions in Europe. In the cohesion countries Greece, Spain, Portugal and Ireland the per capita expenditure for telecommunication technologies in 1994 is about 73 $ on average; in contrast every citizens in rest of the EU countries invested nearly 123 $, i.e. 40 percent more (study, cited in Lob/Oel 1998: 5).

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14 *Source: ESIS 1999*

15 Source: *ESIS 1999*

16 It should be noted that Luxembourg as a city-country is an exception having better spatial framework conditions concerning ICT infrastructure provisions. Comparison with other EU countries is problematic therefore.

Table 3: ICT in EU countries; different indicators; breakdown in forerunners and latecomers

	Forerunners	**Latecomers**
Telephone lines (conv./ mobile/ ISDN)**:** Total number of lines (per 100 inh ? EU average: 74 lines/100 inh.	Sweden, Finland, Luxembourg, Denmark (> 90 lines / inh.)	Spain, Belgium, Ireland, Germany, Portugal (< 70 lines/100 inh)
ISDN lines Total number of ISDN lines per 100 inh ? EU average: 3,13 lines/100 inh	Luxembourg, Netherlands, Germany, France (>4 lines/100 inh.)	Greece, Ireland, Spain (< 1 line/ 100 inh)
PCs Total number of PCs per 100 inh. ? EU average: 27,7 PCs/100 inh	Luxembourg, Denmark, UK, Sweden (>35 PCs/ 100 inh.)	Greece, Spain, Italy, France (<20 PCs/ 100 inh)
Internet use (internet use per 1000 inh.)	Sweden, Finland, Denmark, UK, Netherlands (>80 users/ 1000 inh.)	Greece, Portugal, Spain, Italy, France (< 25 users/1000 inh.)
Internet hosts (Servers) Domains per 1000 inh. ? EU average: 16,9 hosts/1000 inh.	Finland, Denmark, Sweden, Netherlands, UK (>20 hosts/ 1000 inh.)	Greece, Portugal, Italy, Spain, France, Ireland (< 10 hosts/1000 inh.)
Dominance 3 or more	***Dominant Forerunners*** Luxembourg, Netherlands, UK, Sweden, Finland, Denmark	***Dominant Latecomers*** Greece, Portugal, Spain, Ireland, France, Italy

ICT and Urban life: Teleworking and other applications

In the case studies, some country-specific trends are outlined concerning the relationship of ICT and housing, office, public sector, education and culture. Comparative figures on ICT and urban life in the EU that go beyond the basic indicators outlined above are scarcely available, which makes it difficult to draw conclusions for the European level. However, there are some exceptions like „teleworking“ which has been discussed since the 1970s (Nilles et al. 1976). Amazingly it took almost 20 years for reality to catch up with the discussion. The bonmot that there are more scientists talking about telework than there are actual teleworkers had characterised this situation. Now it seems that teleworking is growing fast, particularly in some countries, but science seems to lose interest in this „academic“ subject compared to the 80s.

Teleworking has mostly been mentioned in connection with new working conditions and its potentials for substitution of commuter traffic. Telework occurs when ICT are applied to enable work to be done at a distance from the place where the work results are required or where the work conventionally have been done (see ETO 1997). Telework can have different forms, such as home-based telework or „telecommuting“, mobile telework, telecentres, „telecottages“, and different effects in functional relocations where business functions previously located close to the customer are concentrated and delivered at a distance. There are different reasons for introducing teleworking: Main reasons for employers are opportunities for reducing costs and for employees chances of better co-ordinating occupational activities and obligations at home (e.g. child care).

What about cities and teleworking? A broad dissemination of teleworking can have considerable long term impacts on spatial structures of cities:

- the number of centrally located companies can decrease dramatically,
- micro-firms can evolve (in private apartments) and
- virtual companies without central locations can arise with partly global co-operation relationships.

These developments can have considerable impacts, such as changing demands for commercial floor space in inner city areas, and changing the forms of living because more working space is needed in private apartments. The possible implications for land use patterns are virtually unknown. But experts remark that every shift of working location has led to additional consumption of land so far, and it would be surprising, if the information society made a difference (Floeting 1997: 248). So, whereas teleworking has mostly been discussed as a „problem solver" (e.g. substitution of traffic), it can become to a spatial development problem itself.

What is the current state of teleworking in Europe? As in other sectors, there are considerable variations between countries in defining and measuring telework. The German government for instance defines teleworking as „an activity based on ICT, which is done exclusively or alternating in a workplace outside the company but connected to it by ITC" (cited in: Öko-Institut 1997: 35). However, to get an idea of the rough number and share of teleworkers one has to rely on existing data. Most recent data gathered by ESIS (1999) for the EU shows that teleworking in some EU countries like Greece and Belgium is still negligible (see table 4). On the other hand, the number of teleworkers in some countries is considerably high. In the UK it is estimated that the number of teleworkers exceeds one million, comprising about 4 percent of the labour force. In Sweden nearly 11 percent of the labour force are teleworkers. Also in Finland (3 percent), the Netherlands (2,8%) and in Denmark (0,4-10%), a relatively high rate of the labour force is teleworking. In Ireland the figure is estimated to be between 1 and 9,3 percent depending on the indicator chosen. In Norway also a relatively high share of employees is teleworking. A survey of 1994 revealed that 2 percent of the employees generally work at home, whereas 12 percent conduct some portion of their work at home (see Norwegian case study: Lagran 1999).

Table 4: Number and rate of Teleworkers in EU countries

	Number of teleworkers	**Teleworkers / labour forces**	Reference date
Austria	8 000	0,2	Jan. 1997
Germany	80 000 - 300 000	Less than 1%	June 1997
Belgium	300 - 1000	Negligible	Nov. 1997
Denmark	10,000 - 250,000	0,4-10%	1998
Italy	40,000	0,2%	Dec. 1997
Greece	Negligible	Negligible	1998
France	171,000	1%	1998
Netherlands	183,000	2,8%	End 1998
Spain	200,000	0,01%	Dec. 1998
Finland*	55,000	3%	1997
Sweden	477,225	11,9%	Dec. 1998
United Kingdom	1,140,000	4%	Dec. 1998
Ireland	51,000 (Telework'98) 100,000 occasional 15,000 regular	6,1% 9,3% 1,4%	Late 97/Oct. 1995
* 1 day a week or more No data available: Portugal, Luxembourg			

Source: ESIS 1999

Concerning the ICT use of companies, it is still difficult to provide comparable figures because of adequate indicators and a lack of reliable data. One indicator proposed by the EU is *Electronic Data Interchange (EDI) use by companies.* EDI is a way unaffiliated companies can use networks to link their businesses. While electronic mail between companies is common, electronic data interchange passes bigger bundles that replace large paper documents such as bills and

contracts. Besides saving paper, computers could save time by taking over transactions like regular purchase orders that usually require human intervention. As table 5 reveals, the database on *EDI use by companies* is rather limited. However, it can be seen that in some countries the penetration rate is still negligible (Portugal, Greece, Ireland) whereas it is highest in Denmark (40%) and the UK (33%).

Table 5: EDI use of Companies in the EU 1998

	No. of companies using EDI in 1998	**Penetration rate - End 1998**	**growth rate 1997-1998**	**Favoured sectors**
Austria	8 000	2,60%	46%	Trade & Consumer goods, Banking, Automobile, Building Construction
Belgium		less than 2%		Banking, Automobile, Chemical industry, electronic, Insurance, transport
Denmark	19 000 companies (1997)	40% (1997)		Health care, retail, banking and financing, shipping and farming
Finland	4 000 - 5 000	2,20%	28%	Large and medium sized companies in Trade/consumer goods, Transportation, Chemical/pharmacies, Electronic, Insurance
France	12 000 (1997)			Trade/consumer goods, Insurance
Germany	7 000 (1997)			Automobile, transport
Greece	380	negligible	0,05%	Trade, tourism, banking, health
Ireland	negligible	negligible	negligible	Retail and distribution, electronics/manufacturing, agriculture, pharmaceuticals
Italy	2 500 (excluding corporate banking)	0,07%	150%	Automobile, Chemicals
Netherlands	35 000	6%	20%	
Portugal	132	negligible		Trade and commerce, food/tobacco, equipment
Spain	3 600		20,00%	
United Kingdom	480 000 companies	33% 17% in SMEs - 44% in medium and large companies	18%	Trade/consumer goods, Banking, Automobile, Insurance, Travel Agencies

Source: ESIS 1999

Though we have identified forerunner-countries - like the Netherlands, Denmark, Sweden, Finland and Norway because of their major penetration of ICT, the southern EU countries (Spain, Portugal, Italy, Greece) emerge in a survey clearly as the „interest leaders“ of the continent. These „interests“ identified in the survey are to be taken seriously because all are found among the countries most willing to pay for their ICT applications (Eurobarometer 1997). In addition to interest, it is important to notice the growing role of new technologies related to television, which have high potentials for applications of broad public use. While being digital and therefore very sophisticated and rich in potential, they succeed in hiding their complexity to the user and manage to achieve very important breakthroughs (even geoFigureically) in social layers, which are

relatively little sensitive towards new ICT. Europeans seem once more to be interested in tangible and concrete applications which tackle the most urgent and serious questions of daily life (Eurobarometer 1997: 13). For instance, the survey found that on average 41,8% of EU - inhabitants are interested in telelearning (above average: S 64%; DK 52%; Fin 50%). There is also a high willingness to pay (Sweden 39%, Denmark 32%; EU-average: 20%) (Eurobarometer 1997).

ICT-Penetration of Urban System in Europe: How to Explain Differences?

The analysis of different indicators of ICT penetration revealed a high degree of diversity within the EU, whereby the Scandinavian countries, but also the UK and the Netherlands, clearly seem to be the ICT-forerunner countries. How can the differences of ICT penetration between the EU-countries be explained? There are various possible explanations for this.

Firstly, one can assume that *economic prosperity* is a major factor especially explaining differences between the so-called „latecomers" of ICT-equipment rates and uses in the less favoured southern European countries (Greece, Portugal, Spain). Here it can be assumed that private households are less willing to spend money on ICT applications. Furthermore public authorities in these countries are sometimes less flexible in creating the necessary ICT infrastructure due to scarce financial resources. Nevertheless, Spain, Portugal, Italy and Greece are the „interest leaders" of the EU for ICT applications. ICT is expected to be a chance to increase living standards and economic performance.

Secondly, structural characteristics of countries, especially *spatial structures* and *population densities*, seem to make a difference. The Scandinavian countries Sweden, Denmark, Finland and Norway - which are marked by similar spatial and population characteristics - are all among the ICT-forerunners. All of these countries are large in terms of land area and small in terms of population which results in low population densities. According to classifications of the OECD, about 50 percent of the regional population (Nuts 3) in Norway and Sweden is living in rural communities, in Finland and Denmark this value is 45 or 40 respectively compared to 8 percent in Germany or 1 percent in the UK (OECD 1998).Thus, ICT provide the opportunity that the less densely populated areas can use the various applications. Since the Scandinavian countries also are geoFigureically situated rather at the periphery of Europe, new ICT can help reducing locational disadvantages. Contrary to the poorer EU countries, the Scandinavian ones have the financial means to spend large amounts of money on ICT infrastructure. This brings us to another set of factors.

Thirdly, *public policy* might explain differences of ICT equipment rates and use. As already mentioned, physical infrastructure and broader requirements such as education, training, business development are important prerequisites for ICT-applications and its use. Public authorities can launch programmes for upgrading ICT infrastructure, promote ICT activities and give incentives for private investors to get involved in ICT development (e.g. liberalisation, deregulation). It seems plausible that it makes a difference in terms of ICT penetration if countries have started earlier and more intensely with these activities. However, the hypothesis has to be questioned within the project whether public actors on the federal, state or regional level have been more active in the past in countries like the UK, the Netherlands and Scandinavia than elsewhere.

3.2.3 Classifying Cities: A Tentative Typology

In investigating how the increasing use of ICT affects urban development, we assumed that the various structural characteristics of cities (e.g. size, economy, population) are distinguishing features. Furthermore an underlying hypothesis of the project is that cities with different structural characteristics must react differently towards ICT in order to be successful. Different types of cities must adopt different strategies to meet the requirements set by the information society. Classifying cities or urban regions in Europe referring to its possible impacts on ICT and urban development should help to reduce the complexity as well as facilitating comparison and selection of appropriate cities for case studies. Thereby a typology should reflect those structural features of cities which are most relevant for the relationship of ICT and urban development.

There are various models for classifying city regions in the 1990s (see Castells 1997; Graham/Marvin 1996; Krätke 1995). Most of them distinguish at least between prospering city regions and old industrial regions. Very useful as a basis for classifying cities according to their economic-functional rank is the model offered by Krätke (see table 6). Approaching the structural change of city systems as a process of economic-functional hierarchisation, it takes into account that studies focussing on population trends and degrees of urbanisation are not useful. In Europe cities which are ranked first in terms of population are often not the strongest economic centres (Berlin, Rome). Also the degree of urbanisation of a country is not a good indicator. There are countries with high degrees of urbanisation but great difference in economic strength (Spain, Germany), vice versa there are countries with similar economic power but different degrees of urbanisation (UK, Sweden). Therefore Krätke classifies the European city systems along the components

⇒ quality and range of *controlling capacities*, *finance* and *service functions* and
⇒ degree of specialisation on innovative or traditional *production structures*.

For empirical studies these components can be broken down into several factors and according indicators, i.e. the component production structure can be subdivided to (a) intensity of interlacing productions (indicator: share of regional supplier), (b) intensity of regional innovation activity (indicator: share of new products and productions procedures of the regional production etc.). This heuristic ranking model can help in assessing the current position of a city region in the European system. Thereby cities can move from one position to another if they fulfil the above mentioned criteria. Moreover the interesting question is, in what direction certain city systems develop and which position they are able to achieve.

Table 6: Hierarchy of city regions according to economic rank

Typology	Features	Examples
1. Global Cities concentration of international control and finance capacities and high ranking services	dominance of headquarters of companies and financial centres with *international* spheres of activity; high density of high graded company-oriented services	London, Paris
2. European metropolitan city regions concentration of European-wide control and finance capacities and high ranking services	Headquarters of companies and financial centres with *European* spheres of activity; high density of high grade company-oriented services; location for innovative production structures or standardised productions	Amsterdam, Bruxelles, Frankfurt/M, Hamburg, Berlin, Munich, Zurich, Milan, Stockholm,
3. Relevant national city regions concentration of regional control and finance capacities and company-oriented services	location of national and regional relevant companies and services, location for „innovative" production structures or standardised productions	Lyon, Madrid, Barcelona, Lisbon, Rome, Athens, Glasgow, Dublin, Düsseldorf, Dortmund, Oslo, Prague,
4. Cities specialising on innovative production structures deficit of control and finance capacities	concentration of production plants and companies with „flexible" production as well as a manifold provision of company-oriented services.	Grenoble, Stuttgart, Toulouse, Montpellier, Bologna, Bristol, Cambridge, Valencia
5. Cities specialising on function of standardised mass production deficit of control and finance capacities	dominance of often externally directed companies with traditional industrial organisation structures	Turin, Porto, Manchester, Liverpool, Thessaloniki, Duisburg
6. Marginal city regions deficit of control and finance capacities	decline or lacking of liveable industrial production plants, small provision of company-oriented services; significant scale of the „informal" economic sector	Naples, Palermo,

Source: adapted from Krätke 1995: 139 f.

The economic-functional ranking model might be a good starting point for classifying cities or urban regions. However, we should also assess whether these economic-functional features reflect those characteristics of cities relevant for the interrelations of ICT and urban development outlined above (see chapter 2 and 3). Relevant hypothesis and trends have been:

⇒ Globalisation of the economy and new ICT will have a strong influence on the European city system. An increased hierarchisation of European cities and a reinforced polarisation between economically central and peripheral cities and regions in Europe can be expected. There are two strong axes of economic growth comprising the richest regions in Europe: The north-south axis expanding from South-England to North-Italy („blue banana") and the East-West axis expanding from the North-Italy to the east of Spain (sunbelt region"). These growth centres are characterised by modern industrial production structures and strong and manifold company-oriented services.

⇒ It is expected that ICT will reinforce the existing spatial trends of urban development which would mean further decentralisation and suburbanisation. It is also probable that structural changes going along with ICT will result in a higher consumption of urban space.

⇒ New applications of ITCs like teleworking will have long term impacts on urban structures inducing changing demands for commercial floor space in inner cities and changing forms of living because more working spaces are needed in private apartments.

⇒ Based on different key indicators of current ICT infrastructure and use, the dominant „forerunners“ in Europe are countries like Sweden, Denmark, Netherlands, UK and also Norway. Dominant „latecomers“ comprise the economically less favoured countries within the EU - Greece, Portugal, Spain, Ireland - and remarkable also France.

⇒ Recent surveys indicate that interest for ICT applications is impressively high, very often multiples of the numbers of current users. And even if the divergence between those interested and those who are willing to pay to use these services is large, the market potential isolated thus is considerable.

⇒ Big cities and agglomerations with high population densities could be the winners of new ICT, because they are economically most attractive for private investors of new applications (Sassen 1997; Floeting/Grabow 1998: 19). Case study analysis of the current use of ICT in the participating countries of the EU demonstrates that high penetration rates are predominantly found in prospering large urban areas.

Keeping these prospective trends in mind, the traditional economic-functional typology seems to be a good starting point for the purpose of our study, especially by taking into account that trends of globalisation and the new ICT might reinforce polarisation within the European urban system and that large cities with high population trends could be the winners of ICT. Therefore it is decisive to differ between economically and geoFigureically „central“ and „peripheral“ urban regions in Europe (**„centrality“**) and between cities with high respectively low population densities (**„density“**). Of special interest might also be a differentiation according to functional structures: It can be differentiated between cities with traditional (industrial) production structures and cities with innovative productions structures comprising strong company-oriented services. Tourist or resort-oriented service structures might be another functional sub-category of relevance (**„functional structure“**).

For reducing complexity and relieving comparison, three general categories might be enough, because these categories can be further subdivided (see table 7). The typology draws on the above outlined model by Krätke (1995), but tries to adapt it to the purpose of this project.

Table 7: Hierarchical Classification Model of European Cities / Urban Regions - A Proposal

Typology	**Features** ? economical and geograhical centrality: within growth regions / peripheral regions ? density: high / low pop. densities ? functional structures: traditional, innovative production structures	**Examples**
1. Relevant European Cities/ Urban Regions ? Global Cities ? European Metropolises	economically prospering agglomerations (growth regions); companies and financial centres with international/ European spheres of activity; high population densities; overrepresentation of innovative, company-oriented services	London, Paris Amsterdam, Bruxelles, Frankfurt/M, Hamburg, Berlin, Munich, Zurich, Milan, Stockholm,
2. Nationally Relevant Cities ? old industrial regions ? newly industrialising city regions ? service-oriented city regions	economically growing cities, not necessarily within European growth regions; high/medium pop. densities; location of national and regional relevant companies and services, location for „innovative“ production structures or standardised productions	Lyon, Madrid, Barcelona, Lisbon, Rome, Athens, Glasgow, Dublin, Düsseldorf, Dortmund, Oslo, Prague Grenoble, Stuttgart, Toulouse, Montpellier, Bologna, Bristol, Cambridge, Valencia
3. Marginal/ Declining Cities ? declining industrial cities ? other „peripheral“ cities	economically declining/stagnating cities; geographically and economically „peripheral“ location; dominance of traditional production structures; small share of company-oriented services;	Turin, Porto, Manchester, Liverpool, Thessaloniki, Duisburg Naples, Palermo

This typology is the basis for the selection of 3 cities for case studies in each participating country. Of course, adequate indicators have to be attributed to the various categories. For instance possible indicators measuring „centrality“ could be regional GDP per capita and geographical location within a European „growth region“.

Outlook: Future Developments of the European Urban System

Typologies or classifications like the one presented above are snapshots representing the current state of the European city system. But there is an increasing dynamic within the system propelled by new ICT and intertwined processes of globalisation, liberalisation and deregulation and especially the opening of eastern Europe. It is an interesting question how the expansion and integration of the EU will change the future development of the European city system. In the following some hypothesises are presented.

There is a broad consensus that *competition* between cities and regions in the enlarged European economic area has substantially increased and will further increase. Some authors emphasise that the spatial-economic European system in the future cannot be reflected anymore by a „dual“ centre-periphery scheme. According to Krätke for instance, there will be more diverse patterns of regional development comprising

- prospering regions with innovative production structures,
- prospering regions with rather traditional production systems,
- rising regions outside the old industrial centres based on innovative production systems,

- old and new „growth-peripheries“ controlled by leading metropolitan regions which are conducting only second order production and services („enlarged working desks“), and
- marginalised cities and regions, being disconnected from the European economic context. These might not only be rural peripheries and marginalised agrarian regions, but also declining old industrial centres marked by massive de-industrialisation (see Krätke 1996: 167-68).

Instead of large corridors or axes of growth, the future European spatial structure can better be conceived as a kind of „mosaic“ of regional development types (ibid. 1996: 175).

This model of various regional development types of future trends of cities in Europe is also reflected by an empirical study of 1993 (EMPIRICA 1993). It investigated more than 400 cities and regions in West-, North-, Middle-, and East-Europe with regard to its overall attraction as production locations. It was based on criteria like availability of qualified employees, costs (esp. wages), production density (esp. industry), provision of private services, provision of research institutes, accessibility and market potential, as well as quality of living and the environment. Based on a cluster analysis four types of cities or regions were distinguished:

- Firstly, „low-cost production locations“, which not only contain low wages, but also other locational advantages like qualified employees and good accessibility. Examples of such regions were Poznan in Poland, the Czech Republic, Bratislava (Slovenia), Gyor-Sopron (Hungary) or the Burgenland in Austria.
- Secondly, „costly-but-high-efficient regions“, which offered no cost advantages, but are competitive production locations for distribution- and communication-oriented companies. Examples are Hanover, Lombardia, Zurich and others).
- Thirdly, „regions of a mixed type“, which are neither clearly production- nor service-oriented. Examples for this type of regions are the Rhone-Alps, Provence-Alpes-Cote d’Azur, Emilia-Romana etc..
- Fourthly, „loser regions with a deficient locational profile“. These comprise cities and regions offering nothing except low costs for production. Examples are among others Macedonia in Greece, Galicia in Spain, Alentejo in Portugal, and Fejér in Hungary.

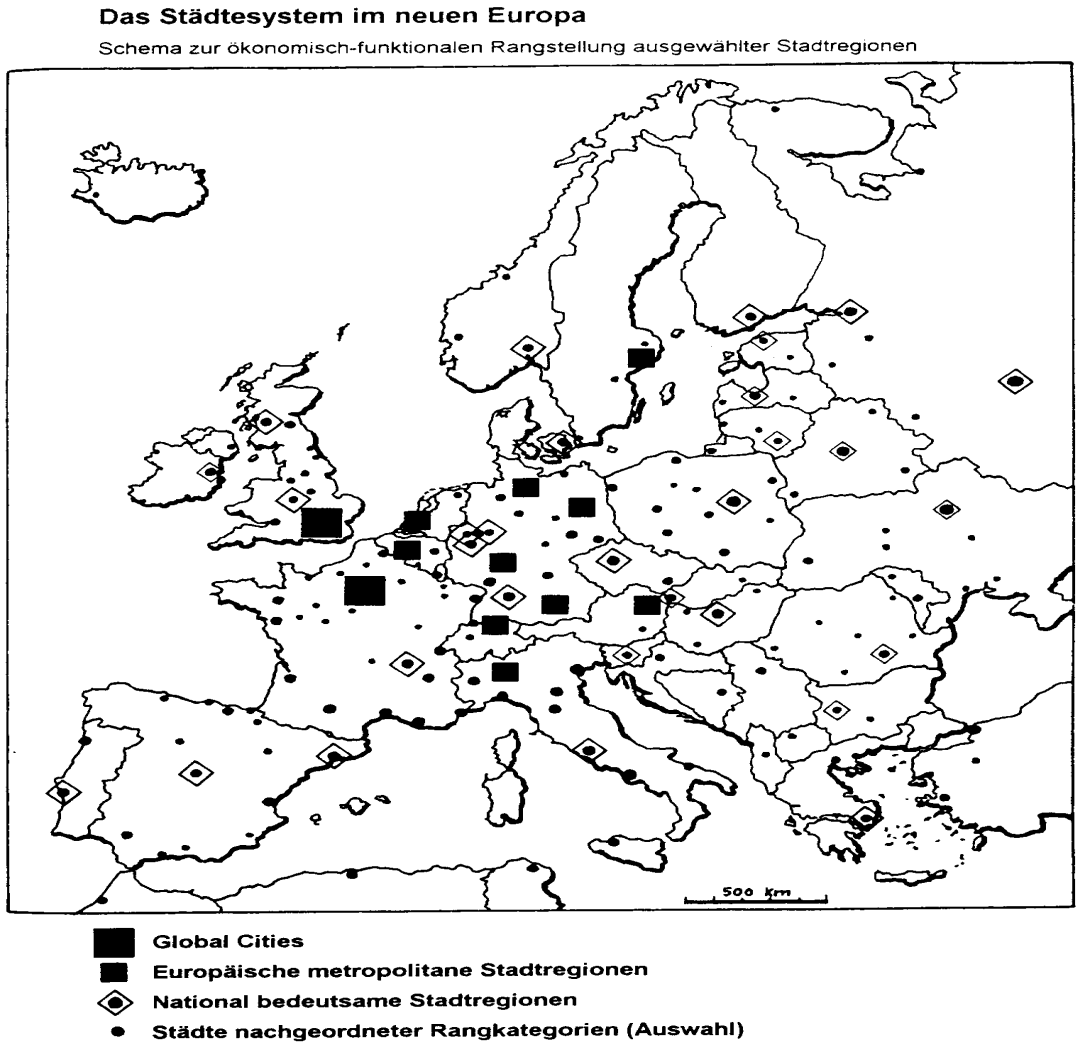
Interestingly the group of „losers“ with inadequate locational profiles are rather evenly distributed between western- and middle-, respectively eastern Europe. Of the group of nearly 200 low-cost cities and regions identified, 124 are in eastern-middle-Europe or in eastern Europe, 74 are in western Europe. That means that in an enlarged European economic area the majority of regions that will be locations for standardised, „second-order“ production, will be found in eastern Europe. All the regions of type „costly-but-high-efficient“ are exceptionally found in western Europe. Thus, there is a danger of a marked West-East-fall between economic strong production areas and dependent „executing“ regions (see EMPIRICA 1993).

These results consent with many other studies emphasising that the European enlargement and integration will lead to further polarisation and increasing disparities within the European city system (see for instance: Dunford/Kafkalas 1992; Bachtler 1995; Krätke 1995, 1996; ERECO

1993).[17] Within the European framework, the polarisation of cities can take on an new quality. Today, economically and geographically „peripheral“ cities in Portugal and Spain, but also in Poland and the Czech Republic are competing for investment-intensive „western“ companies, which are looking for attractive locations for their production plants. According to Krätke, the total European city hierarchy will be dominated by some Global Cities and a couple of European Metropolitan City Regions (see above). In a less stable „transitional“ middle position are cities which primarily formed important locations in a national context. In the new European economic area these nationally relevant cities are competing with many others and trying to rise to a relevant city on a European scale instead of slipping down in the European city hierarchy. All other cities will have less relevance on a European scale (see figure 2). Krätke assumes that certain eastern-middle European cities, like Prague, Budapest, Warsaw) have the potential to rise to a relevant city in the European context if they succeed in becoming a location for strategic company activities for the eastern and middle European markets (Krätke 1996: 173). Bachtler adds that the ability of individual regions in central and eastern Europe to adapt to new economic conditions appears to depend critically on economic structure (including workforce skill, quality of fixed assets), level of socio-economic development (employment opportunities, „entrepreneurship“), and geographical and economic peripherality (proximity to urban centres, transport infrastructure, sources of capital and innovation) (Bachtler 1995: 199).

[17] In this respect another study also investigating the hierarchisation of the European city system concludes that shifts of position will be most marked within the middle-sized cities. Accordingly, many British cities will comprise to the group of the losers, whereas many of the winners will be out of growth regions described as blue banana or sunbelt. Most of the large cities located in „banana“-corridor will be „stabile“ centres. The winners comprise western European urban regions (Paris, Barcelona, Hamburg, Berlin, Vienna) often located outside the „banana“. British cities like Manchester and Birmingham as well as southern European cities like Turin or Marseille are counted to the loser group (see ERECO 1993).

Figure 12: The city system within the new Europe: An economic-functional ranking scheme



Source: Krätke 1995: 143

ICT and Polarisation of the European Urban System

The presented prospects of increased polarisation of the European city system stand in sharp contrast with economic and social cohesion as one of the primary commitments of the European Union. In fact, there might be a trade-off between the completion of the European internal market (liberalisation, deregulation) and economic and social cohesion. Moreover, there is few evidence so far, that the information society and ICT will reverse these trends if there are no strong political efforts and initiatives on various institutional levels.

In theory it is widely agreed that ICT might have the potential to enhance economic and social cohesion, for instance by

- improving access to markets and sources of information,

- bringing work to areas with high unemployment,

- reinforcing positive externalities through shared infrastructures,

- reducing exclusion by making health, education, and cultural services more accessible in geographically more peripheral areas (see EC 1995)

Practically it is not very probable that ITCs will operate autonomously in this way. A prerequisite of ICT applications and uses is the availability of physical infrastructures and human capabilities (training, education etc.). It is not very likely that market forces will produce equal access and distribution of ICT's throughout Europe. It is more likely that market forces will discriminate areas where low returns of investments are expected. These might be the more remote and less densely populated areas.

According to a recent study for the EU assessing the likely economic impact of broadband networks upon rural areas concludes „that those regions most likely to benefit have high population density and easy terrain, a high proportion of information intensive industry and large companies, high GDP, an effective marketing network to inform service users, and good educational and training facilities" (The Policy Studies Institute et al. 1997. 15-16). Thus, we think that there have to be strong political efforts and programmes on various institutional levels are needed to reduce disparities between European cities and regions.

It is a major assumption of the TeleCityVision - project that the choice of appropriate strategies concerning information society and urban development depends heavily on adequate knowledge, perception and vision of political and administrative actors. So, keeping the danger of ongoing polarisation of the city system in mind, it is important to investigate into the perception and visions of political and administrative actors in above mentioned different types of European cities. Especially important in this respect seems to be whether the interviewed actors in less favoured city regions are developing adequate strategies to address these economic-functional problems by applying ICT, and whether the perceptions and strategies of actors in European growth regions are different to the others. Furthermore, it seems worth investigating the kind and quality of co-operation relationships of actors of urban developments to other cities. One might assume that there are more intense co-operations between actors in growing city regions.

3.3 Case Studies

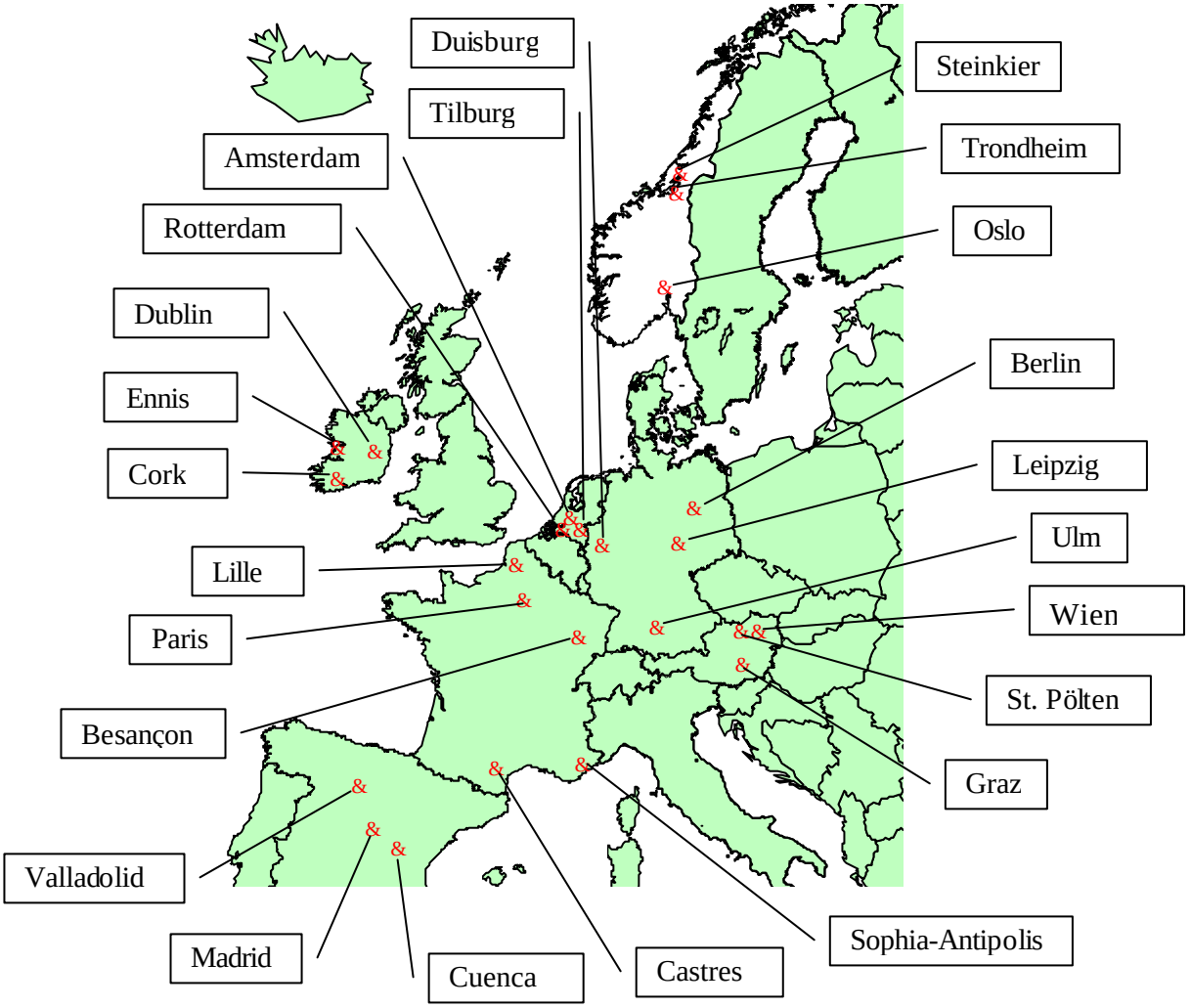
On the basis of the findings of the structural Analysis (Chapter 3.2) the following Cities were selected to be researched in case studies.

Table 8: Hierarchical Classification Model of European Cities / Urban Regions

Typology	**Cities selected for case studies**
1. Relevant European Cities/ Urban Regions Global Cities European Metropolises	**Paris (F),** **Berlin (D),** **Amsterdam (NL),** **Vienna (AU)**
2. Nationally Relevant Cities relatively stable industrial cities newly industrialising cities service-oriented cities	**Madrid (E↑)** **Lille (F)** **Oslo (N)** **Rotterdam (NL)** **Dublin (IRL),** **Ulm (D)** **Sophia-Antipolis (F)** **Leipzig (D)** **Graz (AU)** **St. Pölten (AU)** **Trondheim (N↓)**
3. Marginal/ Declining Cities declining industrial cities other „peripheral“ cities small cities with ICT ambition	**Duisburg (D),** **Cuenca (E)** **Vallodolid (E),** **Cork (IRL),** **Steinkjer (N),** **Besancon (F)** **Tilburg (NL)** **Ennis (IRL)** **Castres/Mazamet (F)**

The following map shows the distribution of the selected Cities in Europe.

Figure 13: Selected Cities in Europe



3.3.1 Methods of the Case Studies

The research consortium agreed upon the methods for the conduction of the case studies (see Deliverable 3). Accordingly the case studies are composed of four research units:

1. analysis of the selected cities
2. qualitative in-depth interviews
3. evaluation of collected data/synthesis
4. report

The research period for the conduction of the case studies covers June 1999 until October 1999 was fixed.

Analysis of the selected cities

A structural analysis of the selected cities was necessary to get a better understanding of the respective cities before the conduction of the interviews. The TCV research consortium has agreed to collect comparable data by a number of commonly available indicators. As far as possible, the following descriptors were collected and compared for the last five year period.

Statistic descriptions

Demographic development

- Migration-rate
- Natural population development (birth rate, death rate)
- Household/Population structure (household size, age, etc.)

Economic development:

- Occupation structure (shares of sectors)
- Unemployment-rate
- Per capita income
- Gross Added Value, per capita
- Budget development of community

Technological development:

- Equipment of households (PC, phone, internet access etc per capita)
- infrastructure of community
- Regional Net-provider/service provider

Additionally it was necessary to describe the cities by some qualitative aspects, structures and developments. Because of these mostly very complex issues a qualitative description seemed to be adequate.

Qualitative description:

- Actors/players in the urban development process (important enterprises, private developers etc.)
- Political programs for regional and local development

- Land use (description of distribution of uses)
- Functional description, characteristics
- Developmental problems in comparison to other cities
- Development projects, such as building or infrastructure measures

Urban development planning:

- Organisation of the governing bodies (divisions, competence, common boards/committees)
- Planning association (division of tasks, integration with surrounding areas)
- Land use plan, regional and urban development programs

Moreover:

- ICT projects
- Web sites/urban information systems

In the end, the results of these analyses had to be summarised, and the peculiar features of the research units needed to be exposed.

Interviews

Interview partners: Three to five cities were selected according to the structural analysis. At least three to five persons in the public government bodies - influencing or working in the field of urban planning and/or urban development - were interviewed. As far as possible two departments of the administration were chosen: 1. the department for urban development/ urban planning and 2. the department of economic promotion. The third share of the interviewees were politicians from different parties concerned with ICT-policies or urban development.

Interview method: The interviews were conducted as half-standardised, half-open qualitative interviews based on an interview guide („problem-centred interview"). All subjects, indicated by the guide, had to be elicited during the interview, but it was left to the interviewee to shape the discussion, and introduce new subjects. Soft inquiry means no immediate proceeding to the next question, but following the associative flow of the interviewed.

The interview was conducted by two persons and took place in the workroom of the interviewee (if possible). Preferably, one person led the discussion, while the other remained in the background, ready to intervene when necessary.

The discussions were arranged in advance; the estimated duration of the interview was at least 1,5 hours, and a temporally open end was necessary. All interviewees had equal information about the project and the research interests.

All discussions were recorded on audio-tape, by permission of the interview partners. Personal specifications were noted by hand, following a standardised short questionnaire. After the interview, the two researchers commented on the main findings of the interview and recorded the outcome of their comments.

Annotation: Our interest was in both the objective acquaintance with information and communication policies in the city and the subjective evaluation of the employee's acceptance and perceptions. The employees were informants as well as objects of research. It was important to take this into account during interviews and the consequent analysis.

Interview Guide

The following interview guide was applied:

1. General questions concerning the problem situation of the city:

- Which do you consider to be the main problems of the city?
- Which are considered, by official assessment, the main problems?
- How does the city react? What can the public administration do/what is done?
- What can you do/What are you doing?
- Are general guidelines/action strategies/goals pursued? Which?
- What are the tasks assigned to your division?
- Which image does the city have with respect to its inhabitants/ externally? Which image should be pursued/is pursued?

2. Information technology and city

- What does 'city in the information society' mean to you?
- Which effects do ICT have for the city in general/for your city?
- Can changes be observed/ be expected in the spatial structure? Since when have these changes been occurring? (decentralisation/ centralisation, concentration/ deconcentration, intensified trends)
- Which part, in this respect, is taken by business and private households?
- What differences in their choice of location can be identified?
- Which problems and opportunities can be identified as a consequence?

  What should the city do?

  What does it do?

  Are there any action strategies?
- How does the city use ICT? Since when? What is your opinion about it?
- What experiences do you have with the urban information system/ digital-city/ city-web site of your city? Which is its assignment? Do you use it at work or at home?

- What is your opinion of applying ICT in the city's administration/in urban (development) planning?
- Does the planning process change? (democratisation/ transparency/ improved co-operation of planning departments/ effectiveness/ information-access/ ...)
- Could you explain this with an example?
- Which meanings do these considerations have in general in the administration/with respect to your work?
- How do you keep yourself informed, concerning the matter just discussed?
- On which topics do you feel well-informed/on which topics would you like to know more?
- What efforts have the city/ your department made to train employees? Do you have any suggestions about what would be necessary?

3. Division of labour in the administration

- What changes have been proceeded in the administration during the last 5 years? (reorganisation/restructuring) What was the reason?
- Who decides what has to be done?
- What is up to yourself to decide?
- With whom do you co-operate?
- Which problems can be identified concerning this division of labour?
- Which role is performed by the citizen? (democratisation)
- What could be improved?
- How do you perceive your role, compared to other actors? (influence)

4. Personal experiences with ICT

- (What is your personal attitude toward ICT?)
- Which experiences do you have?
- Which equipment do you have privately/professionally? Since when?
- How do you perceive the everyday, casual use of computers?
- Do you feel sufficiently qualified? Would you like to apply for more qualifications?

5. End

- What will the future city look like?

Evaluation

After every interview, the interviewers reflected on the discussion and filled out an interview record. This record provided the most important impressions, the specific peculiarities, and the non-verbal communication patterns.

The tape recording was transcribed and evaluated. By means of a qualitative evaluation method („partly standardised content-structuring case analysis“ (PCCA) proposed by BIS), the essential contents of the interview were structured in significant categories. This allowed, on the one hand, a concentrated display of the peculiar case, and, on the other hand, the cross-section comparison. The PCCA contains three steps: 1. Quotations from the text concerning the subject 2. comments and summary by the compiler 3. short characterisation (e.g. positive/negative). The short characterisations were displayed in a table. Thus, the comparison of the cases was facilitated and the transnational evaluation supported.

Finally the results of the evaluation were summarised in reports of the respective research groups, in nearly each case composed of four sections.

Sections I-III discussed, respectively, one of the researched cases (section I = case study I etc.) Every section consisted of the following subdivisions:

- Revision of the type the city was ascribed to, by means of the analysis of the following indicators: demography, economy, technical equipment, structure of the administration, engagement in the ICT sector, for example networks and urban information systems etc.
- Evaluation of the interviews corresponding to subject categories, elaboration of models and concepts
- Confrontation/comparison of the urban analysis with the interview results, elaboration of theses
- Summary and comments

In *Section IV*, the three cases were compared, and differences and parallels were stated, which could possibly point towards certain hypotheses (as well, with respect to questionnaires in the quantitative inquiry).

3.3.2 Summary and Comparison of the Results of the Case Studies[1]

The main objective of the TeleCityVision-Project (TCV) was to survey the relevance of Information and Communication Technologies (ICT) for urban development. For this purpose administrative actors in 24 European Cities were interviewed about their perceptions and expectations of the challenge caused by the rapid development of ICT. To identify key problems and general trends it is necessary to compare the results so far available of the qualitative case studies.

Nevertheless the comparative approach carries the risk of oversimplifying the complex interrelations between different contexts. Hence such comparisons need to be justified by an underlying theory.

The approach has two objectives. On the one hand it provides a general overview of the results of the qualitative expert interviews. They show a wide range of assessments, expectations and perceptions of ICT among administration officers interviewed in cities across Europe. According to the explorative method of qualitative research answers are often manifold and associative. These variations underline the fact of "social construction of reality". Different national attitudes can be recognised. Since a comparison is always a generalisation applied to get more insights into mainstream developments and research tendencies it does not claim to name all results of the interviews. It outlines similarities and differences of the given assessments so that a summary of the main issues can be made.

Due to this perspective the main goal of comparisons is the development of further hypotheses to be evaluated in the quantitative research. New solutions and aspects how to cope with the challenges of ICT within urban contexts can be figured out.

In the centre of the following section, the concept of this comparison will be outlined briefly. The central criteria of the comparison (*tertium comparationis*) is the perception of ICT in the local administrations regarding their relevance for urban development. Different contexts are brought into a dialogue. These contexts - like urban development problems, urban guidelines and images, ICT-policies etc. - structure the following comparison. Corresponding to this it is divided into six sections:

At the beginning, the interviewees' assessments relating to the challenges of the Information Society will be summarised. Secondly, the main considerations regarding urban development problems will be listed in a table in order to discuss noteworthy aspects. In a third step these problems will be related to the guidelines of the cities. The fourth step will examine the ICT policies and initiatives of the cities included in the study. Fifthly, the use of ICT within the cities' administrations will be analysed. Finally, the perception of ICT and their importance for urban development will be outlined and the guiding hypothesis of the comparison illustrated in a concluding diagram.

[1] Summary of the National Reports of the Case Studies: Annex 3 (P. 130)

The Challenges of Information Society

The image of the Information Society is associated with fear as well as hope. The perception varies among the interview partners. Two general aspects often recur in their answers. On the one hand, the new society is defined by the majority as a society where the importance of information grows in line with its increasing accessibility. (The access is seen as facilitated.) Knowledge and information will be available to all. On the other hand, private economic power is often seen as the driving force of the Information Society. In the end it is seen that the current transformation process is depending on private economic decisions. In the ranking of most of the interviewees, private companies and households come first, and only then do public administrations contribute to this process. At first sight, this assessment seems to be quite obvious, but on a second, it raises the further question about the relationships between the different actors, the public as well as well as the private. This important aspect will be discussed in the context of ICT-policy coming up further down in this comparison.

The interviewees' notions on the Information Society can be brought into a general order by dividing them into opinions of pro and contra. It must be considered as remarkable that some of the assessments are contrasting pairs.

Table 9: Pro and contra statements

Pro	Contra
• improvement of communication • higher networking and co-operating • benefits in education and qualification • improvement of citizens par-ticipation • improvement of efficiency and transparency of administrations • improvement of rural areas	• increase of short life and superficial information • information overload or flood of information which will be no longer measurable • dependence on technical operations • two-speed society: creates privileged locations and excludes low qualified people • intransparency • dependence on technology

Some further assessments can be understood as consequences of this development. For instance, it is expected that the production of information will become more important than the production of goods. From this point of view the key words are the strengthening of the service sector and the possibilities of teleworking. Another point worth discussing is the importance of Personal Computers within the transformation from a industrial to a information-orientated society. Do PCs have a high degree of importance or does the personal access to PCs play an inferior role for the shift? Instead, is the transformation more due to a way of informational orientation? In addition to these questions, it is also expected that life in general will be even more dominated by technical operations. Nev-

ertheless, most of the interviewees believe in a growing significance of face-to-face-contacts. Thus they see ICT as complementary to traditional communication rather than as a substitute. Human relations are still seen as an important aspect for solving of urban development problems, for example in the urban planning process.

Urban Development Problems

Another objective of the case studies was to work out the situation of the individual cities. Therefore the officers in the public government bodies were asked to name general and specific urban development problems. The following table illustrates the most pressing problems. It is organised by the typology according to the structural analysis of the cities studied which was due to the first step of the project:

Table 2: Urban development problems

City types according to the structural analysis of the project	Relevant European Urban Cities				Nationally Relevant Cities											Marginal/Declining Cities									
Urban problems \ Cities studied	Paris	Berlin	Amsterdam	Vienna	Madrid	Leipzig	Ulm	Oslo	Trondheim	Dublin	Rotterdam	Lille Metropolis	Sophia Antipolis	Graz	St. Pölten	Besançon	Duisburg	Cuenca	Valladolid	Tilburg	Steinkjer	Cork	Castres-Maz.	Ennis	S
transport/infrastructure	x		x	x	x	x	x			x	x	x		x	x	x		x	x			x		x	17
economic transformation		x		x		x	x	x					x	x		x	x			x	x	x	x	x	14
employment		x	x		x	x	x				x	x	x			x	x	x	x	x					13
environment	x		x	x	x				x	x															6
suburbanisation		x		x		x		x		x				x											6
loss of population						x			x	x											x	x	x		6
budgetary problems		x			x											x		x	x						5
socio-spatial polarisation		x	x								x	x								x					5
interactivity of communities				x				x		x						x									4
lack of an ICT plan	x				x													x	x						4
industrial wasteland								x									x						x		3
security	x				x							x													3
lack of space			x								x									x					3
bad reputation											x						x								2
S	4	5	5	5	6	5	3	4	2	5	5	4	2	3	1	5	4	4	4	4	2	3	3	2	

Apart from unemployment and the spatial reorganisations caused by the pressure of economic transformation, transport is seen as the most urgent problem. Every urban development problem has to be distinguished from town to town according to the size of population and other relevant aspects. Looking at the ICT-policies and -concepts and comparing them with the three most common problems, transport, economic transformation and employment, one can conclude that there is the belief that these problems can be solved with the help of new technologies. Nevertheless, the individual assessments of the interviewees are often contradictory to this general belief according to the ICT-policies (see below).

It is remarkable that, on the one hand, environmental problems are mentioned much less frequently. On the other hand one has to consider that transport and industrial wasteland are particular environmental issues. However, a closer look on the individual studies can show that environmental problems are not seen as relevant in the context of the increas-

ing use of ICT. Industrial wasteland is understood as an obstacle for economic growth. The question is whether this loss of interest is due to a displacement of priorities or not. In these cities, the fight against unemployment for example is seen as more important than environmental protection. In this context, is it relevant how ICT are seen regarding their capacity for solving environmental urban development problems? The inquiries have shown in most of the case studies that this problem-solving-capacity is not seen. This does not mean that there is no potential of ICT to emphasise new perspectives of sustainable urban development, but the interviewees are not prepared to recognise these abilities.

Vice versa one can say that the urban setting has an impact on the perception of ICT. A city with a high amount of industrial wasteland which is followed by a bad reputation like Duisburg suffers from a smaller interest in economic transformation than for example Leipzig. In the latter, especially the housing wastelands are seen as an asset in which it is worth investing, at least in the long term. In the former, the trust in the impact of new technologies is regarded as rather low, in the latter, it is rated rather high. One can assume that there is a connection between the importance given to urban development problems on the one side and the perception of ICT on the other. As a first approach, one can perhaps say that the more a "nice and neat" urban setting is appreciated, the greater are the hopes and expectations associated with ICT.

Urban Guidelines and Images

Urban development problems are mostly related to the guidelines as well as to the internal and external images of the cities. The case studies show that the interviewees are aware of the continuous decrease of the industrial sector while the service sector gains more and more importance but still has to grow to compensate the losses. Even though one of the cities studied, Tilburg in the Netherlands, still believes in industry and tries to maintain its traditional advantage, one can say that none of the cities has failed to recognise this shift towards the service sector. In comparing the cities studied, one can detect the main tendencies of urban identification on the way to the Information Society. Most of them have developed official guidelines. On the one hand these refer to the current and future designs of cities and the new technologies play a crucial role in this context. On the other hand one has to keep in mind that old structures are still alive. They are often represented by the images of the cities as described by the interviewees. These have a more informal character. They often reflect aspects like the general living standard or the economic attractiveness of a city. Traditional urban patterns exist side by side with modern structures and visionary concepts about the future.

Corresponding to this, a comparison, which relates the informal images and the official ICT-guidelines of the 24 European cities included in the qualitative research, allows to outline a typology. Eight types of cities can been derived. Some of the types are more evident, some less, some cities like Dublin seem to be too specific to integrate them. But the idea of this typology is not to get a complete transfer of reality based on structural

characteristics of the cities, but rather a conscious distortion, which is due to the aggregation of the individual interviewees' assessments. The typology should help to reduce the complexity of assessments, the distortion allows to highlight new perspectives on the perception of the research field.

Typology of Urban Guidelines versus Images

(1) The type of no concern

Regarding the guidelines the **Tilburg**-type seems to be a special case in the European city system. Although the importance of wool industry has fallen sharply in recent years, it aims to keep the old industrial image as "the textile town". Regarding strategies to restructure the local administration, Tilburg has been a pioneer over the last decades. But this "Tilburg Model" is not as relevant as one could suppose, because there is not a direct connection between the administrative reforms and the development of guidelines for the city. There is neither a challenge seen nor any kind of activities recognisable for solving the urgent urban development problems with ICT.

(2) The stagnation type

Another type has to be seen in cities which are still in the beginning of reorientation. Stagnation is caused by the existence of a strong industrial sector. What distinguishes cities like **Castres-Mazamet** and **Duisburg** from others is a dramatic loss of population. Following statistic surveys it seems that Duisburg for example has managed to reduce the loss substantially in the nineties. But this positive development was less due to the attempt of the whole Ruhr-Area to cope with the structural change by transforming the former industrial into a service-orientated region. Rather the reason for this has to be seen more in the political change in Germany. Population figures illustrate that the unification process compensated the loss of population only temporarily. The perception of images or guidelines of these cities with a long industrial tradition like "Standort Duisburg" suffers under the burdens of the past, in particular the industrial wastelands. According to the interviewees, the bad reputation hampers the strive for revitalisation. One can assume that the bad setting which determines the hopes and expectations to manage the shift also influences the attitudes towards the new technologies. ICT are only promoted actively by individual employees in the planning department.

(3) The type of cognitive dissonance

The next type can be seen in those cities with a comparable size of population and a positive image regarding the standard of living. Even though there are intensive activities by the local governments in order to transform the economy, the effects are rather limited. The differences lie in the lack of economic attractiveness caused by either the decline of industry, a difficult infrastructural position or in an identity problem, which could be interpreted as cognitive dissonance. The people of **Steinkjer** see their town as the basis of

agriculture. The interviewees agree that “the city of rural areas” is not the best slogan to sell the town in the future. Another example can be seen in **Graz**. Even though the geo-political changes mean that it is a major centre of the south eastern region of Austria, it still suffers from its position within the European context. A peripheral location can lead to a lack of image for outsiders like in **Besançon**. In Graz the guideline remains somehow fuzzy and unspecific as it is just named “guidelines for the economic development of Graz”. A vision for a future image is missing. Also in **Cork**, there is no remarkable guide-line. Although people consider their town as the “real” capital of Ireland, the image of the city is rather negative suffering from the bigger Dublin. In these cities a discrepancy be-tween the positive internal and negative external image is recognisable which contributes to the lack of economic redevelopment.

(4) The fragmentation type

Cities with over a million inhabitants and a high degree of industrial potential can be seen as standing between integration and fragmentation. **Lille** and **Berlin** are good examples for both. Like Berlin, Lille suffers from industrial decline on the one side. On the other hand the dynamics of large projects like the Channel Tunnel in Lille or the movement of the German administration from Bonn to Berlin counteract this decline. These differences are leading to the threat of socio-spatial-polarisation with a simultaneousness of employ-ment and unemployment as well, which is also seen in **Rotterdam**. Beyond that, the con-flict between integration and fragmentation leaves the impression of instability of the im-age. There are lots of guidelines in Berlin, but none of them is well known or known as the leading one among all the others.

(5) The type of high private autonomy

As one will see, similarities to the previous type are recognisable in **Paris** or **Madrid**. However, there is a major distinction which leads to different guidelines. Paris as well as Madrid have a very positive image concerning ICT. These cities have a high degree of economic autonomy and political power – therefore one could add Berlin as well as all other capitals. Paris is the centre of tertiary industry for France. Madrid is also well known because of a high density of ICT. Nevertheless both cities have not developed a very strong policy for ICT like other bigger cities. The private sector plays the main role by offering high quality services to individuals and businesses. Besides this, the Paris area as well as the Madrid area is too large for the local administration to co-ordinate and overview all initiatives. Looking on the regional level of the Paris area, there are variations of this theme within the individual local administrations. Here one can find comprehensive and coherent ICT strategies.

(6) The integration type

Another type has to be seen in cities which are suffering from the break-down of industrial tradition and simultaneously are taking the challenges in a very serious and conscious way like in **Leipzig**, **Oslo** or **Vienna**. Leipzig and Vienna have a high degree of cultural

heritage, but are looking forward to a new economic identity through the shift to the Information Society. In these cities, the guidelines are often describing a good relation between the public and private sectors regarding the Information Society. According to these, ICT projects are addressing citizens as well as businesses from in- and outside. An illustrative and well known guideline is the one of Leipzig: "Stadt der Unternehmenden" (city of entrepreneurs). The concepts of these cities are trying to achieve a high degree of successful integration between administration and economy. This is emphasised by the important role public-private-partnerships play in these cities.

(7) The type of cosmopolitan localism

The profiles of cities like **Trondheim**, **Ulm** or **St. Pölten** are similar being regional centres for their surroundings as well as developing locations with a open-minded approach to global developments. This is forcing the municipalities towards a policy of „cosmopolitan localism". The rise of these smaller towns is caused by economic growth with a strong impact of the development of ICT as the guidelines demonstrate. The one of Trondheim - called „Little big Trondheim" - can be seen as typical for this type of cities. The positive identification of its inhabitants is based on the living standard, the urban tradition and the technological research environment. City marketing is even referring Trondheim as the „capital of technology". Globalisation and the deployment of ICT is understood as a challenge rather than a problem for the city. This leads to the vision of Trondheim becoming a Technopolis and the so-called „Technical Arch". These towns are pursuing the most integrated approach combining all different fields of life using ICT. Last but not least it is remarkable that the population of most of these cities is slowly but steadily growing. It seems that the generally positive setting also contributes to a positive approach towards ICT.

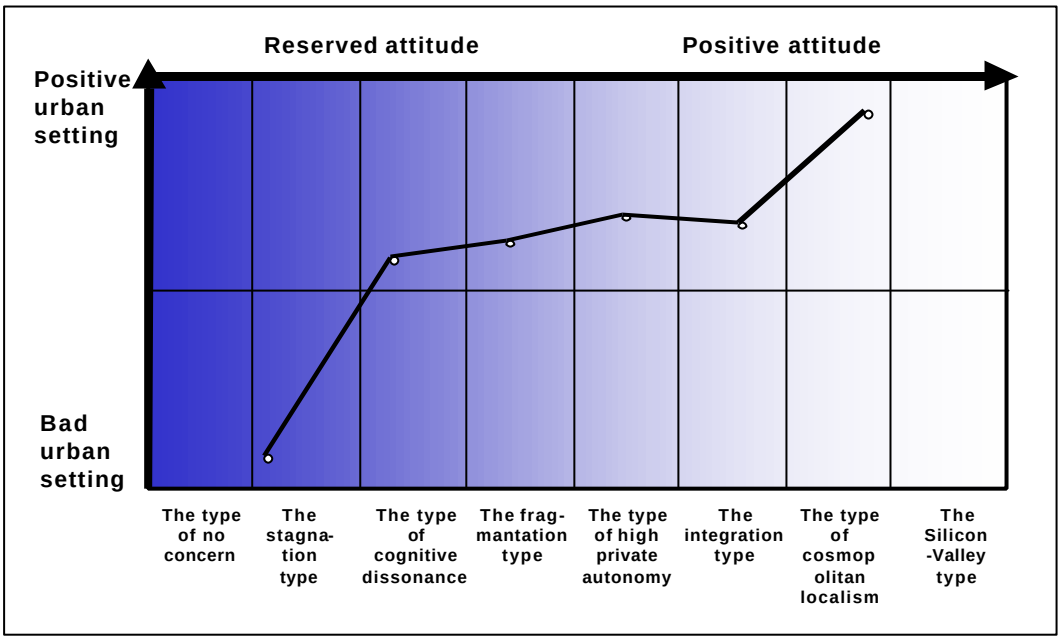
(8) The Silicon-Valley type

Being a high-tech industrial park, **Sophia-Antipolis** must be seen as another special type. It creates a lot of interactions within the whole area and the cities belonging to it. Considered as the Silicon Valley of France, it is underlining the thesis of overcoming spatial resistance and closing the gap between urban and rural areas via ICT. However, it must be admitted that there is still a dualism between the internationally renowned park and for example the city of Valbonne seeking to preserve its identity. As the study points out: "The town of Valbonne wants to be associated with the industrial park of Sophia-Antipolis, while retaining its own identity at the same time." Nevertheless, solutions to those tensions are seen in ICT connecting administrations, public and businesses. Corresponding to this, an increasing economic attractiveness, promotion and rapid communication is expected in the whole area.

According to this typology, one can say: There is a certain relationship between ICT and urban development strategies as they are developed in the official guidelines. But the awareness of this connection is always depending on the situation of the cities and espe-

cially how these situations are reflected in the informal images. In some cases the urban circumstances emphasise a positive perception towards the new technologies, in others bad self-assessments of the urban setting even hamper the apprehension according to the solving potential of ICT. The following diagram summarises the typology. Beyond this, it illustrates the relationship between the urban situation of the cities and the attitudes towards ICT given in the guidelines:

Figure 14: Relationship between the urban setting and the attitudes towards ICT



ICT Policies and Concepts

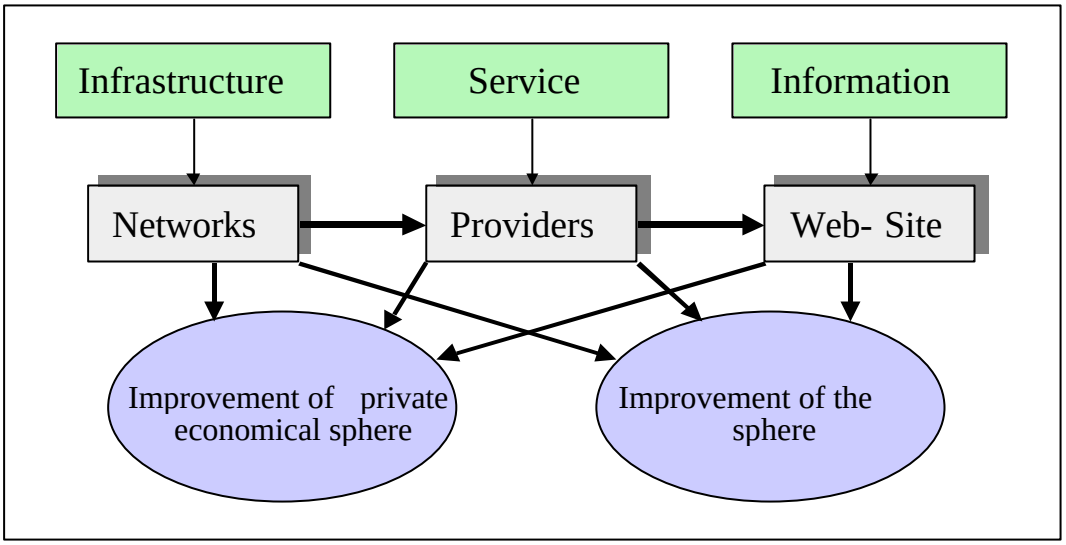
Regarding urban ICT policies and concepts one has to keep in mind that in addition to the local, the national level there is the Telecommunication policy of the European Commission and even the will to formulate a world-wide ICT policy. Within this process, the most important date for Europe is 1 January 1998. Since that date, telecommunication markets are thoroughly liberalised in most of the European Union. Side by side to this change of the legal framework, there is the discussion on Information Society, a point also emphasised by the European Commission. Well known are the papers of the former commissioner Martin Bangemann such as 'A New World Order for Global Communications. The Need for an International Charter' from 1997. On the one hand, it focuses on the promise that the technological progress is going to change socio-economic principles. On the other hand, ICT is suppose to offer radical solutions to these changes. Therefore every participant of the Information Society has to keep pace with the time in order to keep access. According to this demand, a high degree of expectation regarding the significance of new technologies can be recognised by comparing the different ICT concepts of the

study. ICT is seen as the key potential on the way to the new society. The main issues of European urban ICT policies are:

- improving democratisation and citizens' participation,
- favouring and supporting urban competence and relevance within the major European cities,
- improving quality of life, employment, environment, more free time,
- improving the efficiency of public administration,
- facilitating co-operation among urban actors,
- decreasing traffic congestion,
- balancing tendencies towards centralisation and decentralisation,
- supporting urban planning,
- strengthening the relationship between enterprises.

In almost all of the case studies it is possible to differentiate between three sectors of ICT-policies: First there is the infrastructural level including the technical preconditions of ICT as for example the cable networks. Next there is the informational level. Here the main inputs are given in order to set up the interface between the communicating partners as for instance administrative actors and citizens. Regarding contacts with the local administration, this can be seen in a city's web-site. These two areas are linked by the service sector. Main actors are service providers. In some cases ICT policies also include the provision of hardware and access facilities to the users by third parties. This could be described as a further sector of ICT strategies. The three main elements, infrastructure, service and information, are differentiated in the following diagram.

Figure 15: Structure of ICT- Policy



Nearly all of the interviewees consider private actors as the most influential ones with regard to the informatisation of the city. The question is: does the improvement of the public as well as the private economic sphere depend on whether the standards of infrastructure, service and information are set by private or by public actors? Does the private sector gain more importance when they are fully in private hands and vice versa: does the public sector, the improvement of democracy for instance, gain more importance when these sectors are completely in the hands of the administration?. The following structure summarises the main goals of the initiatives studied:

1. increasing the internal efficiency of the municipality on its way towards a service-oriented administration;
2. improving the interaction between administration and the economy to increase the general competitiveness and attractiveness;
3. improving the interaction between administration and the citizen and increasing the quality of life,
4. improving the access as well as the training of the public.

Almost all projects attempt the integration of these goals. The following examples of initiatives refer to these objectives. They show that the greatest efficiency of ICT-policies is not provided by either the public or the private hand alone, but by public-private partnerships. Nearly all initiatives tend to develop in this direction of co-operation:

Examples of ICT initiatives

(1) An interesting case for **increasing the internal efficiency of a municipality** can be seen in the “Light Network” being implemented in Besançon. It is remarkable that the

project started with two main partners, the local authorities and the university. “The aim is to bring together all the public partners from the different entities involved, such as local authorities, university, the army etc, and to pool their efforts in order to provide a high-capacity network which would make possible exchanges of information between the various establishments of any single entity (e.g. to link all the different faculties and buildings of the university). This philosophy has developed over time. This year it is envisaged to include the private sector in this network.“

(2) Initiatives **improving the interaction between administration and the economy** can be seen in most of the cities studied. An interesting project is the IT Fornebu in Oslo, because it underlines the visionary power able to shift whole airports: “Fornebu was until 1998 the airport of Oslo, located on a peninsula just outside Oslo, in the neighbouring Bærum municipality. This very attractive piece of land is partly owned by Bærum municipality, partly by Oslo municipality, and partly by the state. In 1997, an alliance of industry interests and national labour politicians suggested that the area should form the site of a national IT Centre. The vision is to establish a giant centre for ICT-research and industry.”

(3) The most important ICT activities of the cities address companies, both local and exterior. However, not only the private sector benefits from these policies but also, as it is often used as a strong argument for the advantages of the Information Society, there are cities which use the economic potential of ICT to reinforce the public sector and **to improve the interaction between administration and the citizen** as well. For example the web-site of Leipzig offers good access to the ongoing urban planning processes of the city. “It explains the legal framework of participation and planning, and raises attention to several platforms, studies and projects that are going on. There is always one central email address to which the interested citizen can send a request or a remark. Service hours are indicated, as well as the address and the way to get there.”

(4) Even though these projects describe quite a good picture of the possibilities to improve democracy via ICT, some interviewees complained about the missing access to the public. On the other hand improving the access as well as the training of the public in using ICT has been a project in one of the cities surveyed, too. “The most publicised element of the project was the offer to every resident (house-owner) and long term tenant, who, being within the Ennis Urban District Boundary, of a multimedia PC with Windows '95 and Microsoft Office Pro '97 software. To receive their PC, every household nominated a person from their household,(over 16 years old) to undergo a usage test or attend a basic computer familiarisation programme. 2,000 Ennis residents opted to do the usage test and 90% were successful. Despite the initial impression that the PCs would be given out free to residents, it was ultimately decided that those who passed the eligibility criteria would be offered the PC packages (worth £IR1800) at a subsidised cost of £IR240. Some 4,600 Ennis homes (or more than 80% of all residences) now contain PCs with email and web access.”

To conclude the different ICT policies and concepts have improved the communication within administration and between administrative units and external actors. As a result one could say that a policy which combines public and private interests produces lasting positive effects as for example the location of enterprises, the reform of administrations as well as democratisation. However, in the context of perception of the impacts of ICT within local administration departments one has to put this statement into perspective, as one can see in the following.

Use of ICT within the Administrations of European Cities

According to the study of ICT policies another objective in this respect was to identify the use of ICT within the municipalities and especially in urban planning. The purpose of this section is, in contrast to the more general view on the urban policies, whether the following closer look on a particular policy issue can offer a further insight into the way ICT are perceived.

It is true for all of the case studies that ICT-concepts are not only subject to technical renewals of systems and infrastructure. They also go hand in hand with the reorganisation of administration. Actually the use of ICT varies a lot and one of the main tasks in the future will be the challenge to achieve equal communication standards all over the European Union. Nevertheless, in some cities the ultimate goal still seems to be to supply every employee with a PC. There are cities like Cuenca where the Civil service is well equipped, but in most of the administrations surveyed, ICT are still being implemented. Only the city marketing companies are fully equipped with all kinds of new hard- and software, internet access and email. In a city like Trondheim which is calling itself "technological capital" of Norway there is a surprising lack of competence in ICT in the administration, which has had access to Internet for two years but there has not been any organised training of its use. A similar situation can be found in Ennis. Designated to be "Ireland's Information Age Town" it appears as the most underdeveloped in terms of official use of ICT.

At least one remark was made on this more or less negative picture of the technological equipment in local administrations. If the costs of the development of ICT-equipment are not that high compared to the amount invested for instance in roads or social services, the political priorities are still behind the challenges of the Information Society.

A comparison of the cities web sites confirms this impression. Often they are interactive, but mostly on a very low level. They are used in the sense of a public relations instrument to promote the city or at most to inform the citizens about the different departments in the administration.

Regarding to what extent and in what form ICT have been taken up in urban planning, the answers are quite similar. Again they underline the impression: At the present time as well as in the future ICT is not seen as an important element in the planning process. At

least, one can derive six approaches of ICT which are seen as relevant for the future of urban planning:

- registration of vacant lots
- geographical as well as cultural database For example: The project "Access to data" (TAD) in Oslo is trying to establish the internet as a channel for the handling of geographical data and building registers, which has both commercial, rationalisation-, and public aims.
- increase the potential for participation in the planning process
- transport: Trondheim was the first town in the world to use automatic road pricing with the Q-free device. This is a technology developed and first implemented in Trondheim, now exported world-wide.
- higher flexibility of planning outputs
- three-dimensional or animated presentations to make planning outcomes more attractive

In spite of these remarks to the future, the leading opinion is that planning itself will continue to be made mainly by technologically independent actions of trained employees. The common problems like transport will remain the most important ones and ICT are seen as a very little help to solve it. However, it is remarkable that there is a repeated mistrust even compared to the low expectations in ICT. It is said that ICT increase the time- as well as the personnel-intensity. Beyond this, the protection of data is seen as the most important reason for being sceptical towards the use of ICT for urban planning. How can this shortcoming concerning the use of ICT in municipalities in general and the urban planning in particular be explained?

A plausible answer can be given to this. In the case studies a good training and access at the work-place is often considered as a necessity to increase the significance of ICT in administration. Training thus takes place informally. It is depending on individual employees' interests. Also the set-up of web-sites seems to be based on such individual engagement. Even there is a brought discourse on Information Society the perception of ICT and their possibilities depend on whether someone from the staff is interested in them or not.

Perceptions of ICT

As the perception of ICT is the main objective of the comparison, this last section can be understood as a summary. Adding more information from the case studies it will finally try to develop a concluding hypothesis on the topic.

The use of ICT within the municipalities is generally based on individuals' interest and engagement. This can be confirmed by the answers regarding the perceptions of ICT.

Firstly, one can say that the attitude towards ICT is mainly positive but there are mental reservations. ICT are considered as useful tools in order to establish administrative functions and duties more efficiently. On the other hand, they cannot be substitutes for personal contacts, because face-to-face communication will remain important for background knowledge and decision-making.

Secondly, it is said that the frequency of use and attitude towards ICT depend either on the age or the profession of the user. There is obviously an important lag due mainly to the old age civil servants. The statements on this issue were quite limited, however.

The third point has to be regarded as the most important. It responses to the main objective of the project whether the increasing use of information and communication technologies affects the development of cities in Europe. It is recognisable that the answers to the question have been rather reserved. On the one hand, at least an indirect influence on urban development is seen in the strengthening of decentralisation processes caused by ICT. On the other hand, the interviewees had difficulties mainly with the question about the spatial impacts of ICT. Given that this is still quite a new area, none of them had a clear vision of what could happen in the long term.

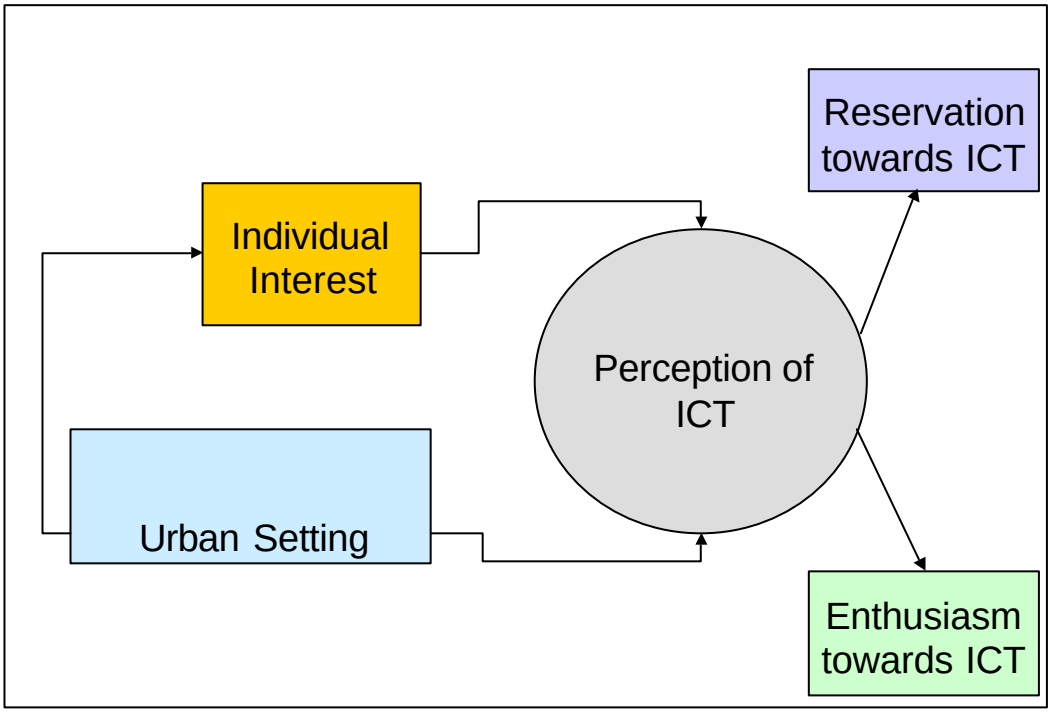
In the perspective of the comparison this sceptical attitude is due to the question of perception. Is it possible that the impacts of ICT are not seen, because they are not directly visible? Nowadays, a typical urban problem like security of public spaces is often solved by a high amount of digital cameras. For instance the difference between urban and rural areas is insignificant for the camera eye. One can assume that this "neutralisation" of space will even have visible consequences for urbanity and urban development in the long term. The idea of the "Tele City" is immaterial compared to the towns we are living in at the moment and which are built on "flesh and stone". This tension between the materiality of cities and the immateriality of the effects of ICT is perhaps the crucial point to the question of perception of the new technologies. It connects on the one side the perception of the urban setting, as it could be studied in the context of the urban problems and the guidelines, and on the other side the perception of ICT as a visionary possibility to react to the common transformation process towards the Information Society.

At the moment, it is only possible to say that the perception of ICT in the local administrations is due to the individual's attitude towards ICT depending on age, profession, knowledge and experiences with the new technologies. If the personal interest is strong, there is a very enthusiastic attitude towards the improving possibilities and a kind of open-minded perception of ICT. One interviewee sees the obligation to mitigate socio-economic problems such as the gap between those educated and not-educated. Other interviewees have the impression that ICT enlarges the hiatus between the educated and the non-educated.

Generally speaking, one can say that the comparison can illustrate that the individual awareness of ICT is shaped by the urban setting of a city. The physical character of a city

has to be seen as an important framework for assessments and decisions of the individual administrative employee. -. Their perception of the potential of ICT for the city goes either in the direction of technological enthusiasm in successful and optimistic settings or in the direction of rejection in shrinking and traditional industrialised cities. The other determining factors, especially the personal conditions (age, education, practical ICT capabilities) have a strong impact on the perception. They have to be analysed and typologised more deeply in the following research. The following diagram shows the final hypothesis of the comparison:

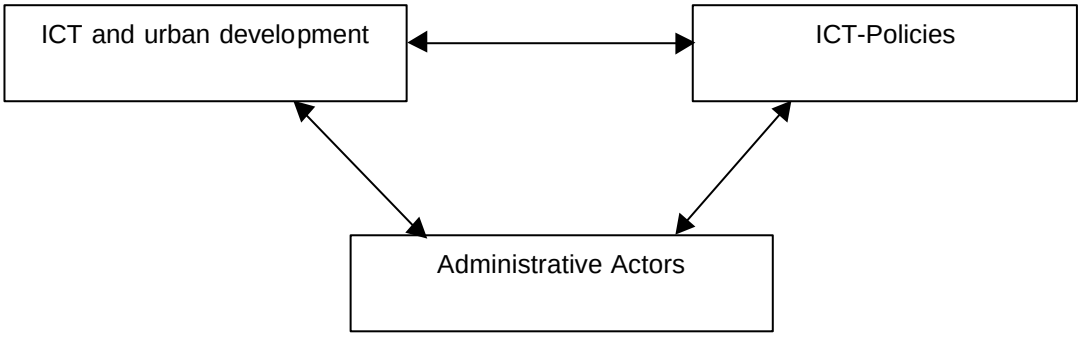
Figure 16: Perception of ICT within the administrations



Facit

The case studies show that ICT strategies in European cities can neither be attributed to national differences, nor to urban economic structures, nor to the size of a city, even though these characteristics certainly do have an influence on the factors which frame ICT strategies (e.g. self-image of the municipality and its tasks, municipal power, urban guidelines...). Nevertheless, a direct impact on the strategies themselves cannot be identified. So, we take the outcomes as a preliminary confirmation of our research issue that there exists no one best way of ICT strategies. Therefore, and again, we have to point to the social construction of the specific negotiation order of the cities, which creates quite a variety of different ICT-strategies patterns. The framing of this pattern is lined out in the figure below.

Figure 17: Three interrelated areas



The general findings of this first phase can be classified into in three interrelated areas:

1) ICT relevance and its impacts on urban development in general; which can further be divided into three issues: 1. changing spatial structures, 2. changing communication structures, and 3. changing internal administrative communication and co-operation.

2) ICT policy of the city, including projects, guidelines and concepts, their objectives and addressees, as well as the assessment by the staff.

3) The disposition of the actors and their relation to ICT in urban development and ICT policy. The ICT acceptance of the actors and their ICT experience plays a decisive role.

This leads us to the following hypotheses:

1. Urban development and ICT

- Administrative actors do expect changes in the urban development process in the near future, but they do not relate them to ICT.

- Expectations are either that communication in general will be improved and sped up by ICT, or that it will not change at all. This is also valid for the inter-administrative communication.

- Co-operation and the political decision-taking-process, on the other hand, are generally not considered to be changing.

2. Urban policy

- The assessment of public ICT activities depends on whether urban actors are seen as actors of informatisation or not.

- All interviewees regard ICT as an economic potential and location factor, additionally some see the effect of democratisation.

- Most ICT-Projects aim to improve the economic structure and attractiveness of the city. Less attention is paid to the aims of participation/democratisation or traffic and environment. Economically decreasing cities invest almost exclusively in economically oriented projects. Cities with a more solid economic structure invest as well in participation oriented projects.

- Each city needs a different ICT concept, depending on its problem structure and sight. Corresponding to this, cities choose their strategies.

3. Administrative Actors and Politicians

- Generally the knowledge of public urban guidelines corresponds with the personal problem perception. The more the guidelines seem to be problem oriented (or seem to meet the perceptions of the interviewees) the more they induce a high identification potential.

- The personal acceptance of ICT corresponds to the assessment of its importance in the own working sphere and of its significance for urban development.

- The acceptance of ICT depends on the administrative department in which it is used. The administrative department which is most used to ICT and knows the most about their effects and applications is the economic promotion department. Among spatial planners, ICT are either known very well and accepted as an instrument, or they are not used at all.

- The municipal actors (politicians) only support ICT if they see some potential benefit in the use. This is especially true for the heads of the departments and of the administration as a whole.

- The structural organisation of the administration seems to have an impact on practices of formal and informal communication and co-operation.

The translation of the hypotheses cited above into researchable and standardised questions provided us with a quite exhaustive questionnaire, which was applied in the following quantitative phase of our study: We conducted a survey among major cities and functional urban region all over Europe. Thus, we expected that the supposed complex interrelations between the three fields of interest, which constitute the framing of the negotiation order for ICT strategies, could be identified more clearly by the end of the survey.

3.4 Questionnaire Survey

The TCV-Consortium was conducting a survey in European Cities which deals with information society and urban development in the perspective of urban administrative actors. The purpose of this survey is to evaluate the hypotheses resulting from the qualitative case studies conducted in selected European cities in 1999 (see chapter 3.3).

The survey was prepared at a workshop held in Madrid in December 1999 and by e-mail communication within the consortium. Most of the proceedings and methods were fixed at the workshop. The questionnaire of the survey was developed by "virtual" discussion groups and in different successive steps.

First, we will explain the research tools, the proceedings and the methods of the survey.

Keeping in mind that, the overarching aim of the TCV project is to understand how the change from an industrial society to a global information society will be expressed in the city, and to understand how the process of informatisation interacts with urban development, the aim of the current survey is both to get a better understanding of the role of the public (administrative) actor and to discover how the urban policies are interrelated to the actors' awareness and acceptance.

The research consortium agreed upon the following hypotheses which served as a basis of the survey:

1. Urban development and ICT

- Administrative actors do expect changes in the urban development process in the near future, but they do not relate them to ICT.
- Administrative actors do not ascribe changes in urban form and development to ICTs.
- Expectations are either that communication in general will be improved and sped up by ICT, or that it will not change at all. This is also valid for the inter-administrative communication.
- Co-operation and the political decision-taking-process, on the other hand, are generally not considered to be changing.

All of the questions referring to these hypotheses should contain aspects of traffic/transport, environment, communication, labour market, democratisation, planning tool, social equality and quality of social life

2. Urban policy

- The assessment of public ICT activities depends on whether urban actors are seen as important actors of informatisation or not.

- All interviewees regard ICT mainly as an economic potential and location factor, additionally only few see the effect of democratisation.
- Most ICT-Projects aim to improve the economic structure and attractiveness of the city. Less attention is paid to the aims of participation/democratisation or traffic and environment. Economically decreasing cities invest almost exclusively in economically oriented projects. Cities with a more solid economic structure invest as well in participation oriented projects.
- Each city applies a different ICT concept, depending on its problem structure and sight. Corresponding to this, cities choose their strategies.

If possible, it was intended to ask the following or similar questions in all areas mentioned above at the end of part 1:
Is your city active in this area?
Can you influence the process?
Are you or is your city planning to become active in that area?

3. Administrative Actors

- Generally the knowledge of public guidelines corresponds with the personal problem perception. The more the guidelines seem to be problem oriented (or seem to meet the perceptions of the interviewees) the more they induce a high identification potential.
- The personal acceptance of ICT corresponds to the assessment of its importance in the own working sphere and of its significance for urban development.
- The acceptance of ICT depends on the administrative department in which it is used. The administrative department which is most used to ICT and knows the most about their effects and applications is the economic promotion department. Among spatial planners, ICT are either known very well and accepted as an instrument, or they are not used at all.
- We assume that the actors only start to support ICT if they expect any potential benefit. This is especially true for the heads of the single departments and of the administration.

Finally we found some hints as to the structural organisation of the administration, which seem to have an impact on the here discussed question. Practices of communication and co-operation depend on administration structures and informal communication structures.

4. Infrastructure/ Equipment/ Technology

- The more complex the administration is organised, the more difficult gets co-operation. On the other hand, familiarity, trust and social control in smaller administration bodies facilitate communication and co-operation processes.
- Technically, the co-operation within the administration and between different departments must be supported by a homogenous, standardised and complementary ICT system. But the sheer technical opportunities will certainly not automatically lead to an improved co-operation.
- Within the last years, many administrations have been starting to respond to new demands and more complex tasks by restructuring and reorganising themselves. An ICT implementation strategy should be integrated right from the beginning, in order to avoid an uncoordinated approach in different departments.

3.4.1 Methods of the survey

The survey is conducted as a quantitative mail survey in European cities. An important issue of the survey is the comparability of the data collected in different countries and in different languages. Basis of the comparability are standardised and commonly developed survey tools. The central questions were how to select the sample, how to design the questionnaire and finally how to collect and evaluate the data (see chapter 3-5).

The quantitative survey is conducted through standardised interviews with a selected target group in the urban administration by a written questionnaire. The structured questionnaire mainly consists of closed questions. It was sent out by mail.

The questionnaire was distributed by all TCV research groups at the end of March. This means, that the survey take place at the same time all over Europe.

The evaluation of the data proceeds in four steps. First, every TCV partner will analyse his own data. Then, the data will be collected and commonly analysed by the German partners. After the first common analysis, the preliminary results will be discussed in a workshop in Dublin at the end of June. Finally, the consortium will decide how to deal with the collected data in the further work process to provide the relevant information for the survey report.

The Selection of the Sample

The consortium agreed upon a number of criteria for the selection of the sample.

The consortium chose a stratified sample design. A stratified sample is a sampling method in which separate samples are drawn from different segments of a population in order to ensure proportionate representation of each segment in the overall sample.

First, we decided to investigate three levels of cities within the participating countries.

1. Major cities which are defined as cities with more than 100.000 inhabitants.
2. Secondary cities which are defined as cities with a population from 50,000 to 100,000 inhabitants.
3. Small Cities with a population of less than 50,000 inhabitants.

This selection of cities is due to the very different urban systems within the partner countries. Generally, we try to include in our research all major cities of the participating countries and additionally a selection of smaller cities to make the different levels comparable. The following table shows the total number of cities surveyed in the respective countries.

Table 10: Number of Cities in the survey

Country/ State	Number of Cities >100,000	Number of Cities <100,000	total Number
Norway	4	16	20
Ireland	2	18	20
Austria	5	15	20
Netherlands	22	8	30
France	36	14	50
Spain	54	11	65
Germany	64	16	80
Total	187	98	285

From the population of all urban administrative employees and all urban politicians of the selected cities, we chose tree target groups:

1. Administrators concerned with urban development/ -planning,
2. Administrators concerned with economic promotion, and
3. Councillors who are concerned with urban development (e.g. members of the committee for urban development).

To address this population we chose the referring departments which differ in every country. Within each department, about ten individuals are selected randomly for inclusion in the sample.

The minimum number of interviews per city was fixed at 10, the maximum at 30 interviews. The decision of the final number per city was left to the single research partners regarding the specific structures of the respective cities.

Following the described proceedings, the total sample would contain about 5700 interviewees. By expecting a low response rate of 20 to 40 percent the data base would consist of about 1140 to 2280 cases. Finally, the survey covered 239 cities with a total of 1560 cases.

Questionnaire

At the Madrid meeting, the research consortium agreed upon the general structure of the questionnaire. The questionnaire was to include four main subjects corresponding to the hypotheses (see above):

1. the actor's perceptions of the interrelation between ICT and urban development

2. the ICT-policies in the city,

3. the use of ICT and actor's acceptance of ICT, and

4. the ICT equipment.

In four "virtual" discussion groups which were each related to one subject, proposals for the different sections of the questionnaire were prepared. After that, the questions of the four proposals were integrated into one questionnaire by the co-ordinators. This first draft version was discussed by the entire group. The co-ordinators tried to integrate all critical reviews in an overall revision of the questionnaire and distributed the new version once again. This procedure was repeated twice until the consortium agreed upon the final version of the questionnaire (see annex).

The final version was translated into the respective languages of the participating countries. During the translation, there was still the necessity to sharpen some expressions and to make clear some meanings which seemed to be quite clear in the English version.

Finally the questionnaire was printed in the responsibility of the partners.

Evaluation of the Data

The consortium will analyse the collected data by the computer assisted evaluation programme SPSS. The evaluation will focus on descriptive data analyses.

The entry of the data in a common SPSS data file follows an equal code plan which both were developed and distributed by the co-ordinator.

In a first step, every partner creates an individual SPSS file following the determined equal code plan. In a national report, the conduction of the survey (problems, response rate) is described and an overview of a set of frequency distributions and - if useful - some cross-tabs are given. The national reports including the SPSS file are delivered to ZTG and BIS until May 30.

BIS and ZTG collect the individual files and put them together. The main file will be distributed again to all partners for their further use.

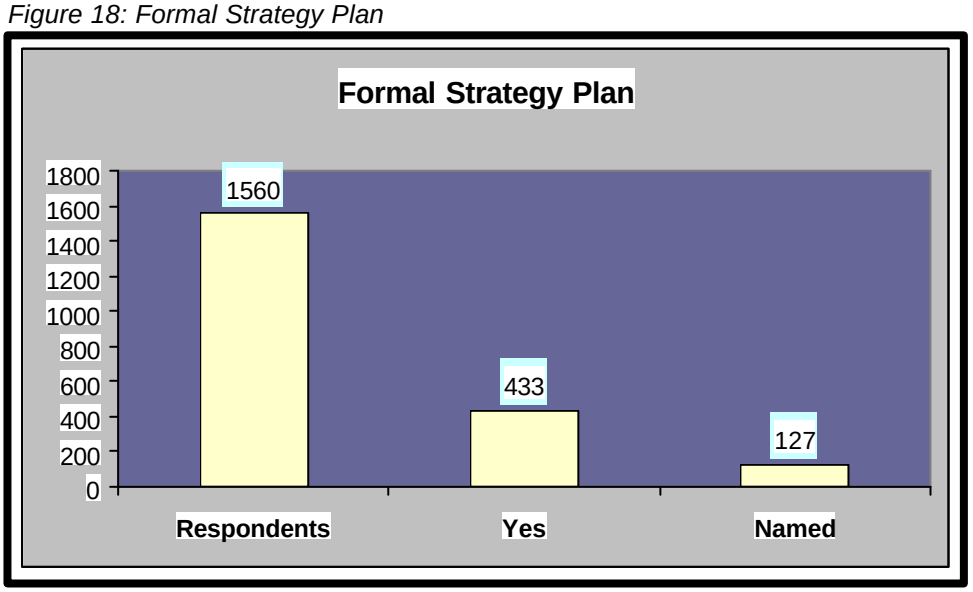
Besides validity and reliability tests the analysis of the main data file will include a correlation matrix (associations), factor analyses (interrelations between factors), cluster analyses (comparison of countries and city types).

3.4.2 Summary and comparison of the results of the survey[1]

Summaries of the national reports can be found in annex 4.

On the first sight, the findings of our study reveal a relatively undifferentiated picture on the effects of ICT on the city. For example, a direct impact on spatial issues was rejected by the people asked in the first qualitative phase of our project. However from a distance perspective, the outcomes lead to the general impression *that within the attitudes, expectations and hopes put into ICT, the fundamental problems of current urban development policies are reflected in a particular manner*. What does this mean? Taking into account the estimates of the different groups the TCV project has interviewed, we observe different knowledge deficits regarding the potential of ICT. What is the reason for this? It has been ascertained in the qualitative phase that ICT initiatives are often due to the efforts of individuals. Furthermore, the quantitative survey demonstrated that the involved people from urban municipalities and city administrations often knew about the existence of an ICT strategy for their city, but were unable to name them. [Figure 18]

Figure 18: Formal Strategy Plan



Out of 1560 respondents 433 answered that there is a formal ICT plan, nevertheless only 127 have been able to name it. Drawing the conclusion that this superficiality is based in

[1] Summary of the National Reports of the Survey: Annex 5 (P. 193)

individual ignorance or personal background might seem logical, but would be a rash judgement. Of course, we all know that city administrators are not aware of the really important processes transforming the world! However, the interviewees as citizens and professionals are not completely autonomous, but are part of their city as a whole. They bear in mind a very individual city concept, which determines their understanding and perception of urban politics and of the potentials of ICT.

This aspect of city concept is important in my reading of the outcomes. It combines the everyday picture of the city including mental maps everybody usually has and also the general idea of the city which is in conjunction with the social surrounding. According to Kevin Lynch, one could point out that the urbanite is reading the city day-by-day. Nevertheless, the persons being asked by us about ICT and its possible impact on the city have to cope with the difficulty in transferring their concept of city, including the professional knowledge about current urban problems, to the potential uses of ICT as well as to the question whether these potentials can be useful for the city. This is in my opinion quite an act!

Such a transformation being successful would ideally imply that the individual concept of city flows into the understanding as well as the shaping of ICT. And in fact in very general it has been recognised that numerous applications of ICT have a sort of urban structure, as the most prominent example, the Internet, shows. Beyond this, we all know that the way we communicate about ICT is very often accompanied by urban metaphors. As metaphors can be understood as little models of thought, as for example the idea of network, they do shape a technical innovation, such as to parallel numbers of PCs. What is more, the technical innovation again provides new social models, for example the network society. From here on, this migration of metaphors goes on and on and while there is a social shaping of technology, also the society is formed by the new technical innovations.

However, taking the social shaping of technology approach seriously, it raises the question, how the ascertained knowledge deficits of urban actors can be related to such processes? Many actors have an idea about ICT potentials in regard to the city, however, according to the assessments of our respondents they stay unspecific. But does this mean that the individual administrator or politician does not have any idea about the potential of the new technologies? It also could be the other way around. It also stays to question, do they really have a useful concept of city what is transferable to ICT? If not, how shall they become aware off their potentials for the city? In political terms, it seems to be almost impossible to gain such a concept of city concerning all relevant urban issues, today. Because of the complexity, city concepts are mostly gained in parts due to what is seen as the most important issue. This implies that some urban structures and problems are embodied and others are left out. Therefore, the awareness of the ICT in regard to city related potentials is very selective, it includes whatever is seen as the most significant item according to the city conception of the respondent.

Correspondingly, my simple thesis is: *As long as there are no explicit city concepts taking the urban structure and problems extensively as possible into account, there will be no adequate perception of the potential of ICT.* Of course, I cannot judge all individual city concepts of all interviewees. Instead, I must specify my thesis in a direction which makes sense to the outcomes. These show in many aspects a lot of similarities. Therefore, I suggest the following reading of the outcomes*. Because ICT is a socially shaped technology of urban communication, the thinking about ICT and its potential linkages to the city is constantly demonstrating the vital situation European Cities are confronted with today*. Following Hartmut Häußermann, most cities are faced with the fundamental decision of whether they can still be understood as a collective social actor, as a space, which encloses all the inhabitants under the welfare of citizenship, or as a marketplace, where only those can participate who obey its laws, rules and behaviour patterns. In many European countries it is becoming more and more obvious that if the cities are losing their status as collective social actors, for example by giving up their influence on shaping residential issues due to financial problems, the questions of social disparity within the urban areas are left to market mechanisms. The consequences are often an increasing social-spatial segregation and polarisation of our cities, whose factual costs can currently hardly be calculated.

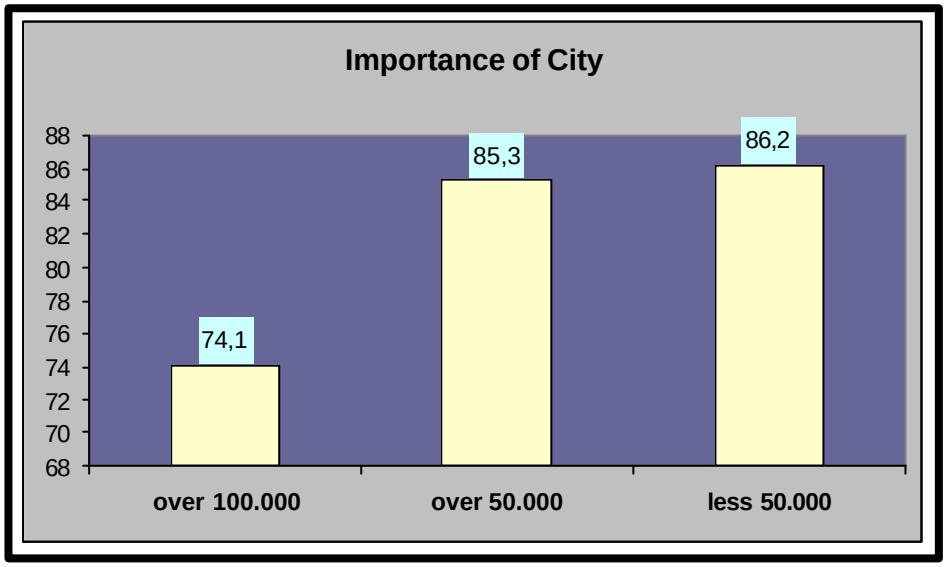
Outcomes

As part of the consciousness of the urban stagnation, the increasing competition within cities as well as among different cities must be seen as a peremptory and particular problem field of the urban crisis. First of all, city competition again makes aware that national borders are losing their significance. Nevertheless, it would be an error to believe that the importance of cities and regions increase in proportion to the decrease of national regulatory frameworks. Rather, the increasing competition shows that the space among cities within the world-wide city network is becoming closer as more and more cities are accepting that challenge.

Under financial restrictions it is necessary today to use all existing resources in order to stimulate innovations and produce growth with the goal of establishing a significant position within the world-wide city network. In the past, rivalry among cities, was discussed mostly in regard to big cities. But now smaller cities are taking part in this rivalry, meaning that we must include them in our perspective. More and more small and medium-size cities are participating in the contest of obtaining a good „position within the international division of labour“. More and more are competing in „functions of control and order“ pertaining to adjacent regional areas and are taking part in the „competition for consumers and money" (Brandner 1997: 349). Not only "relevant European cities" such as Amsterdam and Vienna, but also other cities of Europe are in a struggle for a place in the sun. In our examination 78.1% of all respondents see the competition of the cities rising [Question 3d].

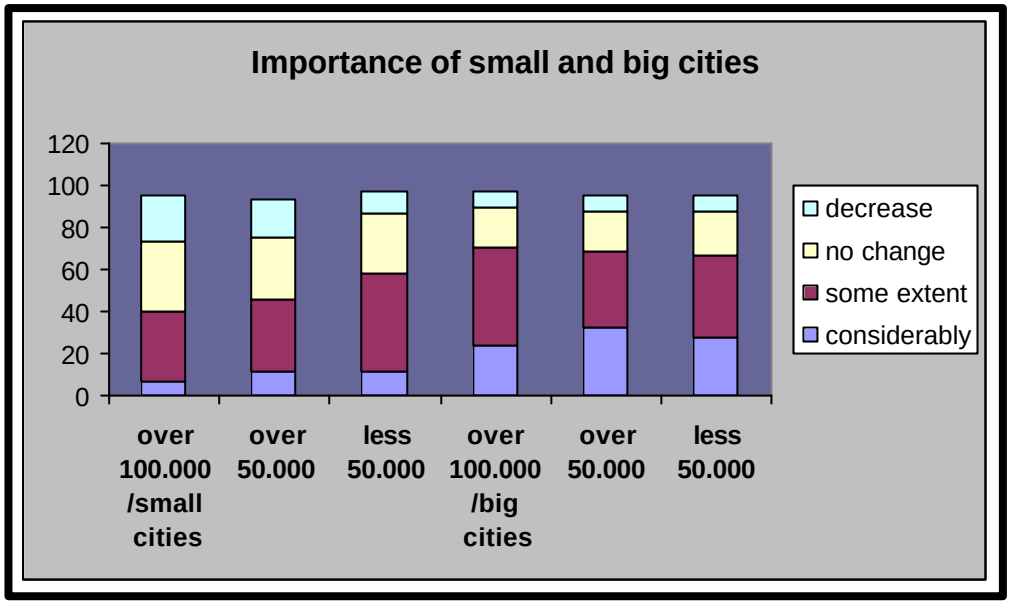
In line with this assumed increasing pressure of competition the visibility of each individual city within the international context becomes a vital issue. While the Global Cities are obviously ever-present, and therefore are without competition (moreover they are drawing more and more innovation and investment capital), national relevant cities like Leipzig or Oslo have to combat strongly the growing threat to their invisibility. After the fall of the iron curtain, for diverse cities such as Graz, for example, the hope was to become an economical and strategical central bridgehead between East, West and the Middle of Europe. I do not know if this is still the hope. Berlin also had very big expectations in the beginning of the 1990s, but these expectations are not very hopefully being seen more realistically today! However, even more effort will be needed by smaller cities, which have ambitions to gain a place in the sun. Interesting in this matter are the assessments within the quantitative survey of our project on the increase of importance of each actor's own city.[Figure 19]

Figure 19: Importance of the city



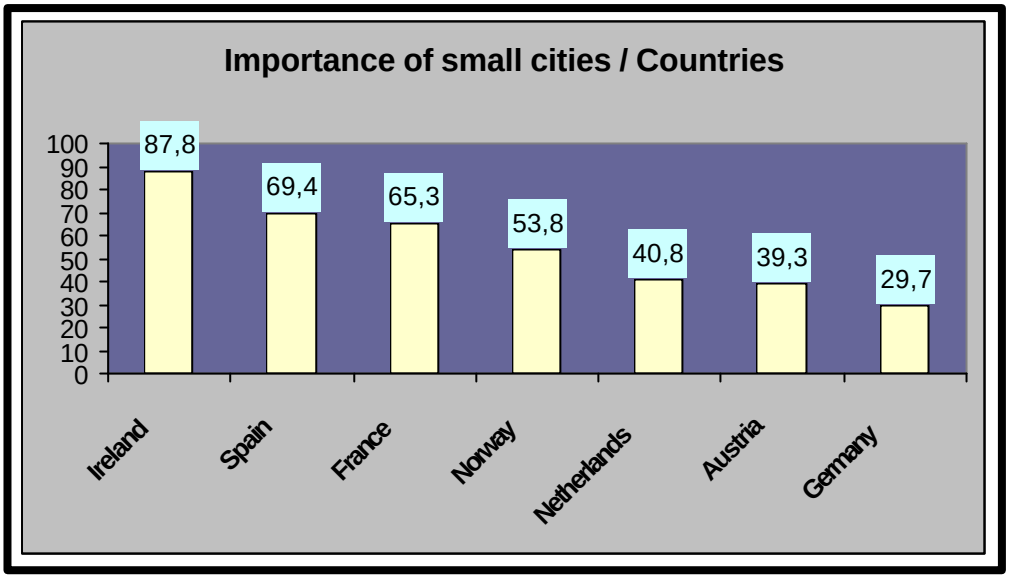
At first glance a homogeneous picture is recognisable. The opinion of 74.1% in accumulated numbers of all people asked in cities over 100.000 inhabitants is that their city will gain in importance in the coming decade; in cities with less inhabitants this assumption increases slightly to 85.3% and in cities with a population under 50.000 inhabitants it increases somewhat again, to 86.2% [Question 3a]. In regard to the future of their own city, people asked are undoubtedly *optimistic*. As our survey deals with city personnel, who probably identify themselves significantly with the city because of their professional work, this outcome seems plausible. However, one could ask further, for what reason does the optimism increase even more in smaller cities? Does a smaller size city allow another identification that furthers the optimism? Is there a better reading of the city possible? Or does the optimism of the smaller city mask its actual insignificance? [Figure 20]

Figure 20: Importance of small an



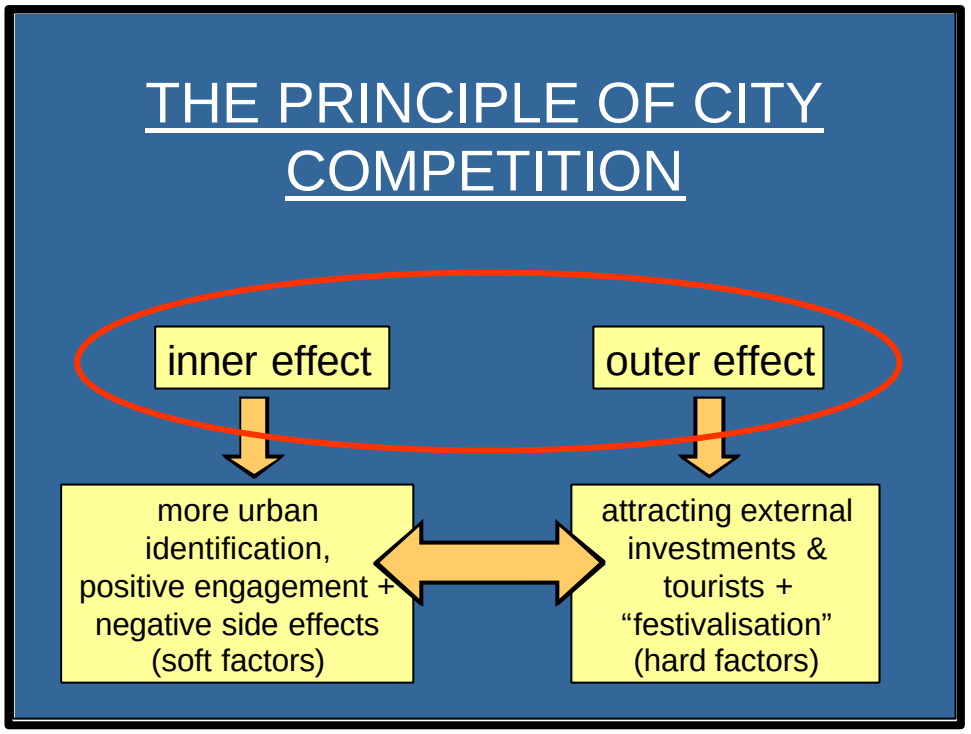
The optimistic picture can be seen in another perspective after further questioning. Comparing large and small cities, the assessment of changes in importance differs. In cities of over 100.000 inhabitants just 40.2 % of the people consider that the importance of smaller cities will increase, whereas 32.7 % think it is implausible that there will be any change and another 22.4 % even believe that there will be a decrease in the importance of small cities. This seems not only due to the arrogance of the city dweller. Similarly, the optimistic tone is reduced by the people from cities under 100.000 inhabitants. The tentative negative assessment of the city dwellers is shared regarding the importance of smaller cities. Observing cities under 50.000 the answers are again similar. Only 11% suppose that the importance of small cities will increase considerably, 35.1 % believe to some extent, 29.3% consider there will be no change, and 17.8% believe there will be a decline. Hence it follows that there are divergences between the confidence in regard to people's own city and the increase in importance of other cities. After all, every fifth person in cities under 100.000 believes that there will be a decrease in smaller cities, while, no matter on which level of city size, everyone assumes there will be a further increase of big cities. 70 % of all that were asked are convinced that the big city will gain further power.

Figure 21: Importance of small cities/countries



Because countries do not have equal numbers of big cities, it is clear that, from a comparative point of view, there are national differences. [Figure 21] In those countries, such as Germany, with many cities of over 100.000 population, it is considered implausible that small cities will increase in importance. 38.5 % believe that the relevance of small cities will not change, and 27.4% even predict a decline of smaller towns in the ranking of cities. The Netherlands show a similar assessment as well. In both participating countries with the lowest density of urban population, Austria with only 5 cities over 100.000 inhabitants, and especially Norway with just 4 big cities, the assessments are rather reserved. However the two countries with a more optimistic perspective are France, followed by Spain and than especially Ireland. 58.1% of all questioned from Ireland expect an increase of importance and another 29.7% even sees this growth as considerable in the coming years. Ireland has two cities of over 100.000 inhabitants, Dublin and Cork. Just 21% of all who were asked came from one of these cities. Even in Spain, which has approximately as many big cities as France, one also believes in an improvement of small cities. What does this mean? Where there has been an economic stability in recent years, one expects a profiting for small cities. One is more reserved toward the Netherlands, considered to be at the top of the current shift towards a new formation of society, simply because just 7% come from cities under 100.000. However, in regard to Ireland this positive belief in the growing significance of smaller cities does not mean that bigger cities, especially Dublin, will lose their weight. The people asked from Spain, however, are a little more sceptical. Still, 50% believe that the importance of big cities will increase, but 10% are presuming a decline of importance, which could imply that the ones being asked in Spain are more critical about metropolises.

Figure 22: The Principle of City Competition



These outcomes underscore that the competitive wind is getting stronger, just as the first optimistic self-assessment implied, but the question remains, how does competitive mentality work? [Figure 22] The discrepancy between the *positive* self-assessment of small cities and the more *sceptical* view from outside reveals the answer. The confidence in regard to the urban future of people's own city leads to the presumption that the competitive mentality not only hardens city life, but also affects positively the identification of citizens with their own city and its surroundings. For many peripheral cities in times where money is tight, the belief that something is changing is the initial prerequisite for a better future. This inner effect of city competition is the pre-condition for competition of cities among each other. People are moving closer together in order to be well prepared for what comes. Regarding the inner cohesion of cities, the principle works. It creates an urban identification in opposition to outer insecurity, thus enabling people's own city to better the climate within the city. Just imagine what would happen if a candidate for city mayor says that he loves some other place in the country than where he is running for election!

Vital in regard to the inner effect of the competitive principle are soft factors referring to the readability of city form. The surroundings in terms of neighbourhoods, offerings of leisure and culture, and also in light of the question whether the urban setting is worth living in, or suffers from pollution, can be affected by this part of the competitive principle. Also, it implies the promotion of education and integration. Positive as well as negative consequences in regard to political strategies can be the result of this impact. Cities suf-

fering heavily under industrial wasteland will probably respond differently towards the competitive pressure than cities with a high standard of living and education. A negative effect of this side of the competition principle lies in the exclusion of the unknown, which is then identified with the insecurity of the space outside the city. But competition also provides the urge to become more homogeneous, motivates building walls around the city's own merits in order to be safe. In a dream of purity based on common sense, the internal effect can lead to expelling everyone who is not loyal to the rules of the city.

In the external direction the competitive principle develops a different dynamic. The goal is to better factors such as transportation infrastructure, employment structure and within this the creation of office space, the strategy aims to attract capital and therefore invests in external presentation of the cities for potential investors and tourists. Surely these factors have an effect on the city's interior as well. There are studies for example which maintain that the mechanisms of social control within a city are ruled more-and-more by tourists than by the original citizens. One can also study the effect by taking city guideline into account. There is a guideline in Tilburg in the Netherlands, a city of almost 200,000 inhabitants, which had presented itself at the beginning of our project as the "textile town". Nowadays, the guideline has changed, at least according to its web site: There it lies not only in a beautiful surrounding but in the heart of the booming region of Mid-Brabant. Both the inner and the outer effects of city competition cannot be considered separately. But it is still necessary to consider if the effects contradict each other.

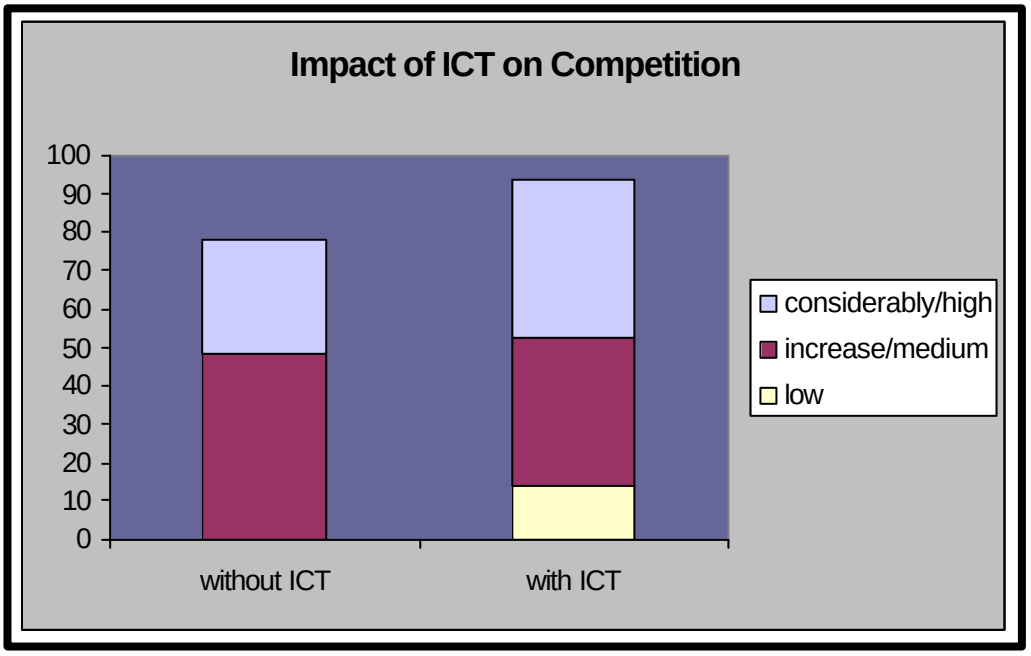
If increasing city competition is oriented exclusively to the outside, if one is only concerned about giving a signal to the world, one gambles with the threat to hide the problems behind an image of the city according to the standards of international representation. *Therefore, the question of how the city competition works shows us that there is a gap between the perception of the internal structure and its problems and the external presentation*. Unbounding self-confidence unmasks itself sooner or later as a last scream for help in a city suffering financial catastrophe.

In this danger of contradiction ICT plays a vital role. In regard to both the inner and the outer effect of competition, the application of the new information and communication technologies offers potential. ICT certainly gives new impulses to business. Especially internet presentation of cities and communities show this. Such presentations offer even economically weaker cities a possibility to present themselves, excluded from all inner conflicts and urban problems, as being a modern location. But also large stagnating industrial cities can refurbish their bad image as a successful city. The Web site than becomes a multilingual visiting and business card of a municipality acting more-and-more as a private firm. The internet presence is part of an urban development policy, which acts as city marketing on the basis of public-private-partnerships, as many ICT-initiatives which have been studied during the project have proven. Thereby hints to big events are not allowed to be missed on the Web sites, as for example: “The famous Tilburg funfair is the largest in Europe!” They help to support the fragile identity of urbanites and also in-

crease the acceptance of mistrustful investors from the outside. Besides the actual costs for festivals, exposition and other events, this allows, at least for a relative time period, to gain some attention on the international parquet for the urban competition. Today one talks more and more of a "festivalisation" of urban politics, which aligns its strategies only to the external presentation of the city. As is being said, the reason for that is because there is no political advantage worth the effort taking classical urban issues into account. City conception is not related to experiences of city life, but to the outside. *ICT is taking effect as a multiplier regarding this precarious situation.*

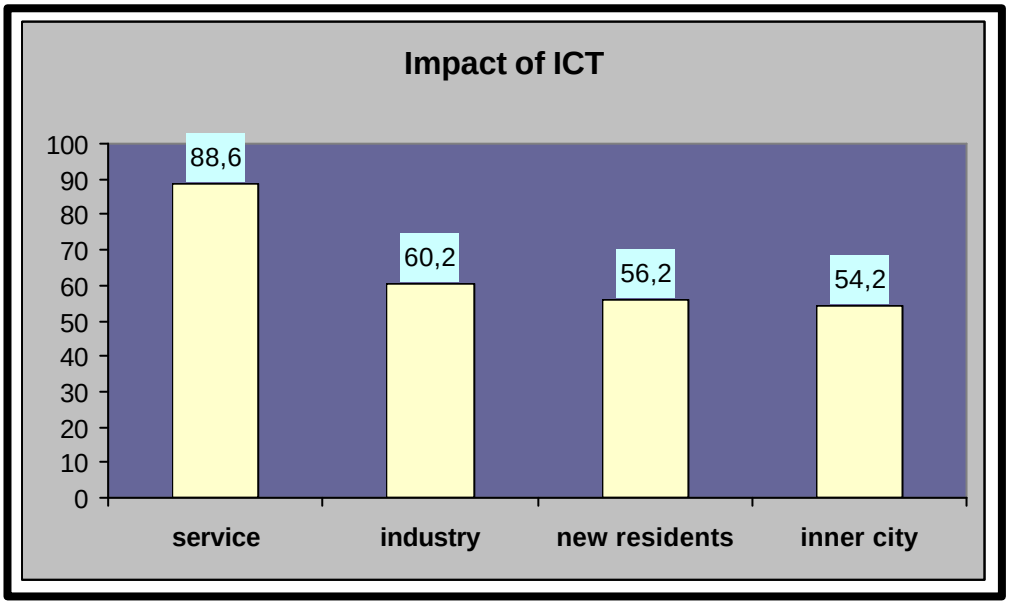
As much as ICT promises equal chances for large and small cities to participate within the word-wide city network, general access due to the new technologies can also mean that city competition increases even more. What has been shown to be a capable answer in regard to the economical erosion of the cities, also even promotes this erosion. Therefore, it has already been proposed as a very discussible matter, to understand a loss in importance within the world-wide city network as a chance. It helps to concentrate on the reality of urban problems. However, the quantitative survey of our project shows that ICT will increase the struggle among cities according to the people asked. All-in-all 94.4 % believe that urban contests will be re-enforced by ICT, whereas 41.8% expect a high impact, 38.3% a medium, and 14.4% a rather low [Question 4d] impact. Again, Ireland and Spain expect more rivalry caused by ICT. Moreover, in cities with more than 100.000 inhabitants one guesses that ICT will cause an increase. Out of 97% 45.6%, believe that the increase in competitive pressure will be significant. Compared to the assessments not taking ICT into account, a increase due to ICT can be ascertained. [Figure 23]

Figure 23: Impact of ICT on Competition



The differences in the assessment demonstrate again the different effects of city competition principle. In regard to the outer presentation and its corresponding factors one sees the substantial potential of ICT. 88.6 % of all respondents take for granted that because of ICT more service business will settle within the cities, 60.2 % are also sure that ICT will certainly attract further industry. Otherwise, only 56.2%, see a possible impact caused by ICT in the question of attracting further residents to the cities, which can be related as a soft factor due to the inner effect. Besides the curiosity that especially France is optimistic in that point, also countries with a low population density as for example Spain, Ireland and especially Norway see at least a little potential on this issue. In Germany instead one does not see an activating factor in regard to residential growth. Furthermore just 54.2% of all people questioned suggest an impact of ICT in regard to the significance and shaping of the inner-city area. Although both aspects, the residential development and especially the formation of the inner city are very much ICT-related issues - the use of security technologies at public sites and streets exist today not only in the UK but in all of Europe– it is proven that the impact of ICT under the increasing competitive pressure relates substantially more to the external effects of the competition principle and its most relevant factors [Figure 24].

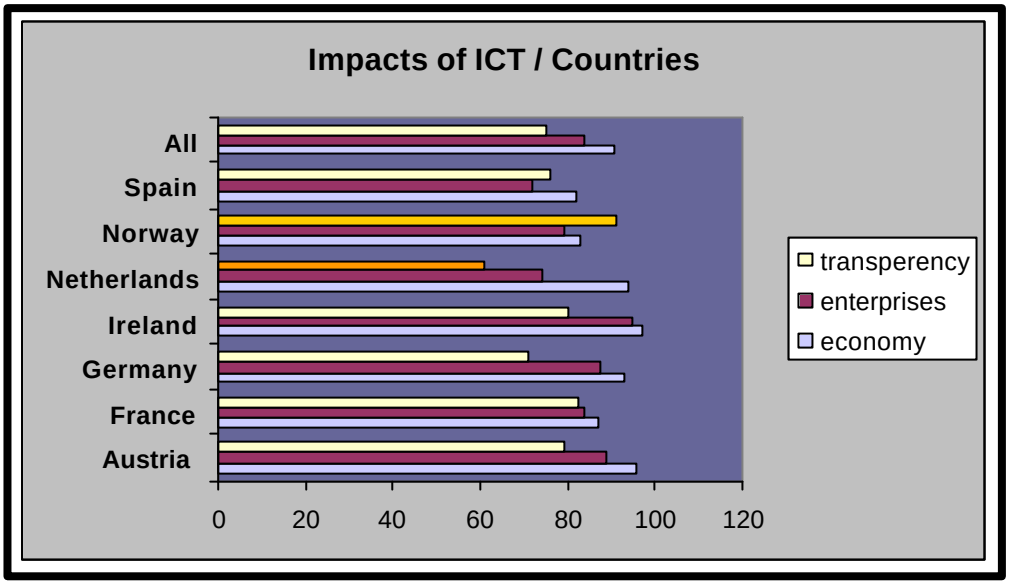
Figure 24: Impact of ICT



The qualitative investigation demonstrated that ICT in the minds of city planners and politicians at first meant attracting Big Business, before raising any questions regarding social structuring of the city for the purpose of improving inner-city climate and infrastructure. This is re-confirmed in the context of city ICT politics. [Figure 24] The potential of ICT for attracting companies stands in the foreground, not city activity. 90.2% see ICT as a decisive instrument of city development politics for boosting economic development.

And half of those of this opinion see ICT as a *very* decisive instrument. 84% are convinced that bringing companies to the city is the most important effect of an ICT engagement. The interviewees consider that ICT promises untold access possibilities to the world market. But it remains questionable how pressing inner infrastructure problems can be solved as long as they are only of secondary importance.

Figure 25: Impacts of ICT / Countires



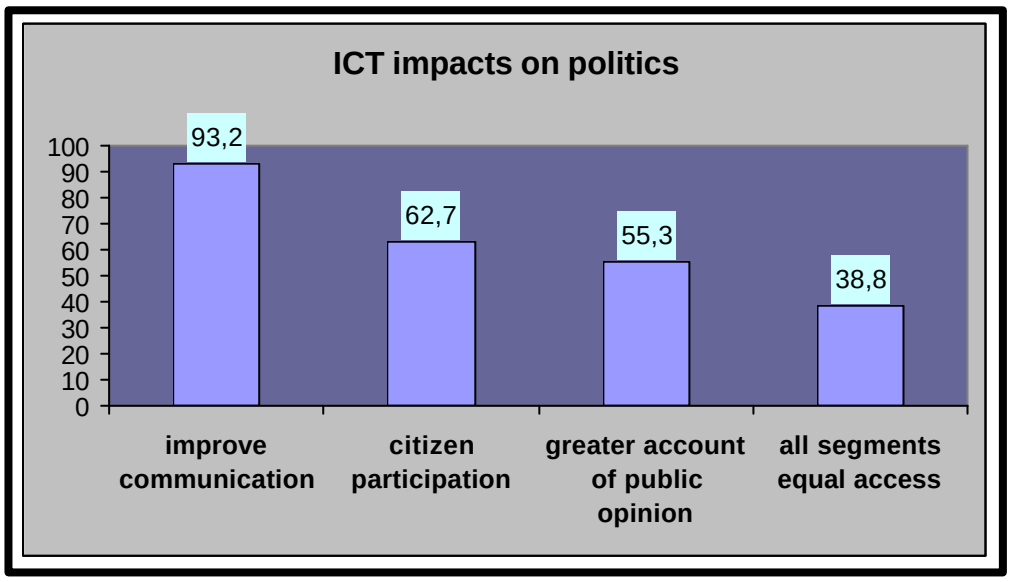
Two questions must be asked: how important are social issues in the context of ICT? Secondly, does ICT cause city planners to lose sight of spatial indicators when seeing the advantages of an improvement in city portrayal for the purpose of attracting companies? Of course, it will not suffice to reduce ICT to Internet sites. A city homepage will appear to reflect modernity and technical competence, that is, an improvement in internal communication structure, which in itself will be important for portraying the city. Quantitative questioning allows further differentiation. Beside the political-economic importance attached to ICT, people are convinced that ICT will also meaningfully affect city political communication processes. For example, in most countries there is a belief that the employment of ICT aims to make the political and administrative processes more transparent. In Norway, as the only country of the study, the respondents consider a higher effect of ICT on political transparency than on the improving of the economic situation. In opposition, the respondents from the Netherlands – the country compared to Norway in particular and to Europe in general with the highest population density - are the most reserved about this aspect. [Figure 25]

But this basic assessment that urban policy will change does not allow evaluating in which direction this change will be. And this question, how much will city politics be changed by ICT, is the central point of city competition, because here outer and inner

effects of the principle are obviously most visibly connected. The countries investigated - with the peculiar exception of the Netherlands again - are convinced that ICT will in general strengthen information flow and communication. 93.2% believe in this potential of ICT. On the other hand, it is assumed that social relationships will not be particularly enhanced through ICT, which is a subject in itself. Here only 19.6% of all respondents see an impact. But for city political processes it can be said that improvements in communication between city administration and citizens are expected. Again, especially the interviewees from Norway see a further chance, whereby it should be considered that the Scandinavian countries have a longer tradition in the democratic use of ICT, and that Norwegians in general know each other better than people in countries with a much larger population.

However, these positive expectations are subject to important limitations in two aspects. More communication in politics with the help of ICT is not the same as more influence. Even when the interviewees were convinced that there are more possibilities for citizens, politicians and administration officials to communicate among themselves, they reveal an uncertain confidence in regard to an increase of citizen participation in politics as a result of ICT.

Figure 26: ICT impacts on Politics



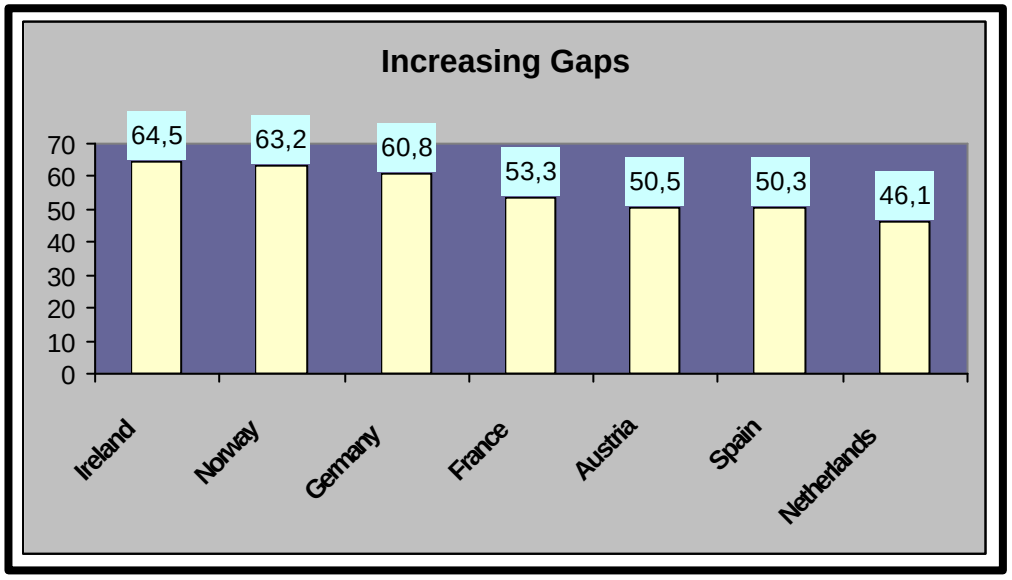
Even though Spain and Germany are the usual opposites, only two-thirds or 62.7 % believe that ICT allows an increase in citizen participation. The results show that a certain scepticism is justified in spite of the positive assessment. Except for the confidence of the Spaniards, barely half think it probable that ICT will lead city administrators to take account of public opinion. Austria, Ireland and Norway have the same opinion here. The interviewees in France, Germany and the Netherlands are much more sceptical. The trust in growth of grass-roots democratic elements however must be questioned when the issue is the effect of ICT on access to education, work and services for all social classes

of the city. Then things appear differently. Only a good third or 38.8 % still believe that ICT creates equal access opportunity for all social classes. The interviewees in France, Austria and Spain are still convinced, but this question is perceived in Germany, Ireland, the Netherlands and Norway with a certain Nordic suspicion.

Conclusion

However a change in the urban politics caused by ICT is seen. Its consequences remain rather vague. Once again, it must be asserted that ICT is still understood as a one-way-street citizens as well as administrators can use in order to inform themselves about each other. But we must realise that political influence by citizen participation cannot be shown to be a potential of ICT, because all citizens do not have equal access to information through ICT. According to the perspective of the respondents the use of information seems to be restricted to the economic aspects. It enforces the external orientation of urban politics, and it must be doubted that all social groups will have a profit out of it.

Figure 27: Increasing Gaps



The majority of the respondents even believes that ICT will increase the gap between the rich and the poor. In numbers are this 57.8%. Even if there are knowledge deficits regarding the potential of ICT, this assessments particularly shows that besides the constraint of being orientated towards the outside, urban actors are still much aware of the inner structure of their cities. They know about the complexity of the urban crisis within their individual conception of city. Only if these contexts will be integrated as much as possible into the perception of the city, the recognition of city-related potential of ICT will change and in line with that also the usage of ICT applications.

3.5 Interdisciplinary Hearing

The Interdiciplinary Hearing was planned as a part of the conference "Envisioning Telecity – The Urbanisation of ICT," organised by the Berlin Institute for Social Research (BIS), which focused on realities and visions of the city in the future. Within that conference the results of the European Commission-supported R&D project "Information Society and Urban Development" (TeleCityVision) served as an initial basis for the discussion and were displayed for critical revision by the participating interdisciplinary experts. Beside the TeleCityVision working group, the range of questions addressed shed further insights into this topic shared a central and overarching problem raised by the further authors of the conference. What are the possible forms and directions of the interplay of information and communication technologies (ICT) and urban developments? Hereafter we report the course of the conference and the main arguments and criticism. Finally we resume some overall results of the sessions.

After *Eva Schulze*, Director of BIS, opened the conference, *Frank Helten*, social scientist and co-ordinator of the Project TeleCityVision at BIS, introduced the goals of the conference, conceived as an exchange forum for such stakeholders as urban researchers, planners, service providers, policy-makers and politicians. The conference also attempted to combine new approaches for the investigation of this field of research, and to discuss findings from various international studies. Three topics were presented to clarify the underlying problem of how ICTs and urban space are affected by the process of the social shaping of technology, in this case by urban actors.

I. Cities and ICT: Visions and realities

II. ICT Policies and Projects

III. TeleCityVisions

I.

To specify the first topic on Visions and Realities, some possible frameworks for articulating visions of the future of ICT were outlined. In a contribution drawing on the latest trends in urban social and spatial development, *Stephen Graham*, professor of urban technology at the Centre of Urban Technology at Newcastle University, discussed the problem "Planning of Cybercities." Graham emphasised the fact that it is no longer acceptable for urban planning to concentrate mainly on spatial planning. Because the widespread use and application of ICTs will continue into the future, he advocated an integration and evaluation of all kinds of ICTs into urban planning. Planning has to be rethought in terms of a more socio-technical approach.

In his talk “Restructuring Cities” *Florian Rötzer*, sociologist and editor of the netzine Telepolis, expressed concerns shared by average citizens. People will live in two worlds at the same time, a real one and a virtual one, permeating each other, where the distinction between city and country will become increasingly fuzzy. The coming of smart home, moreover, may shape our future lifestyle as life under constant observation. This perspective raises many additional questions for human wellbeing, where socially-balanced solutions are still far away.

Michael Hokkeler, urban planner and researcher at the Secretariat for Future Studies, Gelsenkirchen, concentrated on the actual state of the discussion of ICT and urban development, which he placed between vision and reality. Hokkeler suggested that we conceive of ICTs as both tools and trend amplifier, which can steer existing or aimed urban development in different directions. In order to get a clear idea about which directions we want to take, we need visions for future urban development to provide us with scenarios of future situations, which we can imagine, communicate and discuss.

(We need to mention that one of our keynote speakers, *Saskia Sassen*, Ralph Lewis Professor of Sociology at the University of Chicago, could not give her talk “The Embeddedness of Digital Technologies: Implications for Cities” because she was prevented from coming by force majeure. Her paper, however, can be found in the documentation of the conference contributions.)

The discussion of the papers from this first session was moderated by *Ann-Rudinow Saetnan*, Professor of Sociology at Trondheim University, and showed a considerable consensus among the arguments. Visions or science fiction novels are necessary to inform us about future cities, and to provide cues for deciding which road to take. Our knowledge of the socio-technical processes taking place in this field is still weak. As *Ronald Pohoryles*, International Centre for Comparative Research in Social Sciences, Vienna/Paris, put it, we know a lot about ICT, can understand and observe changes, but we lack the measures to conceptualise it. Florian Rötzer argued that it might be too early to collect data and that we have be more patient with empirical studies as we are in the midst of an ongoing process. However, it could be helpful to ask citizens about their visions of how to live in the future, and we can collect valid data on the individual use of media. Furthermore, we can try to influence the role of local authorities in order to support civil networks and to create access to democratic processes. Finally, and in opposition to the more positive views on ICT and the city, a dystopian perspective was articulated: we should not forget about power relations in the city of the future: ”Only privileged people will be able to escape from technology. They will be able to go to Venice. Poor people will see it only on their computers.”

II.

In the second conference topic, "ICT policies and projects," developments now underway were used to illustrate how ICT visions are taking on concrete shape in projects and strategies across a range of concrete policies. *Peter Nijkamp*, Professor of Spatial Economics at the Free University of Amsterdam, highlighted "A Changing Spatial Scene of Innovation." He emphasised the interactive role of ICTs in building up the loosely coupled 'associative city.' Nijkamp connects the concept of the city as a source of knowledge production and exploitation to the concept of the virtual city, which serves via ICTs as a rich exchange core. Within poly-nuclear configurations, new opportunities for innovation appear everywhere within metropolitan areas.

The most important question prompted by this observations was tackled by *Manuel Valenzuela*, Professor of Urban Geography at the Free University of Madrid. In response to the question, does ICT affect the urban planning process, he states, "Politicians and urban planners must re-examine their traditional (CIAM) approaches to land use and its zoning in separated specialised areas." Valenzuela suggested that we conceive of ICTs as means of providing opportunities for the re-integration of home and workplace. We need to consider the role ICT plays in the interaction of social groups in order to accumulate social and cultural capital. Within planning offices, Valenzuela pointed to a widespread use and acceptance of ICTs to enhance the planning process, and to European-wide efforts to connect Geographic Information Systems (GIS) with other ICT applications.

In their paper "The ICT Sector: Growth Engine for Urban Regions?" *Willem van Winden* and *André van der Meer ,* both research fellows at the European Institute for Comparative Urban Research at the Erasmus University of Rotterdam, discussed ICT clusters and clusters policies in three European cities. These clusters are showing different development patterns stemming from differences in the spatial-economic structure of the cities and their position in the national urban systems. Van Winden and van der Meer concluded that the success of cluster policies depends on the degree to which local knowledge is exploited, local demand for ICT and the quality of the urban environment.

Oriol Clos, architect, director of urbanism at 22@bcn S:A and Assistant Professor at the Polytechnical University of Catalonia in Barcelona, gave a paper on "Poblenou Urban Renewal." Clos examined some of the problems involved in restructuring an abandoned, former industrial area of Barcelona, Poblenou, in line with the needs and opportunities of the postindustrial Information Society. The solution applied in the Poblenou area focuses on the reintegration of work, housing and leisure, and is based on a Special Infrastructure Plan (SIP) of five main urban systems: mobility, energy, telecommunications, water cycle and waste. This plan has already redeemed some of the challenges for future planning mentioned by both Valenzuela and Graham, and can serve as a fine example for how to overcome the shortcomings of the CIAM approach. From a quite different point of view,

Klaus Hanser from the Berlin-based city carrier and telecommunication company Berlikomm provided the audience with some insights into the strategies and problems of an ICT player offering innovative services in a highly competitive environment.

The chair for the discussion was taken by *Roddy Flynn*, research fellow at the Communication, Technology and Culture Research Centre, Dublin City University. There was some awareness on the notion of the associative city as a new metaphor for the meaning of cities in postindustrial time. Nijkamp explained his notion of associative city in relation to the network city, where the latter represents the supply side and the former the demand side. Consequently, the city in the Information Age has to cover both city types. Problems concerning new challenges to the associative city/network city have remained quite vague; specifying challenges would only be feasible if we take into account the very special profile of each city, including a specific set of problems and opportunities. It seemed that a balance has to be found between a micro-level of urban analysis and economic policies and a macro-level analysis of socio-spatial policies addressing overall problems such as frameworks for urban renewal, integration of housing, work and leisure.

III.

Finally, in the TeleCityVision session, *Bernd Fischer, Galit Cohen, Camen Vasquez* and *Leon Hempel* presented results and observations from the TeleCityVision Project from various perspectives, including precise visions used by policy-makers and public administrators from a number of European cities as they design and implement these strategies. *Bernd Fischer,* social scientist and research fellow at BIS, first gave a short description of the objectives of the TeleCityVision project. He then turned to his paper, "From professional milieus to cultural lags," emphasising that the perception and use of ICT largely depend on professional milieus. Such milieus help shape adequate ways of using ICTs and create models of urban development for utilising the opportunities ICT may provide. Fischer detected patterns of perceptions about the challenges of ICTs, which range from more optimistic attitudes found among politicians and economic promoters, to more sceptical attitudes within the professional milieu of urban planners. On the other hand, one finds a strong differentiation with regard to city type and ICT policy, while cultural differences in policy issues among nation states play only a minor role.

Galit Cohen, economist and research fellow at the Department of Spatial Economics – Master Point – at the Free University Amsterdam then presented her contribution (written together with Peter Nijkamp), "Expectations of Urban Decision-Makers in Europe." Within a conceptual model for decision making, Cohen explained the first modules of this model, built to answer the question of how urban policy-makers assess the future implications of ICT for their city. *Carmen Vazquez*, urban geographer and professor at the Department of Geography and Planning at the Free University of Madrid, gave a comprehensive analysis, "ICTs influence on the processes of network city and city networking according

to the administration actors assessment." Vazquez first presented her theoretical reflections on the process of networking among cities, and the meaning of ICT infrastructure, relations, linkages and flows, all of which transport information suitable for creating or initiating innovative processes. However, and as shown in the TeleCityVision survey, opportunities and chances for urban development are mainly seen in terms of general economic benefits and not so much in terms of an integration of different sectoral aspects of planning such as transport, housing and the like. It seems that there is a widespread need to understand ICT policy not simply as technology policy, but also as cultural and social policy. Finally, *Leon Hempel*, political scientist and research fellow at the Centre for Technology and Society at the Technical University Berlin, gave his paper, "TeleCityVision or A Short Note on the City's Exodus into Virtual Space." The starting point for Hempel's talk is the existence of widespread conceptual or knowledge gaps. On the one hand, urban actors mainly reflect the problems of their own city; on the other, there is very little concrete knowledge of how ICT opportunities could be translated into urban policies. Drawing on the findings of the TeleCityVision research, Hempel concluded with a description of the quite sceptical attitude among urban actors toward the use of ICT to improve involvement in basic democratic processes or to open up access to education, work and services for all citizens.

The discussion of these papers was moderated by *Ronald Pohoryles* and focussed mainly on methodological questions: which level of comparison to choose in order to get insights into the different modes of perceptions of urban actors, or to relate the perceptions of urban actors to city types or countries. There seem to be significant problems in using quantitative surveys to gather in-depth knowledge of the ongoing and often very fragmented process of urban informatisation. Hence Steven Graham argued that the TeleCityVision project did provide an empirical snapshot to highlight a process of innovation taking place within urban processes. Graham proposed conducting more detailed qualitative case studies in order to explore the symbolic and material meaning of ICT with regard to power relations. *Hans-Liudger Dienel*, Director of the Centre for Technology and Society at the TU Berlin, suggested a comparison of both cities and similar city actions in order to show how different or similar paths might lead to a result with ICT. Finally Pohoryles pointed to the notion of ICT as part of the ongoing development process with regard to changes in both national systems and international relations.

Final discussion

The final discussion addressed topics related to:

1. The research approach of the TeleCityVision project and methodological problems
2. Critical assessment of ICT
3. ICT and urban planning
4. Software will take command - future prospects for research
5. Recommendations for dissemination

Ad 1. The TCV project originally intended to gain more insight into the process of informatisation by comparing the different tactics and strategies found at the country level by applying quantitative and qualitative research methods. In a world of accelerating globalisation, however, we found that it is not so much the differences among countries or nation states which represents the most interesting aspects. The participants of the conference agreed that a shift in perspective, taking into account the changing role and status of cities in a globalised world, would be more adequate to collect rich and meaningful data. Drawing on the outcomes of the TCV project, there was broad consent that the level of comparing different types of cities was promising and had yielded valid data for identifying policy issues on an urban and individual/professional level. Subsequent discussion thus focussed on the methodological steps by which this observation could be pursued. Two general remarks were made in answer to this question. First, to concentrate more on grounded case studies in cities in order to assess in greater detail the respective problems of each city type. Furthermore, in-depth case studies would provide decision-makers with more meaningful data on their own city within a global context. Second, there was a general concern to be more specific about ICT and to differentiate among various types of ICT, as well as the political, social, symbolic and economic dimensions of each. Such assessments need to be interdisciplinary.

Ad 2. The meaning of ICT and especially the availability of ICT infrastructure in relation to economic and social benefits often seemed to fall into ideological frameworks or, as some participants put it, was even fetishised in public discourse on new visions for future society or the new economy. ICT is not a growth machine for all. In fact, we need to be much more critical to overcome the longstanding attitude that ICT by itself is advantageous. We are already finding a concentration process driven by powerful players such as network companies, private telecommunications firms and software companies. These stakeholders are becoming more and more influential as the nation state or local player loses autonomy in times of economic and financial crisis. Access to infrastructure will then present a problem to all those who cannot afford to buy services suited to their demands. Digital and social divide will continue to accelerate. In conclusion, we need to resist to any form of technological or cultural-technological determinism; there has to be greater attention to promoting ICT concepts and policies in line with the values of civil society.

Ad 3. With regard to urban planning, the discussion returned to the problem that the professional staff dealing with the future of the city is still not very well prepared to take into account all the cross-cutting problems interwoven with the coming of ICT to the city. A new or at least revised model of urban planning appears to be necessary to avoid the shortcomings of a more or less traditional planning approach and its concentration on socio-spatial dimensions. It was argued that the application of ICTs such as CCTV or new road-pricing systems will tend to exacerbate social exclusion, and are not in line with the principles of urban planning to create equal living conditions for all. New concepts

cannot draw only from historical developments and problems related to the era of the first urban networks (gas, electricity, telephone). Nor does it suffice to assess visions of future cities and to have knowledge of general trends and tendencies in the coming of network society. A realistic perspective of urban planning will have to integrate the various aspects and areas where urban informatisation will play a major role in much greater detail.

Ad 4. With regard to the last point, the issue was raised that in urban realities of today we have to conduct not only very basic case studies to get a sense of what is really going on within the core of network society or network city. We need to pay more attention to the urbanisation and domestication of software, to the use of software at work, at home, at leisure time, and to such algorithms applied to control private and public urban life. If not the hardware but the software – made by IT-developers – is the new city-builder of both real and virtual space, we may need to initiate a field of interdisciplinary studies in this area. Here we would address not only questions of how the software is used, but also look at the symbolic meaning, economic interests, and political implications such software tools are supposed to create.

Ad 5. Finally, there were some recommendations for disseminating the outcome of the conference. Most important is to address municipal actors adequately and with clear conclusions. Local staff members are quite often reluctant to notice ICTs interrelation with the city and planning process, so we need to make sure that actors will have easy access to the TCV findings. The authors of the conference stated their intention to publish the conference proceedings in a special issue of "Innovation – The European Journal of the Social Sciences."

Résumé

Beside other outcomes of the conference, we want to point out that the interdisciplinary hearing was successful in bringing together urban actors from different fields of research and interests for the evaluation of the results of the TeleCityVision project. At the same time it turned out that TeleCityVision as well as other projects which were introduced during the conference can only serve as a starting point of an advanced research on the subject of urban informatisation. We were pleased to create new opportunities and venues for gaining and sharing insights in a still under-explored field. Future studies, as we discussed at the end of the conference, need to pursue a more interdisciplinary approach. ICT has widespread implications and affects the city as a place where society is becoming real and virtual at the same time.

The conference brought together a broad range of interests, all engaged in exploring the emerging telecity as one possible urban expression of the Information Society. The participants agreed that there are still considerable knowledge gaps and application shortcomings in this field. It comes as no surprise that all conclusions focus on the means by

which we can gain more valid knowledge of, and practice with, the process of urbanisation and domestication of urban technology. How can we assess such processes, and bring them into play in the urban environment? The table below lists some of the main problems, conclusions and policy implications.

Table 11: Policy Implications

Problem	***Conclusion***	***Policy implication***
Knowledge on ICT with regard to urban processes is not adequately shaped.	Widespread optimistic or sceptical assumptions are prevalent. Realistic assessments are rare. Better education is needed.	Revise and improve education and training curricula for urban actors (esp. for planners)
Approaches to assess ICT and cities have to reflect growing complexity and pervasiveness of ICT and must not neglect the socio-technical implications of ICT and urban development	Reshaping research approaches with regard to both the agency of technology and the pervasiveness of ICT in all aspects of social & urban life.	Promote qualitative in-depth studies of interdisciplinary teams covering the fields of politics, culture, economics, social life, technology (hard- and software) with regard to urban processes
Briefing of knowledge on problems of the interrelations of technology and the city is too far away from the practice of urban actors	The exchange of knowledge and data related to the interplay of different technologies and urban processes has to be improved.	Create exchange forums to discuss the complex scope of urban problems. Initiate publications and the dissemination of clear rules of thumb for how to get along with the ICT issue
Using ICT to enhance direct democratic or participative processes has been neglected	Urban actors have less confidence in democratic processes triggered by ICT	Explore and show in pilot projects the spectrum of democratic participation.

The Berlin Institute for Social Research is preparing to publish the conference proceedings in a special issue of "Innovation – The European Journal of the Social Sciences." The papers to be published will be submitted to peer review and we plan to make the publication available in spring 2002. The publication will be offered to the cities which participated in the TCV project and supported our work by taking the time to answer questions and to provide us with meaningful information.

3.6 Results

The overall findings of the project have been synthesised from the different parts of the study corresponding to the logic of the research methodology. The structural analysis provide a basis for the selection of the cases, the case studies lead into the formulation of a range of hypothesis which were tested in the quantitative questionnaire survey. The outcome of this survey was evaluated by interdisciplinary experts, thus the findings explained in the following are a result of the whole research process.

In the perspective of the European comparison the results show a considerable convergence and similar patterns of perception of the ICT issue all over Europe. For that reason we present the findings in thematic chapters. National exceptions are only mentioned occasional.

The image of ICT

ICT is seen as important factor of modernisation, but talking about more specific possibilities and impacts of the technologies plays a minor role in everyday communication. Uncertainty and scepticism can make actors more open to the issue of ICT and urban development. The effects expected for the city are estimated as very few. Changes in urban development and urban communication structures are not attributed to ICT. As far as mentioned, effects are expected on better communication possibilities and greater efficiency of work. No effects are expected on spatial, social and ecological developments. Very clearly the urban actors disagree to the notion that ICT could improve the quality of social relationships. More often it was expected that ICT will increase social gaps, the so-called digital divide and will give access only to certain groups of people.

Administrative actors tend to confine ICT as an instrument for economic promotion. In general ICT is also regarded as an instrument which enforce work efficiency, but the shape and the logic of ICT as an open network structure contradicts the bureaucratic organisation of a public administration. Ideas of a civil society fit much better to the social function of ICT than the expectation of administrative work efficiency.

Internet is seen as a private subject as well as a private space. That can lead in numerous cases to the distinction between (real) work and private internet, which should not intrude the working sphere.

In general the visions on the role of ICT in the city, it's opportunities and it's risks, are rather vague and diffuse.

Attitudes and acceptance in different departments and professional milieus

Politicians and economists show rather high acceptance, dispose of better equipment and express more positive expectations towards ICTs than planners do. A broad experience with ICTs, as found for the economic development department, contributes mostly to a higher acceptance of the new media and to having stronger visions about the future of ICT in urban developments.
Administrative staff from the more spatial oriented planning departments tends to judge ICT quite sceptical. ICT is seen as a normal force beneath others which shape the urban fabric. ICT is perceived within the context of other driving forces. For them ICT is not likely to be the future motor of urban development.

In the distinction between the different types of respondents we discovered different professional milieus: There are considerable differences concerning the mode of communication and patterns of actions between politicians and administrative actors as well as between planners and economic developers. We even may speak of distinguished technological styles. They also differ in their orientations to the global or the local level.

Economic administrative actors for example have a rather positive acceptance towards ICT because they are more struck by the effects of globalisation and ICT obviously facilitate access to global and local markets by the means of communication and information. While spatial planners focus on the local level, on the needs and wants of the citizens. These different orientations lead them to various notions of ICT, according to their general vision what ICT is for. While economic developers see opportunities to promote their work by ICT, planners do only perceive it as working tool like GIS, which replace pencil and paper but which will not impact the local spatial and social structures.

Politicians show the most positive attitudes towards ICT, they are more enthusiastic and more fascinated by the promises of ICT. At the same time ICT more likely seems to be something like “the slogan of the day”. ICT seems to be more or less a rather cheap policy for politicians to support.

Following this structure of different attitudes, expectations and experiences ICT strategies are very dispersed and sometimes contradictory.

It is necessary to break open professional milieus to enforce the communication over the borders of departments and administrations and to increase the acceptance of integrative ICT policies.

ICT policies

First we want to highlight a considerable mismatch of problems and needs of the respected cities, as stated by the respondents, and their strategies for the deployment of

ICT. The solutions and measures envisioned for ICT policies do not reflect the mentioned urban problems and needs.

The reason for that is the one-dimensional perspective under which ICT is assessed: The administrative actors perceive ICT as an instrument for economic development. Due to that notion ICT seem not to meet other basic aspects to fight urban problems.

According to that In most cases the focus of the municipal ICT policies is the improvement of the relation between the economy and the administration and the improvement of the 'attractiveness of the location'. In line with the actor's estimation that social implications of ICT are rather few – in the respect of social segregation as well as for democratic participation – applications in these areas are hardly supported. The neglect of the citizen-administration(government)-relation can induce problematic conditions for the social development in the cities. Attention needs to focus on the social organisation of ICT, otherwise they risk to fail the opportunity to play a role in shaping the informational city.

In general the municipality is not seen as an important actor in the process of informatisation behind private investors, service providers and telecommunication companies. But even if the administrators attribute an important role to the private sector public-private-partnerships in ICT project are rather rare.

Mostly there is rare information about the ICT policy in the city, for example most do not know whether there is an ICT-Plan. In contrast to that often the ICT self images surpasses reality. Especially politicians sell ICT as a solution for the problems but ICT plans as far as they do exist do not mirror the problems addressed.

In comparison of the city types we found confirmation to our thesis that the actor's visions shape strategies: The actors in the European and National Multifunctional Cities have the most concrete visions and according to that European and National Multifunctional Cities are the 'pioneers' in the implementation of ICT policies.

But it is not proven that an ambitious ICT policy leads automatically to a successful economic development, as the rather average commitments in "Rising Successful Cities" have shown. But if we assume that an integrated ICT policy can stimulate a positive development in the future, a further polarisation of the urban system can be expected, because the advanced cities, which tend to implement more integrated ICT policies, will gain momentum of innovation while the fallen back will loose. The practice of European Commission funding perceived by the urban actors as 'favouring the advanced' may possibly support that trend.

Finally it can be stated that for the most actors the use of ICT remains unclear. ICT appear somehow as a kind of "solutions in search of problems" technology. There is no clear definition of ICT goals and objectives to be tackled in the cities. Even the ICT pro-

moter struggle in defining a clear vision on the purpose of the future deployment of ICTs in the city. So, the implementation of ICT in the cities is not driven by uses or problems but by technology and solution.

Thus, the mentioned mismatch seems to be a result of the notion that the perceived urban problems do not fit with the image of ICT. There is no clear expectations on the benefits of the deployment of ICT among the urban administrative and political actors.

Differences in Europe

Although findings are very similar across Europe, there were some remarkable diverging evaluations: The more the interviewees in Ireland knew about ICT the more suspicious they were, while in Germany they had rather positive attitudes the more they knew about ICT. In most countries the economic developers were the most advanced and at the same time "realistic" ICT user, while the planners did not use it as much and they were generally more sceptical. In an exceptional way the Spanish planners did appreciate ICT much more than planners in other European countries.

In Ireland the respondent think that the use of ICTs will contribute to an increasing importance of the own city, while in the Netherlands the actors do not expect an increasing importance of the respective city which can be ascribed to ICT use. This might be explained by the current development in Ireland, where ICT takes a central role in the economic prospering development of the country, while the Netherlands is already of central economic importance in Europe with or without ICT.

The Norwegian respondents were probably the advances users in comparison to the other European countries. It was surprising to us, that they were at the same time the only ones who regard the increase of transparency as a more important effect of ICT than for example economic promotion. Obviously an increasing experience allow to see further opportunities and other goals.

The starting hypothesis

The project has started with two starting hypotheses. During the research process they needed to be reformulated and revised, however, at the end of the study we like to come back to the starting point and check the main hypotheses:

Hypothesis 1: The differing levels of knowledge and awareness among the administrative actors lead them to over- or underestimate the impact of the information society on the process of urban development. This can lead to the application of unsuitable strategies.

We can confirm the first part of the hypothesis as far as there are different knowledge and consciousness among the various administrative actors. They differ according to types of

acceptance, to administrative departments and types of cities. These differences lead them to various expectations on the effects of the information society on the process of urban development. Whether these can be labeled as under- or over-estimations and if these estimations lead therefor to inappropriate strategies could only be stated a posteriori, especially when the definition of 'appropriate' or even 'suitable' necessarily vary from city to city.

If we define comparatively the city type of "Rising successful Cities" as an example for a successful policy and takes it as a measurement of a „suitable ICT strategy", one must state an overestimation of ICT among the European Multifunctional Cities and National Multifunctional Cities and an underestimation among Service and Information Processing Cities and Industrial Cities, which is reflected in their respective ICT policy.

Hypothesis 2: In order to be able to react appropriately to the requirements placed by the information society on cities, and to use the opportunities for innovation, various tools and institutional changes are necessary in cities located in different regions and with different structures.

Despite of the fact that the term „appropriate" can only be defined from city to city, as mentioned above, generally it can be stated, that a broad range of measures can be taken in order to make ICT policies at least more oriented to different types of knowledge and more oriented to the social implementation. Besides others the enforcement of the exchange of experience and concepts between administrative departments as well as between different cities could contribute. The perceived challenge to close gaps of knowledge and experience vary according to Departments and, as assumed in the hypotheses to different city types and structures. As the transnational comparison has shown this is not true for the different European regions as far as the regions are regarded as different national contexts.

Finally we, the research consortium, must state that during our study we could experience that there is a very fast development under way and within that three years of research tremendous changes has been taken place in the municipalities. But the results introduced above therefor point out structural conditions of the development rather than figures about computers, hosts, links, investment in ICT infrastructures, meters of cable etc. So, we can claim that the results remain of interest also for the next years.

But at the same time the high speed of the development show that also the administrative actors do not have enough time to learn to deal with ICT, which proves again the importance of visions in shaping the information society in the city.

4. Conclusions and Policy Implications

In concluding the above explained findings of the study we want to highlight three main results which are of major concern to the further development of adequate ICT policies in European cities:

1. The study discovered a remarkable mismatch of the problem perceptions on the one hand and ICT strategies on the other. The actors experience in their everyday work concrete problems in urban development, from a point of an expert view they have visions on how the city will develop and 'what has to be done'. Further they have more or less experience with ICT and they dispose of images of the information society and its effects. On the basis of that image they construct a vision of 'what can be done by ICT'. In the perceptions of the urban actors the answers to both questions do not fit together. Of course, all support the notion that ICT is an important instrument of modernisation, and nobody wants to belong to the 'laggards' but ICT is not seen as an answer to the urban problems, and thus of secondary concern.

2. Further, we found differences in the perception, acceptance and usage of ICT in various departments within the urban municipality, due to professional orientations and 'life styles'. Distinguished professional milieus and bureaucratic organisation hinder the actors from a cross departure communication and from an exchange of different experiences and knowledge.

3. According to the actor's ICT Image, ICT policies in cities are focusing mostly on measures for economic development, increase of work efficiency and distribution of information. But it is not enough to construct web-sites, build portals and burn CDs if there is not a broad discussion on the interplay of ICT and urban development towards visions on the spatial organisation of urban life in the information society. In line with that mainly the attempt of a social organisation of the new media is neglected, although this could be an anchor for an integrated ICT policy.

These findings induce effects in all the following seven areas of action and show the necessity of political and organisational changes:

1. Policy making: An integrated strategy within the city

ICT is generally seen and employed as an instrument for economic development. Frequently the municipalities attempt to use it to enforce efficiency of administrative action and to provide information to the citizen, whereby interactive applications are still rare. Most attention is put on the technological infrastructure and the attraction of companies. According to the notion that social implications are rather small, the efforts towards an implementation of ICT as an instrument of civil participation and social integration are

rather few. Projects with the aim to increase access for citizens failed, broke up, were abandoned or are still at the beginning.

Even if the municipalities do not see themselves as important actor in the process of the informatisation of the city, the urban authorities need to take their role as a relevant player who is in duty to guarantee urban development that is fair to all social groups.

The attention of the political actor needs to focus on the social organisation of ICT (who is able to use what information to what purpose?) and networking, and not so much on the technology itself.

The policy making process itself should be based on a broader trans-sectional discussion, which involve economical, transport, work, educational, environmental, social, cultural, housing and security issues etc.

Possibly new organisation structures of inter- and intra-administrative work and communication are needed (see under 4 heterogeneous ICT departments). ICT supports rather network structures than hierarchical structures as found in administrations.

2. ICT strategies: The support of a common visions

ICT strategies should not be implemented as single and temporarily disperse projects because only a common vision on how ICT should take place in the city can give orientation how the possibilities of ICT can support the dealing with specific urban problems.

At the same time the envisioning of urban development in the information society should be seen as cultural and social policy as well as technological policy, because ICT policy means more than providing a fibre network. It also leads to new forms of urban life and communication modes. But it must be decided how this urban life should look like and who will be able to have access.

In our study we could assess the influx of visions on the shape of strategies. But the definition of visions is also a part of the practice in education, social work, arts and more. The municipality can draw on a broad range of different experiences and practices in implementing ICT in everyday work and communication with in the administrative body. ICT itself can be a tool to connect these knowledges to the emergence of a common vision and in order to reduce complexity of fragmentised ICT strategies.

3. Development of immanent resources: Making the circle of innovation and learning possible

The mentioned various knowledges show that the more administrative employees are experienced in working with ICT the more ‘realistic’ are their views on the technology. Appropriate strategy in the employment of ICT and in the shaping of technology in the city

can only be developed, if there is an understanding that the process of social shaping of technology is an ongoing process of social learning and negotiating. Due to the problem that it is not possible to development best practice models fitting for a larger numbers of urban contexts, it is necessary to develop adequate strategies in an internal process dependent to an interplay of innovation policy, experience, learning and the revision of policy.

Nevertheless it remains important to compare and evaluate the findings by organising thematic networks between departments and cities in order to exchange ideas and useful applications and to share costs.

4. Knowledge: Overarching qualification measures

In most municipalities the understanding of ICT qualifications measures for the employees stuck in the provision of EDP training. Even if it necessary that employees know how to work with a computer or with a certain software programme it is at least as important to know why, to what end, with whom and by what effects.

It is a duty of the qualification and training to make employees aware of the chances, risks and the challenges of working with ICT. There must be the offer to share experiences and to discuss problems and ideas. Qualification measures should include as well introduction into strategies and objectives concerning the application of ICT in the cities. Exchange forums to discuss the complex scope of urban problems as well as publications and dissemination of clear rules of thumb for how to get along with the ICT issue can contribute to familiarise employees with the subject.

Only if the people know the framework of an common ICT policy they are willing to identify with municipal aims and projects. The relative low rate of concern to urban ICT policy in our study was obviously due to a remarkable lack of information.

As far as knowledge on ICT with regard to urban processes is not already adequately shaped, widespread optimistic or sceptical assumptions are prevalent and realistic assessments are rare, better education is needed. Education and Training curricula for urban actors (e.g. for planners) have to be revised and improved.

As fare as briefing of knowledge on problems of the interrelations of technology and the city is too far away from the practice of urban actors, the gap between everyday practice and common – sometimes vague – visions must be bridged by these measures.

5. Bridging the gap: Heterogeneous ICT departments

Mostly the staff of the ICT departments are ICT experts like engineers, programmers or communication experts. According to the results of our study we recommend that ICT departments should consist of representatives from the different administrative departments. Only in that way gaps of knowledge, different experiences, aims, and orientations

can be considered. Not at least the professional expertise about needs in the administrative departments and among the social groups the respective department is concerned with can contribute to find adequate solutions with most satisfaction within and outside of the administration.

6. Financial support: Transregional policies

The role of national policies are different in among European countries, but in most Cities researched the urban ICT policy is left to the municipality itself. Unfortunately in most cases financial resources are small and city are overstretched by the implementation of an integrated ICT policy. In order to secure work places and international competitiveness it should be of interest for the state government to support local ICT efforts.

The same is true for the role of the European Commission, which according to our results, currently rather support the already advanced cities with the risk to promote the already ongoing process of a further polarisation of the formerly relatively balanced European urban system.

Both national and European ICT policies should support the transfer of experience from the more advanced to the fallen back cities to prevent further polarisation and cultural lags. Even for de-industrialising cities with tremendous financial and social problems there must be an opportunity to catch up.

7. Research needed: What is going on here?

As already mentioned the knowledge about the shaping of new technology in the urban environment is still poor. Even if there are some interesting approaches to discover the introduction of ICT into the urban context, we rather know *that* ICT becomes more and more important in urban life, but we do not know how. We do know that the introduction of ICT is shaped by urban actors in various ways, what could be shown in our study, but we hardly know how the actors do that.

For that reason exploring and researching usage and deployment of new technologies in the city is needed to discover the potential of ICT in order to know about adequate use and applications to support an envisioned socio-economic development.

Approaches to assess ICT and cities have to reflect growing complexity and pervasiveness of ICT and must not neglect the socio-technical implications of ICT and urban development. Reshaping research approaches with regard to both the agency of technology and the pervasiveness of ICT in all aspects of social and urban life.

It is necessary to promote qualitative in-depth studies of interdisciplinary teams covering the fields of politics, culture, economics, social life, technology (hard- and software) with regard to urban processes.

5. Disseminations and Expoitations Plan

The TeleCityVision consortium has agreed to edit a final publication which will include an outline of the TeleCityVision research proceedings, the theoretical framework, the overall results and a second part in which each research partner will focus on one subject deriving from the project findings. First contacts to a British publisher were made by the Austrian partner Ronald Pohoryles. The following structure of the publication was agreed within the consortium:

First Part: Framework, approach, overall results (ca. 90 p.)

1. Short description of the project (aim, theoretical framework, empirical work etc).
2. Results

   Comparison (corresponding to the final report, ZTG)
   Summary of the outcomes of the national reports (BIS)

Second Part: Aspects of urbanisation of ICT: social shaping and learning (ca. 210 p)
(Contributions which are based on the comparison of all countries

1. Professional Milieus in European Municipalities and their attitudes towards ICT (BIS)
2. Model of decision maker's perception facing ICT (ESI)
3. Ideologies (ICCR)
4. User influence (CTS)
5. NN (France)
6. NN (Ireland)
7. Urban networking (Spain)

Annex: Questionnaire, sample description etc.

We will publish a short report of the project on our website, highlighting the main outcomes once the EC has accepted the final report. The web publication will be made available for the cities which participated in the TCV project and supported our work by taking the time to answer questions and to provide us with meaningful information. And the final publication will be announced at the website as well.

Based on the findings and discussion some partners has developed further research questions on the same topic which already resulted in new projects or will serve as input for further project.

Besides that, the project co-ordinator BIS, with the financial support of the European Commission, has organised an international interdisciplinary conference 'Envisioning Telecity – the urbanisation of ICT' on 3-4 December at the TU-Berlin to enforce the international academic and non-academic discussion on the subject of the introduction of ICT to the European Cities (Contract n° HPHA-CT2000-00054).

A project web-site has been established in November 1998 (http://www.tcv.tu-berlin.de) including the list of research partners, the overall objectives of the research activities to be done, the methods to be applied, the announcements of workshops and conferences and a mailing-list. The deliverables D1, D2, D3, D4, D5 as well as the Milestones MS1 and MS2 were available on the FTP-Server (restricted to consortium and the scientific officer of the EC) located at and maintained by the ZTG. Unfortunately the complete server was stolen in October 2001. The consortium decided not to launch a new web-site because of the end of the project and to use the possibility to put the results on the conference web-site linked to the BIS homepage.

Further Publications and conference presentations resulting from the project:

The TCV project started research late in 1998. The consortium decided on the first workshop in Berlin to communicate as soon as possible the outcomes of the research activities to the national and international scientific community.

The French Partners (THEMA) made a presentation on an international conference in Milan, in May 1999: "Built Space, New Technologies and Networks", entitled: "La diffusion des NICT au sein du réseau urbain francais et le rôle des acteurs." They presented a second paper in May 1999 on the ASDRLF Forum.

The German Partners (BIS) were charged by the consortium to attend to an international conference to be held in the UK in November 1999 in Newcastle Upon Tyne - titled "Cities in the Global Information Society: An International Perspective". BIS prepared a paper, referring to the findings of the case studies, which was presented on this conference in November 1999 in Newcastle.

Bernd Fischer and Sandra Huning from BIS presented a paper at the CORP-Symposion (Computer aided spatial planning) in Vienna on 16 – 18 February 2000: "TeleCityVision: Konzepte administrativer Akteure im europäischen Vergleich"(Concepts of administrative actors in European comparison). It is published in: Schrenk, Manfred (Ed.) 2000: Informationstechnologie in der und für die Raumplanung. Page 219-225. It is also available on: http://www.corp.at/corp2000/CORP2000_Tagungsband/CORP2000_fischer_huning.PDF

In co-operation with the Hebrew University of Jerusalem our research partner from the Netherlands, Peter Nijkamp and Galit Cohen from ESI have attended to the same conference in Newcastle and presented a paper entitled “The introduction of ICT in cities”.

Peter Nijkamp and Galit Cohen (ESI) have presented in May a paper entitled: “ICT – policy in European Cities: a comporative approach” in the 6th RSAI World Congress 2000 in Lugano

In co-operation with the Zentrum für Technik und Gesellschaft (ZTG) and BIS was engaged in participating in a research colloquy at the Technische Universität Berlin in June 1999, entitled "Information society and urban development - a European comparison - concepts of administrative actors".

Furthermore, a lecture entitled "Informational space and urban development" was given by BIS within a series of public-audience lectures concerning urban development and globalisation at the Freie Universität Berlin in July 1999.

Pascal Gillon and P.Caro (THEMA) have published a paper about diffusion of ICT in France in the beginning of 2000 appeared in “Révue de géogaphie de Lyon”.

Frank Helten and Bernd Fischer from BIS published a paper entitled “Stadtraum und Informatisierung - Sozialer und technischer Wandel im Stadtentwicklungsprozess“ appeared within a reader “Städte im Globalisierungsprozess” in 2002.

As for co-operation with other projects, we announce that our research partner from Spain are bringing some synergies into the European project entitled “Cost 269: User Aspects of ICT “. The Austrian partners collaborated with IFES, Fessel & GfK, working on the European Household Panel Study.

In September 2000 the BIS (Frank Helten and Bernd Fischer) has organised a session to introduce the TeleCityVision-Project to the EASST-Conference 2000 in Vienna. The papers are entitled: 1. Information society and urban development in perceptions, strategies and policies of urban administrative actors. An European Comparison. Held by Frank Helten & Leon Hempel (ZTG, Berlin) 2. Information society and urban development in perceptions, strategies and policies of urban administrative actors. Example 1: Metropolitan Cities in Transformation. Held by Angelika Kofler (ICCR, Vienna). 3. Information society and urban development in perceptions, strategies and policies of urban administrative actors. Example 2: Challenges for medium sized cities. Held by Ann Sophie Lagran and Hendrik Spilker (CTS, Trondheim).

In May 2001 Frank Helten, BIS-Berlin, presented some of the results of the outcomes of TCV in Germany to an international audience at the “Lifescapes” symposion hold in Vienna on 17-20 May 2001.

Bernd Fischer and Frank Helten had an accepted paper on the results of the TCV project on the international conference “Digital Communities” which took place in Chicago in

November 3-5, 2001. Due to other duty, they, unfortunately, could not hold the paper personally.

Bernd Fischer hold a paper entitled “The ICT-gap” at the international conference “Innovations for an e-society” which took place in Berlin on 17-19 October 2001.

In October 2001 the Spanish partners (Manuel Valenzuelas, Carmen Vazquez and Santiago Lorente, UAM and UPM) organised a national Workshop “How Spanish local administrations face their integration into the information society”.

Furthermore the Spanish team hold several papers on the outcomes of the study:
1. M. Valezuela: “Urban Processes and Dynamics: their links to ICT” (in) New Ways of Urban Social Integration (Conference), Santiago de Compostela (Spain), march 2000.
2. C. Vazquez : “Urban Social Problems and New Information and Communication Technologies. The spanish experience” (in) International Geographical Union Commission on Urban Development and Urban Life (Meeting), Seoul (Korea), August 2000.
3. M. Valenzuela, C. Vazquez & F. Corbera: “The application of ICT to the local scale as a way of generating employment and innovative proposals” (in) Firts International Congress on The Technological Training in a Networked World, Caceres (Spain), November 2000.
4. M. Valenzuela & C. Vazquez: “Current Trends in Urban Development and Policies through the application of ICT. A Challange for Local Administration in Spain” (in) Monitoring the Cities of To-Morrow (Meeting). Calgary (Alberta, Canada), August 2001.

Further the Norwegian team hold a paper: Robert Bye and Robert Naess (2001) "Will Telematics Move in Concert? Transport Telematics Policies in Germany", paper presented at the conference "Computers at the crossroads: Information society and beyond", Trondheim 12-13 February.
And published the article: Robert Bye and Robert Naess (2001) "Will Telematics Move in Concert? Social shaping of transport telematics: The case of Germany", Working paper 2/01, Trondheim: STS.
Robert Bye and Robert Naess (2001) "Will Telematics Move in Concert? Social shaping of transport telematics: The case of Germany", in Elzen, B., Jørgensen, U., Sørensen, K.H. and Thomassen, Ø (editors): Tackling transportation problems around the world. Case studies used in the INTEPOL project, Annex to the final report from the INTEPOL project, Enschede: University of Twente.

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Bernd Fischer and Frank Helten, Berlin

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Annex

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Annex 3: Summaries of the National Results of the Case Studies

For complete National Reports see Milestone Report MS 1.

1. Austria

Remarks on questionnaire, interviews and desk research

The questionnaire which was used for the expert interviews proved to be a flexible, albeit sometimes redundant instrument for exploring the field. Problems of understanding stemmed from the use of general terms like ICT, or information society. In many cases the interviewee could only answer after the terms were specified or exemplified by the interviewer. All in all the questionnaire ensured to gather relevant data which are valuable with respect to the quantitative project phase.

As one could expect answers on certain questions, particularly those on perceptions, differed along the hierarchical structures within municipalities. Particularly the internal use of ICT was assessed differently depending on the position of the interview partner. Besides the hierarchical position also the professional background influenced the perception about ICT.

With regard to desk research the gathering of data on the telecommunication sector in Austria as well as on the ICT-equipment of households at city level proved to be very difficult and complicated. Data for example on the number and quality of internet-provider in Austria are hardly available and not reliable. Data on the telecommunication situation are difficult to access. Here the reason might be found in the at times very competitive situation of the market. Primary data on household equipment at the city level are not available. Those data available do not yet include data on the internet.

Overall findings and conclusions

Generally, when we compare ICT and urban development we have to be aware of the driving factors that are relevant for dynamics. First of all it is difficult to clarify whether ICT or general development factor are the independent variable. The case studies suggest that a mutual influence of both exists. However, it can definitely be said that ICT alone cannot be considered a driving factor. Here, it is the combination of various factors, a classification of which could be:

- factors stemming from the policy level
- factors out of economic developments
- factors out of socio-economic and cultural change.

Further to that we have to take into account that driving factors stem from different policy arenas, which in our case clearly is the European policy framework and the national pol-

icy frameworks. Examples for the first level would be the European RTD-programmes, which at least provide the financial basis for pilot projects and initiatives, as we see by the example of Vienna, but also Graz to a smaller extent. An example for the national framework would be the information society initiative of the Austrian government, which in itself is also to be seen against the background of European policies. Further to be mentioned as a driving factor are global economic trends, and here it is mainly the process of market and trade liberalisation which in combination with ICT lead to significant changes in urban development, although these changes are not perceived in spatial terms.

Findings and perceptions can only be assessed against this greater background.

Coming to the various results we can conclude for the relation of ICT and urban development, that

Generally, spatial impacts caused by the deployment of ICT cannot be observed in each of the three cities. This seems to have basically three reasons:

- First, it is in fact too early to observe effects on the spatial structure. This might be underpinned by the fact that ICT came on the political agenda only in the early-mid nineties in the course of the debate about the information society. Another fact here would be the only recent opening of markets for private telecommunication services in the course of harmonisation with EU-legislation.
- A second reason might be found in the urban structure and traditional land use patterns. All cities show a more or less high degree of multifunctionalism, which might slow down spatial effects of ICT.
- A third reason lies in the perception of ICT and the understanding or knowledge about possible applications in terms of technical and structural solutions. As some answers suggest, the perception differs depending on what sectors are looked at. Trade in combination with logistic systems seem to have undergone major changes already, which also become visible in spatial terms. However, here again other driving factors have to be taken into account, such as market competition and willingness for innovation in enterprises. For example, big trade companies or shopping might use ICT to become more competitive. As they react to market dynamics and economies of scale, they enlarge their sales space and thus move to cheaper and better accessible suburban areas.

In order to get a clearer picture from the quantitative phase, a classification of ICT and related deployments should be introduced, for example in a way as suggested in the first paper by Cohen/Nijkamp.

With regard to future developments the picture is rather manifold than clear. However, many interviewees think that ICT will lead to the decentralisation of some sectors where direct contacts are not required. Telework thus might increase. This might also lead to monofunctional clusters. Both are likely to go hand in hand with suburbanisation. At the

same time new core areas will emerge. Generally, cities within information society will not lose importance, as they will remain nodes of information. However, developments might favour big cities over small towns. The role of the city will depend very much on the degree of municipal activities. Innovative cities might profit. Generally, the opinion is that municipalities are obliged to shape trends and to deploy ICT in support of the citizen.

Looking at the use of ICT within municipalities, we find the following results:

All three municipalities deploy ICT, i.e. mainly computer networks, PC's, internet, intranet, e-mail, and municipal web sites. Vienna here is in a leading position, however, it has to be said that Vienna finds itself in a different situation, as the city is at the same time a federal province and thus has broader administrative obligations and more funds available. In all three cities the majority of office workers have ICT at their disposal. Planning departments have additional ICT available in addition to the standard equipment. Here first applications date back to the early eighties, as departments tried to increase the efficiency of planning by digitalising material and maps. Special software and systems such as GIS are applied. St. Pölten lags behind, as basic infrastructure such as computer networks are not yet available, but under construction.

Generally, it can be said that ICT have improved the communication within administration and between municipal units and external actors, be it citizens, be it other public organisations or companies. The generally perceived effect is an acceleration of communication and thus administrative proceedings, more transparency and an enlarged knowledge base that makes decision-making both at the administrative and political level faster and easier, but sometimes also more complex. The attitude towards ICT is mainly positive, however frequency of use and attitude depend on the age of the interviewee. The general notion is that ICT cannot be a substitute for personal contacts, because face-to-face communication remains important for background knowledge and decision-making.

Further, ICT have a clear impact on rules on internal communication, and there are also structural implications, as hierarchies have lost relevance. Technical possibilities, mainly with respect to e-mail as a tool for internal and external communication not only has substituted traditional ways of mailing, it has also had a significant impact on the way how information within the municipal organisation is treated. In reaction to this structural implication ICT are not always allowed to be fully exploited as they undermine control and change traditionally centralised ways of communication. There are different reactions: Vienna, for example, has worked out general rules for the use of ICT, in Graz and St. Pölten, the decision seems to depend on the heads of units and thus differ depending on personal attitudes. Adaptations of rules to ICT seem to be indispensable.

The majority of the interview partners showed a positive attitude towards ICT. They are mainly perceived through their technical capacities related to information and communication. The topic of socio-economic or societal implications is less raised.

With regard to the perception of possible deployments the general answer is the promotion of economic development in the city, and the improvement of communication with the citizen, be it in terms of public relations by setting up a municipal web-site, or by introducing forms of electronic government. Active support of the urban planning process through the deployment of ICT can only be observed in Vienna and Graz. Here the hope and objective is to make planning and decisions more transparent.

The introduction of new systems, however, seems to depend on pioneering initiatives by individuals. As the examples in all cities suggest, broad and systematic introduction of ICT is a relatively recent trend. The reasons for it seem to be mainly budgetary constraints and a need to economise the administration. As the examples of Vienna and Graz show, new ICT-concepts are not only subject to technical renewals of systems and infrastructure, but go hand in hand with re-organisation of administration. In both cities Graz and Vienna, administration is subject to re-organisation processes with the overall aim of more service-orientation and increased efficiency. In support of the economic development, but also a more citizen-oriented administration, ICT are introduced to modernise management, examples being work-flow-management systems, electronic file systems, intranet-applications, e-commerce. St. Pölten does not have a concept, however, in this city ICT also helped improve the performance of the municipality as demands increased in the after becoming provincial capital.

Qualification measures are related to re-organisation processes. Vienna seems to be in the best situation, as it has an administration academy, since it is an individual province as well.

To summarise, the degree of deployment of ICT varies between the three cases due to different framework conditions, thus comparison can be made only against this background. ICT are set on the agenda within municipalities, be it with regard to urban development, be it for the improvement of administration. However, ICT have in all cases to be seen in relation to various driving factors, the most important of which seems to be the current need to improve competitiveness and economic performance and to economise administration with the aim of getting closer to the citizens' needs.

Suggestions for the quantitative phase

According to the findings of the case studies and the remarks on the interviews the following recommendations for the subsequent project phase – the quantitative analysis – can be made:

It became obvious by the case studies that the urban public administration plays a more or less active role in the interrelation between urban development and the application of ICT. Urban administration as a public actor can help create a critical mass in terms of a market, i.e. in terms of demand and supply to a certain extent for the promotion of ICT. Here, as we have seen from the case study of the city of Vienna, international co-operation in the framework of activities at the level of the European Union or the Euro-

pean Commission play a role in this process as a vehicle for developments. The relevant question to be answered in the course of the quantitative analysis would be what role the European level plays as an intervening variable.

Another observation in that direction was made in the interviews. As the data suggest the alignment of general economic development strategies might have an influence on the deployment of ICT and might shape ICT-strategy/action plans. For example, a concept that emphasises decentral regional development might need other ICT-strategies than an economic cluster approach.

A second question that relates to the first recommendation would be to analyse the role of the private economy or in general the role of the market in the urban development process with respect to the shaping of ICT use. As the case of Vienna suggests, the development and the implementation of new forms of economic activities, in concrete the construction and provision of new office buildings that use ICT, such as teleports and kin-projects are left to private initiatives and thus depend on the free market, whereby in turn other cities might show other patterns of dealing with that topic.

The data suggest that municipalities, that deploy ICT in the form of web-sites of e-government, e-commerce might tend to reverse the trend of more service-orientation, as ICT technically could support the argument that it is the obligation of the citizen to get information, and not the other way round, to provide them with data. This hypothesis might be interesting to analyse in the quantitative survey.

As interviews with ICT-experts show it would be wise to consult an expert from the technical sciences for the development of the quantitative questionnaire. Generally, a clarification about systems, possible deployments and classifications should be made.

2. France

This chapter presents the main results of the interviews carried out with 29 people in 5 French agglomerations, Paris, Lille, Besançon, Castres-Mazamet and Sophia-Antipolis . The interviews were carried out between July and September 1999 and at least 5 people were interviewed, except in the case of Sophia Antipolis (4 people only).

In any case, our enquiries are not very representative of the general opinion of local actors as regards ICT. The large number of people involved at local level, as well as the large number of institutions in charge of landplanning in France (municipalities, inter-community structures etc) leads to a certain reserve with regard to the opinions voiced.

The people interviewed had difficulties mainly with the questions about the spatial impacts of ICT. Given that this is still quite a new area, the theoretical reflections are not developed enough, and those involved have not yet taken enough distance to be able to measure objectively the impacts of these ICT. None had a clear vision of what could hap-

pen in the long term. The rapid and unpredictable nature of innovation and diffusion throughout the world of ICT is one explanation for this reserve.

Summary of general aspects of the questionnaire

The five towns or agglomerations selected were chosen on the basis of the diversity of the initiatives launched.

A part of the summary is dedicated to the general questions asked in the questionnaire which had no direct connection with the experiences undertaken - for example, the spatial impact of ICT on the town, the perception of an information society, or the debates about local democracy.

Another part of summary compares the experiences, and shows that a certain number of common factors emerge.

Finally, we conclude with a number of general remarks about the subjects which were not dealt with, or about the exact methodology.

Spatial impacts of ICT

The questions about the spatial impacts of ICT generally went unanswered, or tended to embarrass somewhat the person being interviewed. The formulation was too general and on the subject of concentration or deconcentration of activities, both answers are possible.

As regards the question about the observed impacts, there was practically no change attributable to ICT observed in the spatial structure, apart from the teleport of Roubaix which was the impetus for the renovation of an industrial wasteland. *The ICT sometimes played a role, but were merely one factor among many*. The example in Besançon of the hospital services being kept in the town centre was favoured by new technologies (ability to transfer information quickly and free of cost by means of the network), but this was only one of several factors taken into account in the decision.

The question of the position which the towns would take in the information society was tied in with the one about the position of the citizen vis-à-vis the territory, which is a debate currently ongoing in France.

The majority of interviewees underlined the favourable position of their towns as regards access to ICT. Many factors were advanced to explain this :

- density, which favours the reduction of installation costs, and the installation of high-capacity infrastructures (notion of a limit to the quantity of traffic)
- towns usually represent a concentration of activity, and thus of clients for operators in a position of competition. They are only interested in large towns and cities (i.e. over 200,000 inhabitants) because only these represent a profitable market at the current time.

- towns are usually the source of production and management of the information that is to be relayed with these infrastructures. It is also in the towns that the information is handled (most qualified workers)
- towns also have an important function as social and economic focal points, and this role will be strengthened by means of these networks.

Nonetheless, some of those interviewed underlined the opportunities that exist for some rural zones (zones on the periphery of urban zones only, not very isolated areas) to exploit the qualities they possess (quality of life, lower cost of living, proximity to main urban area) to attract activity, on condition that they have the necessary quality infrastructures.

The phenomenon of diffusion of these technologies was also stressed, and many of those interviewed thought that rural zones will eventually have the same infrastructures, although with a considerable time interval. However, technical development is still so uncertain that it is difficult to estimate how long this interval might be.

Regarding the concentration-deconcentration question, answers were provided, but no clear tendencies emerge from the answers received.

- new technologies make it possible to have better repartition across the whole territory and avoid concentration of certain services. This is the case for Mayor's Offices who emphasis the possibility of connecting all their different administrative buildings, which may be very spread out across the whole area. In some cases, some departments may even have been re-centralised in order to facilitate contact.
- on the other hand, the existence of high-performance infrastructures can promotion the concentration of services. At the level of large agglomerations, this tendency is evident : Paris concentrates the main operators, whereas towns with less than 200,000 inhabitants have at most one operator in competition with the traditional operator. This concentration of infrastructures can promote a concentration of companies.

On the question of whether ICT have a role to play in the localisation of individuals and businesses, there are two clear camps which can be identified :

- as regards individuals, the question is moot : for individuals, ICT are not a factor in their localisation. It is clear that the fact of being in a zone where there is a cable operator is in the long term an advantage for access to a range of services (television, internet and possibly telephone), but the cable operators have had some difficulties in getting their installations to meet the demands of these services. Furthermore, the availability of ADSL will make it possible for households that are not connected to cable to have quite similar conditions. In any case, a large part of the population isn't even aware of the changes that are going on, and therefore do not take this factor into account in their choice of location.

- as regards businesses, the situation is more mixed. Telecommunications and access to high-capacity networks do contribute to their choice of location. However, the type of activity also has an important part to play : for example, companies with a strong command or control function, or for whom information processing is a very important part of their production and activity, will be very amenable to this argument, because the capacity of the network might be a particularly determinant point for them. However, other business might take the telecommunications costs into account, but it may not be a more important factor than the need for qualified labour, or a logistics centre, for example. On the other hand, it is clear that in the case of initiatives undertaken by public authorities, these arguments all figure. In the cases of Besançon and Castres, which are relatively advanced projects, the presence of these infrastructures would appear to have influenced the choice of location of some businesses (few in number, but interesting from a qualitative point of view) and would be a good argument in advertising to other industries. It would be necessary to continue these enquiries and interview the businesses in question to find out what was the impact of these infrastructures in their decision to locate there. It must also be noted that for the metropolitan networks established by the towns, a planning aspect is taken into account, namely the town authorities try to spread the network evenly throughout the whole area, thereby reducing disparities between areas. This is not the case in the Paris, for example, where the operators install their infrastructures according to the number of structures already in place, i.e. only zones with a high concentration of businesses are served for the moment.

For the domain where ICT could be introduced, several possible leads are identified, and range from the regulation of traffic, to video-surveillance, via culture (libraries etc). Yet again, in this area, the way forward is not very clear for some of the actors involved.

In fact, the questions about the urban impact of ICT were way ahead of the thinking of those interviewed, who replied to it was far too early to make any assessment or statement about these new phenomena, which were only introduced very recently.

The definition of information society and knowledge of techniques

The question about what exactly the term « information technology » might mean and/or include was not significant, nor did it bring forth any additional information, since the people interviewed practically all had good knowledge in this area.

On the other hand, the question about the definition of an information society was much more informative :

- Most of those interviewed were in agreement when it came to putting forward the profound changes which are happening and which few people are aware of as yet.
- The information society is defined as a society where access to information is facilitated and where the knowledge and information will be available to all.

- The role of information as the main support of the economy and the set up of electronic business are underlined quite often.
- In connection with this, the hope of a more actively participating electronic democracy is also expressed
- Negative aspects are also pointed out : Access to information also represents the danger of a two-speed society, where some people will be connected to the networks, and able to exploit them, while others will be left behind. These people therefore underline the role of the public authorities in making sure that such a situation doesn't come to pass.
- The problem of sorting out all the information is also mentioned, the huge multiplicity of sources and their level reliability can cause great loss of time when searching for the right information.
- Finally, the fact that everyone is going along with the development of internet and networks, despite the fact that nobody knows where it's all going to lead is a problem that some people mention, because « we can't just lag behind ».

Access to ICT in the workplace and in their environment

We only interviewed people involved in the conception and design of project or who were in decision-making positions as regards the time frame or the finances. We didn't interview the people in «lower » positions, so to speak, within the hierarchy of the departments involved.

The use of ICT can be divided into three stages, in our opinion :

- Use of message services/mailboxes: this teaches people how to communicate
- Development of web-sites and their exploitation (navigating on internet) : once people have learned to communicate between themselves, they are taught to search for information externally
- Finally, people are taught how to work together on the information (groupware, collective projects etc)

In order to use ICT, one needs at the very least a computer, a local network and an internet connection.

In the projects we studied, all the towns had a local network and the use of message services was well advanced in all the structures. This development already poses some problems, because it implies an evolution in the functioning of the services, with strictly hierarchical relations being seen as heavier, and easier to get around. The control of some people is thus brought into question and sometimes acts as a brake.

On the other hand, the second stage is much less frequent, as access to internet in some cases is reserved to those who are at the top of the administrative hierarchy. There is a

dual motivation for this : firstly to limit the costs, and secondly that people will be wasting their time on the network or on the web.

Finally, the third stage outline above is rare, and works best in environments with small numbers, with people who are in the habit of working in groups.

The development of departments dealing with ICT has not yet materialised in many Mayor's Offices, but could come to pass in the long term. The awareness that information and its processing and management are becoming more and more crucial for the administration is starting to develop in those Mayor's Offices and administrative offices who have been experimenting with ICT for some time now.

Telephones and faxes are considered so completely indispensable that they are not even mentioned. Conversely, access to videoconferences is exceptional.

We came across more or less two groups, with practically opposite viewpoints :

- on the one hand, the people who use computers and ICT and are strong advocates thereof,
- and on the other hand, people who have access to such facilities, but who use them very rarely, preferring to let their colleagues use them on their behalf (important role of secretaries). These jobs have profiles based on decision-making, and are occupied by people around 50 years old. Just because they don't use them, however, doesn't mean that they are necessarily unamenable to these technologies.

For the people who do use ICT, it appears to be difficult to do without them at work, and they agree in estimating that ICT help them save considerable time on repetitive tasks, and that the internet is a very high performance tool.

As regards training, most people keep abreast of developments by reading (specialised press), by internet, by attending colloquia and above all, by working on projects. The education and training dimension of staff was underlined by all actors as being totally indispensable and a good training policy is the key to success in departments using ICT.

Finally, it is remarkable to note that many actors who are equipped with ICT at home are only connected because of their children, who are often adolescents. In fact, most of the interviewees were aged between 45 and 55 years, and are pushed into buying and using computers at home by the younger generation, who are very keen on computers, internet and telephoning.

The role of the system of information and local democracy

The towns' internet sites were not very interactive, but the state of current legislation does not favour interactivity. Administrative cyber-departments are going to be one of the main applications proposed by Mayor's Offices and town halls when the legal obstacles are removed (electronic signature). At the present time, the web sites serve only to inform the

public about the departments and services, and the activities that are available in the town.

Very few towns are prepared to launch themselves in procedure of greater transparency in their local democracy : the types of initiative started by the city of Paris, or above all Issy-Les-Moulineaux are still quite rare. Many people showed themselves to be reticent about making council debates and decisions available on a web site.

As regards the urban development projects, people were even more dubious. Some people mentioned the lack of education for the public, who do not always know the regulations about urbanism, and would therefore make inappropriate proposals, causing an excess of work. For others, only the specialists should be consulted, as the public shows little interest.

Nonetheless, some people were very much in favour of public debate by means of internet and thought that it is an important tool for transparency - e.g. nobody comes to watch a Municipal Council meeting, but people might be interested in it if they have access to the information from at home.

The debate is interesting and brings up a lot of quite contradictory opinions and one could even ask oneself whether there isn't a link between finances and ICT.

ICT and urban development

ICT are not a strategic element in future urban development. There seems to be a strong consensus to put forward the problems of accessibility, transport, economy and quality of life as decisive factors in the future development of towns and cities. The facility of access to the town centre, the fluidity of transport, the employment/unemployment situation, together with the attractiveness, the image and the quality of air or water of a town were all put forward by the interviewees before ICT.

ICT appear only to be a complement which is important in strengthening the attractiveness and image of a town. The future of these technologies seems to be more important in a social context : access, the risk of a two-speed society, local government.

Summary of the projects themselves

There are not that many common points between the experiences we studied, which is quite logical since we tried to select completely different cases. Nonetheless, certain similarities do appear :

1.1.1.1 The actors involved

- The role of actors and participants is crucial in the initiation of such projects. These technologies are not yet stabilised, their uses remain to be discovered, but we have come across people willing to break new ground, people who have understood the huge potential of these technologies and who have dedicated their energy to setting up projects in this area. The administrative structures are lagging behind, and are

taking quite some time to adapt themselves and without such innovators, movement is much slower.

- The support of certain politicians is also essential to the project, even if it is evident that in France, the majority of political staff has not realised the extent of the evolution which is going on around them. In the case of Besançon, the Mayor resisted the pressure from the traditional operator ; in the case of Castres and Mazamet, the consensus amongst politicians made the materialisation of the project possible ; in Issy-Les-Moulineaux the Mayor himself is the leader of the project ; in Sophia Antipolis yet again it was a politician who launched the project. It is crucial to get politicians involved in this revolution, because they hold the key to decision-making processes, especially as regards the liberation of funding, and it is their duty to look after the daily life and the future life of their towns.
- The personnel, if correctly trained and educated, can adapt relatively well to the use of these technologies, and their position in the hierarchy is not necessarily a good indicator : everybody underlined the rapid integration of new technologies by secretaries, for example.

At the current time, human resources play a fundamental role in establishing projects, which puts technology in its proper place, namely as a tool to be used by men.

The motivations behind the projects

- Savings in the telecommunications budgets of the local authorities participating in such projects was perhaps not the main motivation behind their involvement, but was nonetheless an indisputable contributing factor. The majority of investments were made all the more easily, the more it was possible to show that functioning costs decreased.
- The effect of the town's image also played an interesting role. For Roubaix, or Castres and Mazamet, it is obvious that the development of ICT was aimed at combating their image of industrial decline. The project also aimed to improve their attractiveness for companies who are particularly sensitive to this image phenomenon (case of the SIP-PEREC as example). The case of Issy-Les-Moulineaux illustrates this to perfection. In about 15 years, this town recreated a totally new image (from industrial town to high tech town) and succeeded in attracting a radically different type of business from that which existed previously. It is clear that other aspects played a part in this successful transformation, such as their proximity to Paris, the existence of infrastructures etc.
- Increasing the awareness of different groups of the public to these technologies is an important aspect of all the projects. In Paris or in Lille, awareness-raising programmes were carried out in order to prepare the economic environment to use these ICT to the best possible advantage. The projects also had a social dimension aimed at several different areas of the public : all the projects (except Sophia Antipolis, which is oriented exclusively towards business and research) take education into account. It is

always a question of connecting primary and secondary schools, with third level training often having other means of access. Apart from the purely technical aspect, which concerns only the infrastructures, the projects also try to favour pedagogic applications. The second target is the general public. Many initiatives are taken to try to increase the awareness of the public about the potential of these technologies (opening of interactive terminals, financial support for associations who provide training etc). The major preoccupation is to avoid the development of a gap between the initiated and the rest of the public.

- Also present in the projects is the dimension of renovating and modernising public services. The aim is to improve the internal functioning of the departments and in the long term, to propose better quality services to citizens. However, in no way is this the main dimension of these projects.

Putting the projects into place

The projects were often initiated in response to very concrete problems (connecting the libraries in the case of Besançon, keeping Pierre Fabre laboratories based in Castres, attracting businesses to locate in Roubaix....), with the exception of Sophia Antipolis. They are directly linked to the local reality. The major developed and grew in size as people became aware of the potential of ICT. The examples of Besançon and Castres are symbolic : one started off with an economic aim and then added the social dimension later, while the other did just the opposite. The Euroteleport also developed considerably and tried to respond to the needs, although within a regulatory situation which was too constricting to allow it to work properly.

General Remarks

For the French cases, it appears impossible to us to avoid coming back to the strong tendencies of the telecommunications sector which have a considerable impact on ICT based projects. Furthermore, this aspect was brought up in most of the interviews and it seems necessary to us to follow the evolution in order to understand the actions of the public and private actors.

The telecommunications sector is transformed under the effect of three factors :

- the technical factor
- the regulatory factor
- the economic factor

The technical factor

The unrestrained development of technology completely changes the possibilities offered by telecommunications: the arrival of fibre optics technology (for the backbone of operators' networks, but also by means of cable for televisions) ; the development of relaying infrastructures (example of transatlantic cables) ; the multiplication of satellites and their

transfer capacities ; the arrival of future satellite constellations ; the development of wireless technologies (local radio loops) all profoundly modify the economy of telecommunications, causing the costs to drop rapidly, and by changing the users' access. Until recently, only the operator in the monopoly position served the general public with the traditional analogue phone lines. The appearance of new technologies makes it possible to have access to the users by going around the operator..... cable operators can thus propose services by internet or by telecommunications, a local operator can propose the same type of service by means of radio infrastructures.

These technologies also make it possible to have real competition because the operator in the monopoly, who used to control the final access to the users can be bypassed, although the legislation in this area remains to be developed.

The regulatory factor

The liberalisation of the telecommunications sector in Europe is quite recent (1998). The traditional operator, in France in any case, had the time to prepare itself for competition, and at the current time, remains in a dominant position. At the level of the local network (access to the user) there is still a situation of monopoly and the debate about whether to open this sector up to competition is ongoing.

The obstacles underlined by the interviewees demonstrate the fundamental role of the traditional operator, who can still over-charge for services because the competition has not really been properly established.

The economic factor

The competition in this area is not yet completely effective. In fact, only some parts of the market are really in competition, namely international telephone communication, as well as the market for businesses of a certain size. In fact, operators are obliged to invest considerable sums of money in the installation of modern, high capacity infrastructures. They have to make sure they get a rapid return on their investment, and only certain sectors interest them. This is why Paris doesn't have to worry about being served by operators who are falling over each other to get onto the market there. High density urban areas with at least 200,000 inhabitants are also well placed, as well as certain zones which bring together a lot of businesses. The rest of the country will be less well served - the towns and public actors are not powerful or influential enough when taken individually to interest the operators.

The case of the competition to propose services for private individuals is a good example of this problematic situation. Densely populated zones were cabled by cable operators (the high density makes it possible to make large scale savings, which decreases the unitary cost of the cabling), who started off by proposing internet and telephone services. In order to stand up to this competition, the traditional operator proposed a new service using the traditional analogue phone lines, namely ADSL, in order to improve internet access (more rapid and practically the same capacity as the cable). This service is only

proposed in places where there is a cable operator, for the time being at least. Thus, the inhabitants of densely populated areas will have the choice, whereas elsewhere, they will only have the traditional and least efficient technology, which is the case in Issy-Les-Moulineaux, for example.

Hence the initiatives launched by the public actors to create metropolitan networks. In the absence of competition and sometimes even of commercial offers, some local authorities decided to create their own infrastructures which they would then cede to the operators. This solution, led by the legislation which allows for the installation of « black fibres » under certain restrictive conditions, presents two distinct advantages for the towns :

- Firstly, these projects are ideal for bringing together the local actors in a collaborative effort, namely the economic sector, the public sector and sometimes associations, thereby mobilising a maximum of capacities and capabilities within a region. A local network deals with an adjoining territory in which proximity is an important factor, thus the interest of relying on local resources. It also facilitates co-operation between communes, as the resources relayed by the network are not necessarily to be found within one single commune.
- Secondly, this networks gives a certain control to the authorities and become then a tool in their territorial landplanning. The advantage is also that the landplanners are locally elected officials and are answerable to their voters (the users) while operators are answerable to their shareholders.

These strong tendencies are essential in analysing the spatial repercussions of ICT, at two levels : In an intra-urban context, if the town is in control of the infrastructures, then it can try to avoid spatial imbalance by providing for the whole area equally. There are no privileged points which limits the phenomenon of over-concentration (although let there be no misunderstanding, concentration facilitates the installation of infrastructures). The cases of Besançon and Castres show this, the industrial zones are all served (even if there is some time interval, it is not very prolonged). In the case where there is strong competition and the local authorities are not in charge of the network development, the operators choose the most profitable places, which can lead to spatial imbalances within towns, at least in the early stages. In this case, an increased concentration of businesses can be noticed, as these latter tend to settle in the best served zone, with the best served zone in turn being well served because of the number of businesses there, and so on (a positive retrospective effect). In the long term, this phenomenon will abate (reduction in cost of installing infrastructures as the technology becomes more widespread).

At the level of the urban hierarchy, the development of high capacity infrastructures undoubtedly favours the larger cities and highly concentrated urban areas. The traditional operator developed a high performance network for the territory but its competitors arriving on the market are - for the moment - only challenging the most densely populated areas in order to profit from their infrastructures (the traditional operator didn't have this

worry when developing its network). This phenomenon is therefore more likely to reinforce the spatial polarities.

The analysis of the socio-demographic criteria did not really bring forth any particularly pertinent information. The development of these technologies does not depend on the citizen, at least not in the case of large scale infrastructures. Furthermore, the authorities' projects, even if they are partly oriented towards the citizens, are more oriented towards economic aspects or towards improving their image. However, it is clear that the more wealthy the household, the more likely it is that they have a computer and an internet connection. The role of children in introducing these technologies into the home is an important point to note.

3. Germany

Selected cities

The cities which were chosen for the German case studies are the following:

1. Berlin as the German capital,
2. Duisburg as a stagnating old-industrial city,
3. Leipzig as a reviving old-industrial city from the former GDR, and
4. Ulm as a modern industrial city.

General urban development problems and urban guidelines

The following factors are regarded by almost all interviewees as relevant problems in their local context. At the same time, they probably have to be seen as general problems of cities in Germany:

- suburbanisation,
- social segregation,
- structural unemployment,
- economic modernisation and transformation problems, and
- rising communal household deficits.

In all cities, the local context bears these problems to a different extent. The urban guidelines seem to correspond with the problem perception of the interviewees, depending on the different spheres of work. The smaller a city and an administration is, the more the actors share the same identification with urban guidelines. This can lead to the assumption that both the awareness and the identification is more a matter of communication within the administration than of problem-adequate guidelines.

No explicit ICT-oriented guideline was found; the implementation of ICT and its application is not perceived as an independent goal, but mostly as an instrument which may contribute to solve urban problems.

General urban development and ICT concepts and policies

Urban actors generally tend to invest into projects which aim at strengthening local economic structures respectively their revitalisation. Differences among the cities are noticeable as to means and measures, and to the room which is left for other projects and other goals, e.g. the support of participation, greater transparency of administration, tourism, the networking of cultural projects, ecological or traffic related projects. A difference is also noticeable with regard to the development of citizen-oriented and ICT-imparted services. Since ICT are mainly used in the economic context and as economic instruments, they seem to be perceived as appropriate means to support economic urban goals.

Urban actors try to establish an image for their city which is as "future-oriented" as possible, by declaring competencies in economically prospering branches (e.g. ICT, bio- and genetic engineering, microelectronics, solar engineering, etc.). In the end, all projects are intended to increase the attractiveness of the city as economic location.

All cities have their own web sites (www.name.de). Generally a city's web site is seen as a public relations instrument. In most cases it is not integrated into administrative procedures, which means that it is not connected with the intra-administrative information and communication system, and interaction is still impossible. Accordingly, the web sites are always regarded as an additional, and not as an institutional task: the maintenance of data depends on the commitment of single employees.

Information contents vary as well as the web sites' organisational structures, making it more or less complicated for the user to get the information he/she is looking for. Remarkably, more than half of the interviewees, regardless out of which professional area, does not know the own city's web sites. The ones who do know them mostly assess them as too incomplete.

All of the selected cities participated in the contest Media@komm, for which the Federal Ministry for Education, Science, Research and Technology invited entries in 1998. The contest aimed at supporting and awarding good examples of ICT projects and activities on a local level.

The expectations of the staff members, especially in the urban planning departments, are directed towards participation and the chance of a higher transparency. Further expectations exist with regard to more flexibility, more topical information, the substitution of written documents, a generally improved network, and a better information supply. Environmental and traffic aspects do not play a role in these notions.

In general, the priorities in the cities' ICT strategies vary, partly according to the most urgent urban problems. In old industrial regions, massive transformation problems lead to priorities as the restoration and marketing of industrial waste land or the attraction and settlement of new companies. Examples are Berlin and Duisburg, with Berlin also showing complex activities in the fields of education/qualification and science.

On the other hand, Ulm is integrating e.g. participatory issues into its ICT strategy. This corresponds to the actors' perception about which useful side effects ICT may have. Leipzig would, at this point, be an exception: in spite of transformational problems, it has implemented a quite integrated ICT concept with not only economic, but also educational and participatory objectives. This may be due to the fact that it conceives itself as a media location.

The networking of the administration seems to get more and more difficult with its rising complexity (see Berlin). Communicative advantages through spatial proximity in smaller and less complex administrations leave the technical networking as a secondary problem. This is evident in Ulm: a manifold engagement of the city on the one hand, the relatively late establishment of a network within the administration on the other hand.

Information society and the perception of its relevance for urban development

Some interviewees define "information society" quite formally, for example as "society, where the production and processing of information is more substantial than the production of (industrial) goods". More frequently, valuing opinions are given, suggesting that the image of the information society is connected with fear as well as with hope. Most interviewees expect – more or less significant – changes in their everyday life.

Negative expectations are usually linked to the fear that the mass of information can not be managed (information overload), and that information will become more and more superficial/short-lived. Positive expectations are directed towards an improvement of communication means and information gathering. Potential benefits are also expected in the fields of qualification and education, electronic commerce, and citizens' participation. The interviewees generally think that ICT will in the long run become an important location factor. After all, positive and negative expectations seem to be balanced. That balance seems to be independent from city structure, administration department and personal acceptance of ICT.

Actors of informatisation

Some interviewees think that the ICT implementation can be left to the market, which will lead to an adequate distribution of infrastructure and access. On the other hand, many think that it is a task where the local administration and other public actors need to become involved.

ICT and space

As far as the impact of an increasing use of ICT on space is concerned, the interviewees' estimations are rather reserved. While there is a general awareness of changing spatial patterns, these are not seen as being caused by ICT, but by a whole range of driving forces, since current developments are seen as too complex to simply state one-dimensional cause-effect-relations.

Almost all interviewees agree that cities will keep their importance as centre of different functions and activities, especially with regard to face-to-face communication and leisure activities. This implies a functional change for the city rather than a change of relevance. The interviewees have no common notion on behalf of the modification and decentralisation of employment and production, apart from the expectation that production sites will continue to quit their urban locations. In their opinion, centralisation and decentralisation, concentration and deconcentration processes run parallel, although the interviewees tend to expect concentration processes. These awareness' are as well independent from city structure, administration department and personal acceptance of ICT.

ICT and communication

The relevance of ICT for communication processes is assessed very differently. In Berlin and Ulm, the contrast is the most obvious: While the interviewees in Berlin think that communication will become better and faster, the interviewees in Ulm are seeing hardly any changes. In the other two cities, both opinions are stated. The interviewees in Duisburg stressed the fact that communication via ICT cannot replace a personal contact, which was also mentioned in other cities, but not as rigorous.

ICT and co-operation

Co-operation processes are generally seen as unchanged, and are also not expected to change. This shows that an improvement of communication means does not necessarily lead to a better co-operation. Personal contacts seem to be seen as essential for a successful co-operation, irrespective of city structure, administration structure or ICT equipment. The same – no changes - is expected with regard to the political decision making process.

ICT and transparency

Ulm is the only city where the interviewees think that transparency within the administration is increased by ICT, and where this transparency is also defined as a positive guideline. In all other cities, opinions vary.

ICT in the spatial planning process

When discussing possible applications and benefits of ICT within the spatial planning process, particularly the interviewees in Leipzig and Ulm state that ICT can contribute to a more elaborate participation process. Further positive expectations are the acceleration

of the planning process, improved data bases, higher flexibility of planning outputs, and three-dimensional or animated presentations to make planning outcomes more sensual.

Negative effects are expected to derive from the rising expectations with regard to flexibility and the perfection of presentations, because the increasing time- and personnel-intensity often is not taken into account. Data protection is mentioned as another problem. Last, but not least, the interviewees think only those can profit from new ICT-based participation strategies who have access to ICT, a group which is growing, but nevertheless still limited.

Some more neutral assessments suggest that ICT will have no influence on spatial planning procedures. They only expect changes with regard to the planning tools. Planning itself will, in their opinion, continue to take place “in the heads” and cannot be replaced by computer generated procedures.

Remarks

In general, there is hardly any recognition of an ICT relevance for spatial development. The ideas about slight changes that might take place are heterogeneous, especially with regard to the way the city council should become part of the ICT implementation process, how communication structures and procedures are changing, and in what ways ICT can be of use in the spatial planning process. The differing opinions vary among the cities insofar as the interviewees in Leipzig and Ulm apparently hope for an augmentation of transparency and participation, while the interviewees in Berlin are more hopeful with regard to the improvement of communication processes within the administration, and the interviewees in Duisburg stress the restrictions through data protection regulations.

A possible conclusion of these findings is that the expected benefit determines in which way administrative actors become active in the ICT implementation process. They probably initiate or support the implementation of ICT and its applications when the expected benefit corresponds with their goals.

Individual ICT acceptance (profile) and ICT relevance in the work context

An acceptance profile can be assigned to each interviewee and classed on an ordinal scale. Almost half of the interviewees show a high ICT acceptance, one quarter a rather high acceptance, and one quarter a rather low or low acceptance.

Even though the interviewees can certainly not be regarded as representative of their whole administration, the choice of interviewees may stand for a somewhat limited contingency. Accordingly, it is probable that the staff in the administration of Ulm shows a higher ICT acceptance than in Duisburg. Berlin and Leipzig would be placed between these two.

The difference in the ICT acceptance between the different departments is significant. Members of the economic promotion departments seem to be most open to ICT. The acceptance of politicians also is rather high.

Urban planners, on the other hand, seem to be split up into two groups: the one frequently using ICT, the others with no ICT experience at all. This is probably due to the fact that urban planners are the only interviewed group that has to deal with applications requiring a special qualification. While economic promoters and politicians use ICT for text-processing, spreadsheet and communication via email (and eventually the management of data bases) - applications which may be considered as relatively self-explanatory and common -, urban planners have to handle geographical information systems (GIS) based on exactly measured data. This requires special skills. Accordingly, those staff members that have never used ICT before might be discouraged.

The findings of our interviews suggest that those staff members who have acquired the relevant ICT or GIS skills at university or during their training on the job show a high acceptance, while those who have never even worked with more common applications (text processing etc.) tend to avoid ICT and especially GIS. This may imply, with regard to the urban planning staff, a certain difference in ICT acceptance between the generations, based on experience and skills rather than age. However, there is no evidence that this is also true for interviewees with other professional backgrounds, who mainly have to do with the more common, somewhat self-explanatory ICT applications.

It would be interesting for this project to examine the interrelation between ICT acceptance and, on the one hand, the assessment of ICT relevance for urban development, and, on the other hand, the identification with ICT programmes within the city. Is it reasonable to assume that personal ICT acceptance contributes to the acceptance of public ICT programmes, or, the other way around, that public ICT programmes have an impact on the personal ICT acceptance? How do the assessments of potential ICT benefits and of the ICT relevance in the urban development process vary?

Related to ICT policy, we assume that a higher acceptance among the staff is interrelated with a broad ICT implementation approach. Whether this relationship really exists, and in what ways it might function, remains to be seen.

Qualification measures and necessities

Qualification of the staff seems to be an important issue in order to deal with the challenges of ICT.

Apparently, further education programmes with regard to ICT are offered sufficiently in all cities. All interviewees said that if someone wants to get informed in the ICT sector, there is no problem to find a suitable ICT qualification measure. Also, the interviewees found that the daily routine is necessary to deepen the knowledge that has been acquired in qualification programmes. Some think that it is essential to understand the structure of an application, and then it is a lot easier to understand all others, too.

The qualification programmes are concentrated in the field of software applications, whereas other questions – as job-specific, social, and spatial potentials and effects of ICT

– are not subject to these programmes. But there does not seem to be an awareness that these issues are lacking.

Only staff members who are especially interested in ICT take the initiative and visit conferences or read corresponding literature. Facing more urgent problems and a scarcity of staff and financial means, further education in the ICT area tends to be regarded as a personal "hobby".

4. Ireland

Irish Case Studies

The Irish Case Studies Municipalities were:

- Dublin (Capital City, pop. 1 million, situated in the eastern seaboard.)
- Cork (Second largest city, pop. 130,000, situated on the south coast.)
- Ennis (Administrative capital of County Clare in the west of the country, pop. 17,000, Ennis is currently the base for an Eircom (the dominant Irish telco) "Information Age Town" experiment.)

Major Urban Problems:

All three case studies pointed to traffic congestion as the major urban issue. Thus far the cities surveyed have not considered ICT-based approaches to dealing with traffic but have relied (with little success) on a combination of road improvement and better public transport policies.

Perception of Cities:

On the whole the interviewees reported a positive internal perception (on the part of the local population) of their cities. Reported external perceptions varied but all the perception of all case studies had benefited from the "Celtic Tiger" phenomenon.

Awareness/Use of ICTs

On the whole there was a limited awareness of ICTs within the municipality contexts we studied. Even in the abstract the terms "ICTs" and Digital City meant little to those interviewed. On explaining the term ICT, most interviewees then simply pointed to the use of PCs within their office (although it should be noted that even this was not universal). Despite this in some of the case studies, most notably Dublin, ICTs were being used in traffic management and in on-street information provision systems. (In this regard we would note that how an individual understood IT/ICT clearly influenced their perception of how IT/ICT could be applied in their municipality.) Politicians were, on the whole, dubious with regard to the potential offered by ICTs for aiding the process of democratisation and introducing political/administrative transparency. The general consensus could be summed by a quote from one councilor to the effect that such a system was only as good as its

ubiquity – “precisely the people who are most likely to want to talk to me are amongst that element of society who are least likely to have access to a PC let alone email.”

The most interesting case study in this regard was the smallest – Ennis which had achieved a household penetration rate of 80% for online PCs as a result of the Information Age Town Project. Schools and businesses had also benefited from high-speed telecoms infrastructure investment. Despite this the interviewees from Ennis (with a few exceptions) offered the least developed thinking around the potential role of ICTs in the municipality. At a political/administrative level there was very little evidence that the local Urban District Council has made any substantive use of the local web site or Intranet as a means of disseminating information. As in other case studies, however, those Ennis interviewees from an economic development background

Perceptions of ICT and urban development

Given the material above it is hardly surprising that we should report that none of the interviewees volunteered (i.e. without prompting) the opinion that ICTs had any implication for the spatial structure of their locality and little for urban development. When the issue of the ICT/urban development relationship was pursued, however, a contrasting range of opinions as the related benefits/problems emerged. For those interviewees from cities experiencing substantial economic growth (i.e. Dublin), ICTs were seen as offering potential solutions to problems of traffic congestion, urban sprawl and spiraling house prices through allowing employees to live and work outside the urban centre. By contrast interviewees from Cork which notwithstanding its relative current economic health remains stagnant compared to Dublin, the locational flexibility associated with ICTs was seen as potentially dangerous for the city, since it would facilitate urban depopulation.

Information Gathering/Perceptions on/of ICTs and urban development

There was a noticeable gap between the levels of ICT knowledge on the part of, on the one hand, those interviewees from a planning or political background and on the other, those interviewees with an economic development function. The former group tended to acquire information on a “need to know” basis – i.e. learning by doing with regard to new software or via short term (one day) training programmes. By contrast, those from an economic development background have developed a level of expertise in ICT-related matters that far exceeds their planning or political counterparts. This is in large part driven by the employment priorities of central government which has identified the IT and IT-related industries (hardware manufacture, call centres, software localisation and e-commerce in general) as a (perhaps the) key source of current and future job creation.

(In this regard we would express the view based on the interviews that personal experiences with IT, including those interactions in the private sphere (i.e., at home) have, in the absence of a strong IT culture in the workplace, a determining influence on how ICTs will be viewed and used in that latter context. Our findings suggest that neither age nor gender can be regarded as reliable predictors of attitudes towards ICTs. However our

limited sample would suggest that those interviewees with children aged between 10 and 18 years of age had a greater personal knowledge of computers than others, simply on the basis of the fact that they were more likely to have a computer in the home. We would add the following caveat in this regard, however: although a) personal/private experience with ICTs is important in determining the attitude of our interviewees towards these technologies and b) in general this experience has been positive, it is nonetheless the case that most interviewees lack a theoretical context in which to translate this positivity into developing practical applications which employed ICTs in thinking about urban development and planning.)

On the whole ICTs were viewed either neutrally or positively (i.e. there were very few comments that portrayed such technology in a negative light.) Yet on the whole, planners and politicians did not see ICTs changing the basic processes, administrative structures and intellectual paradigms in which they operated within the foreseeable future, although all were willing to acknowledge the possibility of change in the abstract. In this regard we would advert to the narrow technical definition of the role of the IT department within municipal government - to serve the internal IT needs of the councils/corporations. Given this it is unsurprising that their members have offered little or nothing in the way of thinking on how IT/ICTs could be integrated into the thinking of other departments – in short, we can point to the dangers of over-specialisation as stifling creative intellectual collaboration between departments of the same city institution.

Again it will come as no surprise given the comments above regarding those interviewees from an economic development background that this group saw IT/ICTs as being highly significant for future job creation, (especially in the Dublin and Ennis areas).

Conclusion – Future of Urban Development in Ireland

In the short term (i.e. next five years) we have discovered little to make us believe that there will be any coherent or integrated adoption of ICTs on the part of Irish municipalities as a means of planing future urban development. The models/understandings of ICT operational amongst Irish planners with regard to the process of urban development are limited to:

- IT is a useful tool for general administration (i.e. a PC in every office – although not necessarily on every desk in the smaller administrations – is taken for granted).
- ICTs may also operate in very specific non-administrative roles. Dublin Corporation cite the use of traffic management technology. However such ICT use is considered as an extending/facilitating existing functions/duties, rather than fundamentally altering them or creating the possibility for new functions.
- There is virtually no awareness at an official or unofficial level of the potential impact of ICTs on spatial urban development.

Beyond these factors we would also point to the context of Irish political culture:

Political decision-making is highly centralised at national governmental level. Local innovation must operate within the confines of centrally made decisions. This leads to an absence of an active policy-making function at a local level, to the extent where there is an absence of a policy-making competency (measured both in terms of knowledge but also in terms of staff availability) at a local level.

To date central government would appear to have placed insufficient stress on the potential role of ICTs in facilitating urban development. In this context it is unsurprising that on the whole there has been little discussion and less action with regard to relating ICTs to urban development in Ireland.

5. The Netherlands

ICT policies are a relatively new area of public decision-making. Although many of us are using ICT applications, the definition of ICT in general, and specifically ICT policy, is still vague and its meaning can be interpreted in many different ways. One main goal of the interviews that took place in the current stage of the research is to investigate the way that different decision-makers perceive these concepts. Hence, the method chosen was based on open interviews with guided questions. The clear benefit of such a method is the opportunity to hear pure associative images of ICT and ICT policies without imposing own perceptions. However, such a method has also a drawback, since it makes the comparison among the interviews relatively difficult. Each interview partner may choose to pay a different attention and emphasis on the different questions and issues raised. As a result, in many cases the questionnaire is not always complete.

As we tried to interview urban administrators from different fields, the emphasis and knowledge regarding ICT activities in the city showed quite some variation. Therefore, the relatively small number of interviews does not allow us to get a complete picture of ICT activities in those cities. Since, in some cases, ICT was not on the interviewer's professional agenda, he or she had no information or opinion about some of the questions.

Our case studies included three cities: Amsterdam, Rotterdam and Tilburg. Amsterdam and Rotterdam are the two biggest cities in the Netherlands, both located in the Randstad area, the core of Holland. However, there are many differences between them. The image of Amsterdam is of cultural centre, tourist attraction and global business centre, while Rotterdam has the image of blue-collar working class, and its main attraction is the harbour (that attracts certain kinds of economic activities). It was interesting to check whether these different images affect the ICT policy and the way the administration perceives the opportunities of ICT. It seems that the interview partners in Rotterdam had higher expectations from ICT and its capabilities to solve urban problems. However, it is not clear whether these (slight) differences are only related to the city or to the different field of responsibility of the interviewers.

Tilburg is located outside the Randstad area. Its image as industrial city attracted us, since in our post-industrial society many industrial cities are looking for a new source for economic growth. It was interesting to check whether this is the case in Tilburg and whether ICT applications are a desirable urban goal. We found that this is not the case in Tilburg. Tilburg still believes in industry and tries to continue its traditional advantage.

In our opinion, the interviews give an excellent background for the next phase of our project: the quantitative research. It helped to define the relevant issues that should be investigated. It created the agenda for the research and stressed the possible indicators that can explain differences in ICT policy in different cities.

The interviews

Amsterdam

Four interviews took place in Amsterdam. All the interview partners are working at the community, though belonging to different departments. Two interviewers belong to the economic development department, one is working at the transportation department and the fourth one works at the spatial planning department. Naturally, each of the interview partners focused on his own working field. Nevertheless, all of them stressed the same problems that characterise Amsterdam. Clearly, ICT applications were neither the main planning tool, nor they expected it would change dramatically the role of the city in the near future. However, it seems that the use of electronic mail, Internet and Intranet is widely spread at the working environment and improves the quality and efficiency of their work. None of them had a negative attitude towards ICT (at least, the way they presented it), but they use it mainly at work and not at home.

Expectation towards ICT within the administration varied among the interviewers. While one of them hopes to standardise the system, the other one pointed out the benefits from such differences (creativity, foster development). The third interviewer criticised the over-secured system and the fourth one chose to stress the important role of ICT as facilitator to public participation.

Not all the interviewers responded to the qualification questions. It seems that since they have a reasonable system, they are not bothering to evaluate the system and its quality. The interview partner that is in charge of the communication team in the economic department seemed to be satisfied, although he said the adoption of ICT is quite slow.

Rotterdam

Three interviews were conducted in Rotterdam. One of the interview partners is working for the Rotterdam community at the department of harbour and development. The second one works at the port community Rotterdam (PCR) in a public private partnership, and the third one works at the community of Rotterdam. Unfortunately, the second interview is not complete. As sometimes happens with open interviews, the interview partner choose selectively her answers and did not leave enough time to complete the whole interview.

Nevertheless, it is interesting to note that as she was the only one (among all the Dutch interviews) that does not belong entirely to the public sector, she was also the only one that chose not to talk about “urban vision”, guiding principle for urban development and so on. It is not to say that she does not have opinion about that, but she was ready to talk just about her direct field of responsibility.

All the interviewers in Rotterdam are occupied with ICT applications as part of their responsibilities in work. Thus, it is not surprising that they had a relatively advanced knowledge of ICT application. The way we selected the interview partners affects that: when we tried to select the persons for interviews and introduced the subject, we were directed to those people that deals with ICT in the community. In the other two cities (Amsterdam and Tilburg) it was not the case, maybe because the ICT responsibility is less concentrated.

Tilburg

Four interviews took place in Tilburg. Three of the interviewers work at the Tilburg community and the fourth one works at Indutil (Industry Tilburg), which is a regional development company founded by the community. Three of the interview partners noted that lack of space to businesses is a major problem in Tilburg. However, it seems that ICT initiatives are not a major tool to cope with this problems. Instead, they suggest improvement in the urban environment as the main strategy to attract both citizens and businesses. Another important issue is the co-operation at the regional scale, to gain regional advantages.

On the one hand, Tilburg has the image of an industrial city. On the other hand, the interior image is a green, small city. It seems that the desired image of Tilburg is to keep its industrial image, but add to it a modern side. However, from the interviews it is not clear how they suggest to add the modern side to Tilburg image. None of the interview partners declared a negative attitude towards ICT, but just one of them was enthusiastic about the possible ICT implications and applications. However, even he stressed the marginal part of ICT within the overall economic activity in Tilburg.

A main issue that was raised in the interviews were the changes in the administrative structure that took (and still are taking) part in Tilburg: “The Tilburg Model”. There is no clear agreement among the administration about the benefits from such restructuring, but they all agree that indeed, major changes had took place. The part of ICT in these changes is also not clear. On the one hand, ICT improves communications within the administration and offer a tool for public participation, both central aspects of the model. On the other hand, the interviewers tended to clarify that ICT applications are additional and that they are not a main tool in these changes.

Comparison of interview findings

Urban development problems

The main problems that were raised in the interviews are common to all the three cities. Low qualified unemployment, and lack of space of locations for business and or housing, were mentioned as major problems in these cities. Amsterdam and Rotterdam seem to suffer also from high levels of traffic congestion while Tilburg had mentioned the accessibility problem, i.e., lack of connectivity.

City image

Amsterdam's image is a crowded city where space is expensive and the housing market is over exerted. On the other hand, it is the "real" experience and the gateway to Europe. Rotterdam's image tends to be negative; hard labour but a modern place where business is possible. The image of Tilburg is of an outdated industrial city, non-attractive and chaotic. Its residents appreciate the small scale, green environment.

Urban development guidelines

The interview partners tended to offer their own urban development guideline for their cities, not necessarily the "formal guidelines". Hence, we could not find comprehensive and agreed guidelines. In Amsterdam the co-operation with neighboured communities, mentioned as an important issue of the regional interdependency, is increasing. Also intensifying land use, mixed urban structure and blend ethnic groups are important ideas that had been raised. The interview partners of Rotterdam offered different aspects of urban development principles like decentralisation of urban administration (into districts) and to keep concentrating in improving urban infrastructure. The interview partners of Tilburg suggested further urban concentration and compact-city approach (following the national urban development policy), and to keep focusing on manufacturing development for Tilburg.

ICT in the city

The Internet site for Dutch municipalities can be found at www."municipality name".nl. All the three cities have web-sites, although they are designed quite differently. Table 1-1 offers a comparison among these web sites. The sites of Amsterdam and Tilburg have a central management of their virtual city hall, while the Rotterdam web site is a collection of independent sites of different departments or companies.

Most of the interview partners in the selected cities could not supply unique information about ICT projects or applications in their city. Most of the interviewees thought that their city web-site needs improvements, and can give better services. One interview partner in Rotterdam could supply information about the cable infrastructure in the city, no other interview partners mentioned ICT infrastructure issues. In Tilburg one example of ICT application in the transportation area is mentioned, and a false attempt to create public participation via the Internet. In Amsterdam the Digital City project was mentioned, as

well as the scientific centre that established for start-up companies and the Teleport project. Also, there are Internet cell boxes in a few places in Amsterdam that enable contacting the net with a telephone card.

The information society, city and ICT

The perceptions of the information society vary among the interview partners. However, most of them pointed out the continuing importance of the city and face-to face meetings. The city will stay important since it offers cultural and social advantages. Some of the Information society meanings are :

- Information provision rises; easier and cheaper access to information;
- Over-kill information;
- Low qualified people are excluded;
- Computer is the most visible and central aspect;
- Computer is NOT the most important part: the informational thinking is the most important part;
- The whole world becomes your world;
- Image gains importance.

Administration and ICT, ICT and policy-making

The most common ICT application is the e-mail. Most of the interview partners pointed out the intensive use of e-mail and its importance in their daily routine. It improves their communication with colleagues, with other departments and institutions. It is increasing the communication, but not substituting the other forms of communicating (face-to-face meetings, telephone). However, **all** the interviewees claimed that ICT does not seem to have a major effect on their work and decision-making process.

On the one hand, ICT enables more information to support decision-making, on the other hand it can make it more complicated. ICT is enabling higher quality products, faster processes and easier access to work-partners. It allows more flexibility, more alternatives towards problems and makes it possible for departments to be independent since the physical location is less crucial.

Attitudes towards compatibility vary. Some think that there is a need for more central management of the ICT application to enable easy communications. Others see the lack of central management as a positive thing, since it is enabling creativity within the different departments and enables them to develop suitable applications for their own needs.

Gathering information about ICT usually happens through journals and conferences. Those employees for whom ICT is part of their tasks tend to pay more attention to updating (visit in the Silicon Valley, conferences, professional magazine and even special employees that doing a routine market research). On the other hand, one interview part-

ner said that he is overloaded with such information since the private sector is taking care of informing him.

6. Norway

Selected cities for the case studies

- Oslo – the capital city. It is already decided through the project proposal to use the capital city as one of the case studies. The Oslo region is decidedly the fastest growing region in Norway, in terms of population as well as economy. Many of the workplaces created are within knowledge and information based sectors, where ICT plays an important role. The latest development in this regard is the coming establishment of an ICT centre at the site of the former main airport, Fornebu. Plans for the centre include agglomerations of ICT and telecom companies, amongst others Telenor, the national telecom.
- Trondheim – a regional centre. Trondheim is with its 146 000 inhabitants the third biggest town in Norway and the regional centre for the counties of Sør-Trøndelag and Nord-Trøndelag in the central region of Norway. Research and education as well as public administration are particularly important for employment in Trondheim. The University of Trondheim is the leading university in Norway within polytechnics. The research institute SINTEF is with its 1900 employees and turnover of 1,4 billion kroner, the fourth largest European independent research institute on science and technology. This constitutes a technological and scientific base for Trondheim's claim to be the "technological capital" of Norway. The Trondheim region has faced net out-migration in recent years. Despite a regional centralisation towards this region, it is thus clear that the national centralisation around Oslo is stronger.
- Steinkjer – a small town in transition. Steinkjer is the administrative centre for Nord-Trøndelag county. With its 10,309 inhabitants in the centre, it is a rather small town also in the Norwegian context. The town has faced relatively high net out-migration and a small decline in population in recent years, and is serious in trying to turn this trend. The municipality administration has been very active in trying to attract new industries, as well as motivating young people who have moved out for education to come back after graduation. A recent initiative is the marketing of Steinkjer as the "IT-town." This includes ambitious aims in terms of providing ICT-facilities in the schools, among the public as well as the industries. Special initiatives will be taken to provide infrastructure for entrepreneurs who want to establish ICT-based industries in Steinkjer. We chose Steinkjer as the third case because this will illustrate how a small town uses ICT in their strategies to attract new inhabitants as well as industries.

The situation of the cities

The Oslo-region is the fastest growing region of Norway, while both Trondheim and Steinkjer are facing a net out-migration. We found that the planners and politicians of Oslo defined the city problems in terms of rather traditionalist city planning concerns: traffic congestion, housing space, regulation of relations to neighbouring municipalities. In Trondheim and Steinkjer on the other hand, politicians were much more concerned about the future of the city as such, and perceived the main challenge for the cities to be the forming of new policies and strategies to prevent further decline.

Information technology and the city

Economical development

The perception of the role of ICT in the economical development of the cities can be summed up as follows:

- Steinkjer: ICT perceived as the solution. There is a strong involvement from the public sector in attracting ICT-based private as well as public enterprises. Hope is that this will create an environment that will facilitate development of new industries.
- Trondheim: The strategy is to prevent "brain drain" by strengthening the knowledge intensive sector based on the technological milieu. Politicians want to achieve this by providing areas for development but without much active involvement.
- Oslo: The politicians of Oslo do not involve themselves in developing industries – not even in the discussion on IT Fornebu. The city is growing anyhow, and politicians/planners do not seem to have much interest in directing the development of the growth.

The impetus for the uptake of new technologies may stem from various sources, including, of course, as solutions to internally defined problems. However, in relation to new ICTs, a very strong impetus stems from the near omnipresent hyperbole surrounding these new technologies. In general, it stresses the inevitability, persuasiveness, and enormous benificiality of the new ICTs *for those who adopt*. While present in somewhat different variants in the mass media, in industrial marketing and in modern fiction, we assumed that the current discourses over the information society and global cities in the EU and US would constitute the main reference point for our informants. This held true. Without exception, our informants were able to perform informed discussions over the notion of the information society and of globalisation. Interestingly however, their interpretations of in what way these scenarios would effect themselves and their cities, varied considerably. For example, the politicians of Oslo forwarded the argument that cities bigger than a half million now are growing faster than other cities - therefore, Oslo was "in". Steinkjer, on the other hand, was able to interpret the information society discourses within a client-oriented city approach. Our conclusion is that discourses on the informa-

tion society and the globalisation of the economy are given locally congruent interpretations.

Spatial changes

None of the informants foresee significant spatial changes as a result of new ICTs. All cities are experiencing a removal of heavy industry and a revitalisation process in the city centres. But this is seen more as a consequence of tertiarisation of the cities and the increased importance of knowledge-based consultancy, than as a result of new ICT infrastructure. In fact, more ICTs are seen to lead to two perhaps contradictory developments: It will lead to more traffic (the more you travel, the more you communicate), and increase the importance for social meeting places (face-to-face interaction vital for innovative milieus). In this respect, we found that city politicians and planners generally are marked by a strong pessimism or defeatism - in an interestingly sharp contrast to official national politics in this field, where the potential for decentralisation and reduction of traffics are stressed.

ICTs are perceived as offering a potential for better monitoring and regulation of traffic flows. Trondheim was the first city in the world to implement a digital payment system for cars entering the city. However, while the initial argumentation for the system was environmental, this has largely slipped over to an economical argumentation. Oslo has later implemented the same system, based on the technology of the "queue-free bricks". Some experiments with web-transmitted traffic-monitoring of the road between Oslo and its new airport at Gardemoen are now taking place, but not initiated by the city municipals. In general, city planners admit that they have not the resources nor the confidence to keep up with industrial developments in the field of Internet based transport services.

ICTs and the participation of citizens

There are, broadly speaking, three issues related to citizens' participation and new ICTs:

- *Provision of training and access*.
- *Increased public participation in decision-making*.
- *Improvement of public services*.

Knowing the traditionally strong emphasis on the educator-role taken by the Norwegian government, it is not surprising that the first issue has dominated the political debate over new ICTs. The question of participation has to a large extent been domesticated as a question of participation *in* ICTs, not *by means of* ICTs. In both Trondheim and Oslo training in ICTs in the public education was on the top ten list of topics in the local elections in the autumn of 1999. One of the clear paradoxes of the Oslo policy is that all pupils in the compulsory school now have access to the world wide web, while that is not the case for the majority of council workers.

It is perhaps surprising that the issue of increased participation in decision-making not at all have been linked to the new ICTs, but that is the case. This is very much a continental debate that has stopped outside our borders. It is not that the issue of participation in itself is not debated, but the debates are framed within more traditional approaches to the problems. The same lack of considerations over new ICTs is - at least partly - the situation when discussing the possibilities for the improvement of public services.

Urban information systems (web services)

There are some differences between the three cities in how they have configured their web-presence. Oslo has developed a very minimalist bulletin-version, consisting mainly of copies of budgetary proposals, press releases and minutes from city council meetings. Steinkjer, that first went on the web in the autumn of 1999, has so far settled for an electronic newspaper variant, with a deliberate editorial profile. However, looking for the possibility to enter public services or to participate in an exchange of views, the site is rather disappointing. Trondheim has the clearly most ambitious web service of these cities, with interactive maps of the town and graphical representations of the various organisational units, with the possibility to virtually enter the different offices. We were not surprised when we learned that the site was designed by a student that was inspired by the "digital city"-movement. However, the site suffers severely both under unfulfilled promises and lack of maintenance.

A general impression is that the reflections on and the explorations of what the web can be as a communication tool towards the citizens, so far is at a very immature stage. Furthermore, we doubt that the city governments have taken much lessons from the experiences so far. Our analysis of the three web-sites shows that the running of an administrative web-service towards citizens poses a set of technical as well as organisational and political challenges.

Technically, it is clear that the running of a web-service demands more than a students summer work. The problem of maintaining and updating the web-sites requires resources and routines. Often perceived as a challenge of presentation, we find that the real challenge is one of logistics, that is, how to make the various departments and instances of the administration contribute as information and service suppliers. None of cities have e.g. capitalised on the map expertise of the planning departments in their public ICT efforts, which could have been one way to develop a service that is truly grounded in the administration's own unique collection of knowledge.[1] With the possible exception of Steinkjer, the running of the web-services have been delegated to the margins of administrative organisations, and the kind of organisational reflections that are necessary to stimulate these kind of developments, has not been initiated.

[1] The digital maps of the Trondheim site are also the work of university students, and are, by the way, graphically and otherwise poor compared to what is being developed in Oslo.

There are also further organisational and political obstacles to use ICTs as a channel for the delivery of public services and the stimulation of public participation. Except for very informal and "amateurish" use of e-mail - that is, there are no established routines for the use of e-mail as a delivery channel -, all use of ICT-systems ends at the case-worker's desks. It seems to be very hard for administrators and politicians to imagine a world that it organised differently.

New ICT at the workplace

Planners are accustomed to work with computerised work tools, whether new or old. More than any other administrative departments (with the possible exception of the economical departments), the knowledge base of city planners have become connected to the use of such tools. During the past decades, planners have become accustomed to a wide variety of new technologies, especially related to the handling of geographical information. Recent developments for the production, display and storage of data includes techniques as ortho-photo, 3-d-modelling and advances in GIS-technologies. One important implication of this computerisation is that the capacity to perform advanced analysis's, has increased decisively. However, according to our informants, this has not led to a redundancy of planners, but to an increasing demand for more concultancy.

The computerisation of planning has not been a trivial experience, thou. Rather, it offers vivid illustrations of tensions raised by the introduction of new technologies. In our material, we found at least three types of conflicts caused by the implementation of new city planning tools:

- *Conflicts over the level of ambition*. New planning tools raise conflict between the enthusiasts and the rest of the urban planning departments as well as the administration and the politicians in terms of getting economical funding as well as over the allocation of human resources. Especially Steinkjer had experience with large development projects that had failed, while Trondheim reported on the problems caused by the turn-over of competent staff to the industry.
- *Conflicts over the compatibility of systems*. Another conflict has been caused by the lack of compatibility between the high performance equipment of the planning divisions and other administrative intra-networks.
- *Conflicts over the utility of applications*. Again, this can be portrayed as a conflict between enthusiasts and the rest. It is a conflict between those who prefer the information systems that performs the most high performance analysis, and those who prefer the information systems that most easily can be distributed and displayed, and therefore used e.g. by case workers, but ultimately also by the public.

Now, with the "Internet challenge" - the new possibilities of linking up and communicating outwards - we would have expected that this last conflict stood at the forefront of the internal discussions nowadays. But that is not (yet) the case. The critical issues raised by the Internet technologies concerns the distribution and display of data. In Oslo, we were

offered some impressive demonstrations of recent achievements in the way map displays could be linked to various databases containing information on regulations, ownership, infrastructure supply etc. However, these applications are only available for a smaller number of the planners themselves. Counter officers have got access to the digital maps, but still have to "order" a lot of the other information needed to handle public requests.

In fact, the heads of the planning department of Oslo display a rather ambiguous attitude towards the Internet technologies. It is only the leaders of the five divisions of the planning department in Oslo that have access to the world wide web. This was partly explained as a problem of economical investments and technological infrastructure, but we also heard moral prejudices against letting the employees have this access. Overall, we heard less reflections on what the Internet could mean as a possibility to change work practices, information flows or professional relations in Oslo than in Trondheim and Steinkjer.

On the other hand, they had spend quite some effort investing in the department's home-page, that by far is the best home-page among the departments of the city. Even more striking is the enterprise of the map division of the department that is running. The map division has turned the retailing of digital map information into a full-blown commercial enterprise. Various public and private organisations (e.g. the police, the ambulance service, but also private cable-television companies) are subscribing to the digital map databases, while entrepreneurs, architects, estate agents and others can order various, highly sophisticated digital map products. Now, in this case the planning department are by far going beyond their administrative duties to the public. A very interesting project in the prolongation of this enterprise, is now on the verge. Building on their expertise in handling geographical data, and their success in selling it, the plan is to exploit the Internet as the future channel for this retailing. This could amount to a truly innovative domestication of the Internet technologies. The odd thing, however, is that it is based neither on reflections nor on tinkering with Internet applications. The Internet is more like a coincidence that happened while they were looking for ways to further exploit their knowledge base.

Even if we were puzzled by the contradictions in the Oslo case, we think it offers an important example of what could be elements of an "intelligent enterprise approach" towards the appropriation of Internet applications. That is, by taking ones own expertise as the point of departure, one can find ways to meaningfully integrate new ICTs to local practices .

Changes in administration/ politics

Historically, the introduction of information systems in the municipal administrations of Norway has occurred in three phases. The seventies saw the establishment of large databases on public registers. In the eighties, together with the introduction of the PCs and the text editors, came the investments in large intranets and the computerisation of case-work. Without going in detail, we learned that these, often very costly investments, now

are great obstacles for the modernisation of the equipment. Designed to last, and to be internally compatible, they lacked the flexibility to handle changing demands. Today, we are in the midst of the third phase of administrative information systems, where the internal systems are being linked to the global networks of the Internet. Even if this has been a surprisingly slow process compared to other sectors in Norway, at least all employees in the case study cities now have personal e-mail accounts.

In no case has the implementation of new information systems been linked to significant organisational reforms. On the other hand, both Oslo and Trondheim have during the last 20 years conducted mayor changes in the administrative system, but this has happened without reference to technology. Recent developments in Steinkjer may be an exception to this picture, but it is too early to tell. At least, the introduction of the new intranet in 1999 is perceived as a kind of open social experiment, where the hope is to generate catalytic networks and stimulate innovative action. We find that this tinkering attitude towards new information systems represents something new in the Norwegian administrative context, compared to the much more narrow efficiency goals of prior investments. Given the smaller size and possibly more open structures of the administration in Steinkjer, and the focus on Steinkjer as an "IT-town", there might be reasons to expect some interesting outcomes of this process.

7. Spain

Urban type-dynamics of development-guiding principles:

Madrid

Madrid is the capital city and a national metropolis, in fact the biggest Spanish city in number of inhabitants. It functions as core municipality leading the metropolitan area and supporting an urban region which gathers some 5,000,000 inhabitants. The dynamics of development show a population stagnation and a functional/productive specialisation of the core municipality (including selective reurbanisation processes: urban renewal, gentrification, etc.), spreading the high consuming real state activities to the urban rings, a switch of the residential land use patterns to those areas with high environmental quality, and great increase of the metropolitan rings. It keeps in common with the other two cases (Valladolid and Cuenca) the following features:

- the infrastructure deficiencies
- the unemployment
- the budgetary problems
- and the lack of an ICT integrated action plan.

Bearing in mind this urban characterisation, some interviewees working on economic and finance areas (dealing among others with the problems of population and enterprise stagnation and/or overflow) point out the following guiding principles:

- The improvement of the supporting economic atmosphere
- The creation of high quality job
- The competition to attract foreign investments: "Marketing City" politics
- Attracting Conferences and Fairs
- Attracting tourism
- Keeping the character of a big industrial city

For others having a more spatial (urban planning) and socio-economic approach, there is a high correlation between functional/productive specialisation of the core municipality (including selective reurbanisation processes: urban renewal, gentrification, etc., and the strenghthening or creation of excluded areas), spreading the high consuming real state activities to the urban rings and the need of emphasising socio-spatial approaches:

- Improving urban social integration
- Protecting historical heritage
- Ecological city developments
- Balancing off decentralising and centralising trends

Some others having technical or political duties (one is at the political opposition to the governing body of Madrid's municipality) stress the need of:

- Issuing regulations and laws having to do with "virtual" urban spaces

Valladolid

Valladolid is the capital city of an inland rural region (Castilla y León), a second-rank metropolis provided with some specialised services (like university) and an industrial-service economy supported by public investments which start to become a rising metropolitan area. As the other two cases, it undergoes problems of:

- infrastructure deficiencies (in this case the claims focus on the planned high speed train and the need of an improved airport)
- unemployment
- budgetary problems
- and lack of an ICT integrated action plan.

Some interviewees stress the relationship between diversification and specialising industrial activities (Hi-tech industry) as well as service ones (Valladolid as a regional cultural

city), Valladolid's geo-strategic location favoured by good and modern infrastructures (high speed train and airport), and the potentialities of Valladolid as rising business centre for the whole Spanish North-western region (one of the political guiding concepts).

Others pointed to a dynamic of development devoted mainly to urban beautification (buildings' façades and improved public open spaces) in relation with the political aim of recovering the Valladolid potential as cultural city.

Even other person (he works at the Chamber of Commerce) highlights a dynamic of development determined by a strong, yet missing urban planning flexibility which makes housing and industrial land still more expensive and therefore is inconsistent with the politics aiming at controlling population and enterprises overflow.

Cuenca

Cuenca is a province capital located in a deprived inland region (Castilla-La Mancha) which fits, according to the Spanish urban ranking, into the position of a very small city whose most characteristic functions are the commercial and service ones, both oriented towards the provincial demands. Besides an ageing population (obviously because the city is located in a rural and deprived region which has undergone migration processes since the 50's) the city undergoes similar problems to the other two cases studies:

- infrastructure deficiencies (in this case they are fighting for the high speed train)
- unemployment
- budgetary problems
- and lack of an ICT integrated action plan

Keeping in mind the above mentioned problems all the interviewees highlight a dynamic of development determined by the lack of transport and ICT infrastructures which must be counterbalanced by local politics focusing on solving this problem and promoting a new and more modern urban image in order to create employment, attract tourism and change the exterior image of Cuenca as little village.

Comparison per city: general urban development – ICT activities

Madrid

Some interviewees stresses the relationship between general urban development, at metropolitan scale, in terms of economy (creating new economic spaces, building new and well developed infrastructure networks) and active politics supporting ICTs activities such as:

- Fibre optic network
- Subsidies for the ICTs introduction
- Collaboration with teleco operators

- Relations with ICTs enterprises
- Specific working groups

For others, the general urban development reveals itself in the improvement of urban environment including citizen safety problems and the increasing the efficiency, the democracy and the transparency of local administration, and all these have a high correlation with public ICTs activities dealing with:

- Fibre optic network
- Setting an urban information system for administration decentralising (one and single administration grill)
- Avoiding traffic congestion and citizens physical movements

One interviewee (working at the urban planning department) can see a partial correlation between the spreading of high consuming land activities to the urban rings (e.g. the back offices of big enterprises), the switch of the residential land use patterns to those areas of environmental quality, and the ICTs introduction (optic-fibre cabling, urban information system, etc.). He even said that ICTs introduction becomes a potential tool to recover the urban central areas as living spaces. Nevertheless he thinks the traffic congestion removal target has failed.

Other interviewees do not have any connection in mind between public ICT activities and spatial patterns. In fact one said that the ICT development is not leading the urban one.

Valladolid

Some of the interviewees do not know how to articulate a clear relationship between the two aspects above mentioned and no clear effect on physical development except for the fact that as long as the public administration will become more modernised (setting information points, urban information system, etc.), the decentralisation proceses throughout the city will be strenghthened.

Others argue that the public ICT effects on Valladolid urban development are very poor except for punctual aspects such as bus timetables, traffic light regulation.

Even others (mainly the person working at the urban planning department) are very critical about the ICTs possibilities of promoting any economic or population recovery. Therefore while the general urban development promoted by the local administration focus on new housing and industrial developments to control population and enterprises overflow, building new cultural premises and the improvement and/or creation of transport and ICTs infrastructures, the public ICTs politics are supporting the creation of a two tier society, reinforcing the best possibilities for those who have access to information, and creating privileged locations.

Cuenca

The interviewee working at the Social Services department stresses the relationship between the urban dynamic of this small city located in a marginal region and the public ICT adoption of a "citizen network" model. He believes in showing a willing attitude that marginal areas are being benefited from this kind of ICT adoption which reinforces local development (employment and democratisation) and is the cheapest way acting as an alternative to a more expensive and classical municipal information system. At this stage it is too early to have a critical balance of the relationship between urban development and the public promotion of the citizen network.

The others interviewees keep a more sceptical attitude about the relationship between urban development and public ICT activities. They argue that it stays at a very starting level and except for the "citizen network" experience carried on by the Social Services, currently the public ICT activities focus on the own local administration sphere (purchasing of hardware and software and building local networks and applications).

Comparisons per city: perception of the interviewee (significance) -ICT profile

Madrid

- For some, there is a high correlation between positive profile and attitudes towards ICTs and their capabilities for:
    - favouring and supporting Madrid's competence and relevance within the major European cities,
    - improving quality of life,
    - decreasing traffic congestion..
    - balancing off the centralising and decentralising trends
    - helping urban planning as ICTs are good computer tools
- For others, having a positive approach to ICTs, there is no clear vision as to the relevance of ICTs for urban development (although they do have a relevance for the administrative and bureaucratic activities and efficiency).
- Still for others, having a receptive view on ICTs, they see no relevance for urban development

Valladolid

- Those very favourable to ICTs, see them as useful tools for:
    - Improving public administration efficiency
    - Improving urban quality of life (employment, environment, more free time...)
    - Helping the efficiency of the citizens-administration relationships (the municipality should be a "service factory")

    - Having an impact only in the long run, but not in the short run.
    - Strengthening the relationship among enterprises
- Others don't even contemplate the potential usefulness of ICTs for urban development.
- Still others, being very optimistic about ICTs in their personal lives, they see that ICTs are not helping the citizen engagement into public life (democratisation, participation in public affairs...), and so the individualistic way of life seems unaltered by the growing ICTs adoption.

Cuenca

Those very favourable to ICTs, see them as useful tools for:

- The citizen network possibilities: employment, tourism, urban refurbishing of the city.
- Democratisation and co-operation among urban actors
- Administrative efficiency

Others, also very enthusiastic in ICT matters, they nevertheless think that these technologies don't have any spatial implications in very small places like Cuenca (being so small, "everything is at hand").

Comparisons per city: ICT within the own working sphere-ICT profile

Madrid

As a general rule, it can be said that there should not be a relationship between the two, because the working place equipment is a "given", and the ICT profile depends on each one's will. Nevertheless, small relationships can be told of between a high profile and whether the interviewee pushes and fights for improving such equipment at work.

In a hi-tech context, like the Economic Development Institute, high ICT profile fits a high equipment-based working place: internet and intranet with a local industrial space browser, own web pages... and a wish for still better software applications relating to interactive tools.

In the rest, high level equipment for administrative procedures correlate with high ICT profile.

There is yet a case of an interviewee with a extremely high ICT profile who nevertheless is also extremely critical about her own ICT equipment (both hardware and software) in her work place. There must be said that this person is at the political opposition to the governing body of Madrid's municipality.

Last, it can be detected a case of rather low ICT profile and low ICT equipment at the working place. This person believes ICTs are just good for administrative procedures, but for nothing else.

Valladolid

In this municipality there is but a medium-level ICT equipment, and most of them (except those working in the Urban Planning Department) still don't have an access to internet. Most are still sticking to Windows 95, even to 3.11, and at the very most they have access to an intranet. They have developed their own tools for accounting, financial affairs, taxes...

Those at the Urban Planning Department have additional software such as GIS and graphic and CAD informatic applications.

All of them have a very positive attitude towards ICTs, but budget --and probably, political will-- is scarce.

At the Chamber of Commerce they have a high level of ICT equipment, included videoconferencing, have access to intranet and internet, and they even teach courses on PC use.

Cuenca

At the Social Service area they are very well equipped, and oddly enough they are the ones who have really introduced ICTs and the use of internet as a working tool on a great scale in the Cuenca municipality. Obviously, they all have a high ICT profile. They even go as far as creating the municipality's web pages. They manage the "telecentre" on a nomadic basis with no fixed address.

At the data processing centre, they are well equipped, and create some of the applications needed, although they buy external software and do some outsourcing, too.

Qualification measures and necessities with regard to ICTs per city

Madrid

As a general rule, it can be said that all interviewees see the training need in ICTs in order to become a qualified user, and hence, they deem training as an useful personal asset to increase the degree of ICT penetration in the overall management of the municipality.

Besides that general premise, several concrete remarks have come up:

- Many interviewees insist upon the need of developing interactive tools as soon as legal data protection and electronic signature issues have been solved. Citizen-municipality interactivity is seen as a must.

- Creation of a "virtual university" so that the young graduates' know-how might be transferred into those small and medium industrial and service enterprises which cannot afford high ICTs investments.
- Training should be given not only in terms of *ad hoc* courses, but also at the very working place.
- Municipality activity implies a lot of computer-aided design and graphic know- how. Consequently, much training should be devoted to CAD-type tools.

Valladolid

Same overall remark as mentioned for the Madrid case: general consensus about the training needs. As to more particular issues mentioned at the interviews:

- Providing courses to municipal employees is OK, but motivation to do those courses should be of paramount importance, too, if one wants that those courses be really effective and that the trainees become aware of the ICTs capabilities.
- Besides *ad hoc* training bodies, the Municipality should also take initiatives as a training institution (probably outsourcing it), in matters regarding ICTs, also for the general population.
- CAD and graphic tools are of utmost importance
- Co-ordination and a well thought-of plan are necessary to increase ICT skills among municipality personnel.

Cuenca

Again, same general remark as in the two previous cities in the sense of emphasising the need of training activities regarding ICTs. Other concrete observations raised by the inverviewees:

- The need of allocating a generous budget into the training activity
- The creation and keeping of a permanent mobile or nomad youth telecentre where the younger generations learn how to interact with their municipality.
- The design and development of a practical "e-democracy" project and to teach its contents to the general population.
- A previous work of ranking ICT training needs and providing the training according to that rank.
- A three-year training plan on ICTs
- The Y2K effect as part of the training syllabus

Annex 4: Questionnaire of the Survey

This is a draft version of the questionnaire which served as basis for the development of the national questionnaires in the respective national languages.

The definition of information and communication technologies (ICTs) as we use it in this survey is as follows:

"ICTs are a collection of technologies and applications which enable the processing, storing and transferring of information (hardware, software and infrastructure), provided by, and serving both the public at-large as well as the institutional and business sectors."

This definition includes:

- hardware: PCs, laptops, telephones, fax machines, mobile phones etc.
- infrastructure: Fibre Optic Cable, Cable, ISDN, ASDL, ATM etc.
- software: world wide web, email, ftp etc.

For each question, please tick the appropriate box (x).

Manual for the coded TCV and the corresponding SPSS-file

The answers of this questionnaire will be analysed with SPSS. For that reason, each question and each answer have a code;

❑ The codes of the questions will be found in the first columns in case there are tables or under/ behind the questions.

❑ The codes of the answers will be found in the second row in case there are tables or before the answer-possibilities.

If a question in this questionnaire does not have a response, the answer should be coded with number "9".

There are two exceptions;

❑ question 21 (the code for no answer is 999) and

❑ question 28 (the code for no answer is 9999).

The "other, please specify"-questions have to be handled in a special way. These sort of questions are divided in 2 parts;

- the first part is the question and
- the second part is the specification

(see for example question probl2p and probl2q).

The specification-answers which you will get back from the respondent, must be coded by the partners. A list with these used codes and their meanings must be sent to the co-ordinator of TCV.

The respondents can cross multiple answers for the questions 15, 16a, 18, 19, 20 and 34. That is why every answer-possibility of these questions is handled as a single question which you can answer with "yes" (= code 1) or "no" (= code 2).

The answers that are crossed by the respondents must get code 1 and the others must get code 2. If a respondent does not answer the question, then every item will get the answer "no" and so the code for every item is "2".

The SPSS-program starts with 4 questions that are not in the questionnaire;

- city size code (size0a)
- country code (state0b)
- city code (number0c)
- department code (dept0d)

With these questions it is possible to give every questionnaire an ID number. This ID number has to be marked on the questionnaire before distributing.

The city codes are for every country different, so that is the only question which the partners of TCV have to define by themselves.

Please send the city codes which you will be using to the co-ordinator of TCV, so that we know which code is which city.

1. To what extent do you consider your city (agglomeration/functional urban area) to be…

		Very much	To some extent	A little	Not at all	I don't know
		1	2	3	4	5
city1a	... an industrial centre	❑	❑	❑	❑	❑
city1b	... a services centre	❑	❑	❑	❑	❑
city1c	... an administrative centre	❑	❑	❑	❑	❑
city1d	... a centre of logistics	❑	❑	❑	❑	❑
city1e	... a centre for tourists	❑	❑	❑	❑	❑
city1f	... a commercial centre	❑	❑	❑	❑	❑
city1g	... an ICT and/or multimedia centre	❑	❑	❑	❑	❑
city1h	... a centre for higher education	❑	❑	❑	❑	❑
city1i	... an important city in the regional context	❑	❑	❑	❑	❑
city1j	... an important city in the national context	❑	❑	❑	❑	❑
city1k	... an important city in the European urban system	❑	❑	❑	❑	❑
city1l	... attractive for (business) enterprises	❑	❑	❑	❑	❑
city1m	... attractive to live in	❑	❑	❑	❑	❑

2. Which of the problems outlined below affect your city and to what extent?

		Very much	To some extent	A little	Not at all	I don't know
		1	2	3	4	5
probl2a	Traffic congestion	❑	❑	❑	❑	❑
probl2b	Housing Shortage	❑	❑	❑	❑	❑
probl2c	Lack of land reserve	❑	❑	❑	❑	❑
probl2d	Unemployment	❑	❑	❑	❑	❑
probl2e	Decline in the industrial sector	❑	❑	❑	❑	❑
probl2f	Ageing population	❑	❑	❑	❑	❑
probl2g	Sub-urbanisation/ urban sprawl	❑	❑	❑	❑	❑
probl2h	Decline of the city centre	❑	❑	❑	❑	❑
probl2i	Socio-spatial segregation (i.e. the fact that wealth and poverty tend to be concentrated in specific areas in our city)	❑	❑	❑	❑	❑
probl2j	Problematic real estate market	❑	❑	❑	❑	❑
probl2k	Lack of open (green) space	❑	❑	❑	❑	❑
probl2l	Negative image of the city	❑	❑	❑	❑	❑
probl2m	Pollution	❑	❑	❑	❑	❑
probl2n	Budget deficit	❑	❑	❑	❑	❑
probl2o	Problems in the education system	❑	❑	❑	❑	❑
probl2p	Other	❑	❑	❑	❑	❑
probl2q	(please specify): _____					

3. In the next 10 years, which of the following developments do you expect?

		… increase considerably	… increase to some extent	... not change	… decrease	I don't know
		1	2	3	4	5
de-vel3a	*The importance of our city* will...	❑	❑	❑	❑	❑
de-vel3b	In general, the importance of *small cities* will...	❑	❑	❑	❑	❑
de-vel3c	In general, the importance of *large cities* will...	❑	❑	❑	❑	❑
de-vel3d	*Competition between our and other cities will...*	❑	❑	❑	❑	❑
de-vel3e	*Co-operation between our and other cities will...*	❑	❑	❑	❑	❑
de-vel3f	The potential of our city to attract service companies will...	❑	❑	❑	❑	❑
de-vel3g	The potential of our city to attract *industrial enterprises* will...	❑	❑	❑	❑	❑
de-vel3h	The potential of our city to attract new residents will...	❑	❑	❑	❑	❑
de-vel3i	In general, t*he importance of the central business district* in our city will...	❑	❑	❑	❑	❑
de-vel3j	*Suburbanisation* will...	❑	❑	❑	❑	❑
de-vel3k	*Socio-spatial segregation* (i.e. the fact that wealth and poverty tend to be concentrated in specific areas) in our city will ...	❑	❑	❑	❑	❑
de-vel3l	*Traffic* in our city will...	❑	❑	❑	❑	❑
de-vel3m	The flow of goods will...	❑	❑	❑	❑	❑
de-vel3n	*The flow of people (mobility) will...*	❑	❑	❑	❑	❑
de-vel3o	The *effectiveness of environmental protection* in our city will...	❑	❑	❑	❑	❑

4. ... and how do you assess the influence of ICTs on these developments?

		High	Medium	Low	None	I don't know
		1	2	3	4	5
ict4a	*the importance of our city*	❑	❑	❑	❑	❑
ict4b	the importance of *small cities*	❑	❑	❑	❑	❑
ict4c	the importance of large *cities*	❑	❑	❑	❑	❑
ict4d	*competition between our and other cities*	❑	❑	❑	❑	❑
ict4e	the potential of our city to attract service companies	❑	❑	❑	❑	❑
ict4f	the potential of our city to attract *industrial enterprises*	❑	❑	❑	❑	❑
ict4g	the potential of our city to attract new residents	❑	❑	❑	❑	❑
ict4h	t*he importance of the central business district* in our city	❑	❑	❑	❑	❑
ict4i	*suburbanisation*	❑	❑	❑	❑	❑
ict4j	*socio-spatial segregation* (i.e. the fact that wealth and poverty tend to be concentrated in specific areas) in our city	❑	❑	❑	❑	❑
ict4k	*traffic* in our city	❑	❑	❑	❑	❑
ict4l	the flow of goods	❑	❑	❑	❑	❑
ict4m	*the flow of people*	❑	❑	❑	❑	❑
ict4n	the *effectiveness of environmental protection* in our city	❑	❑	❑	❑	❑

5. **To what extent do you agree with the following statements?**

		Strongly agree	**Agree**	**Dis-agree**	**Strongly disagree**	**I don't know**
		1	2	3	4	5
state5a	ICTs will change the policy making process in our municipality.	❑	❑	❑	❑	❑
state5b	ICTs make the political decision-making process	❑	❑	❑	❑	❑

	more efficient.					
state5c	The implementation of policies is more efficient with ICTs.	❑	❑	❑	❑	❑
state5d	ICTs improve communication within our city administration.	❑	❑	❑	❑	❑
state5e	ICTs improve the ability of our city administration to serve the citizens.	❑	❑	❑	❑	❑
state5f	ICTs improve citizen access to *useful* information.	❑	❑	❑	❑	❑
state5g	ICTs give the administration better access to public opinion.	❑	❑	❑	❑	❑
state5h	ICTs will lead the administration to take greater account of public opinion in forming policy.	❑	❑	❑	❑	❑
state5i	ICTs will increase citizen participation in the policy process.	❑	❑	❑	❑	❑
state5j	ICTs provide all segments of the population with equal access to education, employment and social services.	❑	❑	❑	❑	❑
state5k	ICTs increase even more the gaps between poor and rich.	❑	❑	❑	❑	❑
state5l	ICTs enable people to get better access to professional services without living in a city.	❑	❑	❑	❑	❑
state5m	ICTs enable people to get better access to urban cultural life without living in a city.	❑	❑	❑	❑	❑
state5n	ICTs will reduce the need for people to travel.	❑	❑	❑	❑	❑
state5o	ICTs improve the quality of social relationships.	❑	❑	❑	❑	❑
state5p	ICTs will increase working at home in our city.	❑	❑	❑	❑	❑

6. How much influence do the following actors have with regard to the application of ICTs in your city?

		High	Me-dium	Low	None	I don't know
		1	2	3	4	5
in-flu6a	Municipality	❑	❑	❑	❑	❑
in-flu6b	Chamber of commerce	❑	❑	❑	❑	❑
in-flu6c	Pressure groups	❑	❑	❑	❑	❑
in-flu6d	Community groups	❑	❑	❑	❑	❑
in-flu6e	Regional authorities	❑	❑	❑	❑	❑
in-flu6f	National authorities	❑	❑	❑	❑	❑
in-flu6g	Private individuals	❑	❑	❑	❑	❑
in-flu6h	Private ICTs sector (Tele-com and others)	❑	❑	❑	❑	❑
in-flu6i	Other private investors	❑	❑	❑	❑	❑
in-flu6j	Business agencies/local development funds	❑	❑	❑	❑	❑
in-flu6k	Global players (multina-tional enterprises)	❑	❑	❑	❑	❑

7. With regard to the ICT policies, which of the following statements is true for your municipality?

		Strongly agree	Agree	Dis-agree	Strongly disagree	I don't know
		1	2	3	4	5
pol-icy7a	My city is implementing a systematic and compre-hensive ICT policy.	❑	❑	❑	❑	❑
pol-icy7b	My city is implementing an ICT policy which con-centrates on specific ar-eas/problems/needs.	❑	❑	❑	❑	❑
pol-icy7c	My city has no specific ICT policies.	❑	❑	❑	❑	❑
pol-icy7d	My city has no ICT poli-cies at all.	❑	❑	❑	❑	❑

8. As far as your municipality is concerned, to what extent do you agree to the following statements?

		Strongly agree	Agree	Dis-agree	Strongly disagree	I don't know
		1	2	3	4	5
muni 8a	Economic development is a very important area for the deployment of ICTs.	❑	❑	❑	❑	❑
muni 8b	Attracting new enterprises is a very important area for the deployment of ICTs	❑	❑	❑	❑	❑
muni 8c	The application of ICTs is intended to render the political/administrative process more transparent for citizens.	❑	❑	❑	❑	❑
muni 8d	Private sector decisions and activities are not affected by municipal ICT-activities.	❑	❑	❑	❑	❑
muni 8e	Improving citizen-municipality relations is a very important rationale for the municipality's deployment of ICTs.	❑	❑	❑	❑	❑
muni 8f	ICTs are deployed in urban planning to improve planner-citizen communications.	❑	❑	❑	❑	❑
muni 8g	ICTs enables better networking with other cities.	❑	❑	❑	❑	❑
muni 8h	ICTs can make our municipality more competitive vis-à-vis other cities.	❑	❑	❑	❑	❑

9. Is there a formal strategy plan/program on ICTs in your city?

plan9

1 ❑ yes

if possible, please name it (plan9a): _____

2 ❑ no (please continue question 12)

3 ❑ I don't know (please continue question 12)

10. Does this ICT strategy plan/program reflect the urban problems indicated below?

		Very much	To some extent	A little	Not at all	I don't know
		1	2	3	4	5
refle10a	Traffic congestion	❑	❑	❑	❑	❑
refle10b	Housing shortage	❑	❑	❑	❑	❑
refle10c	Lack of land reserve	❑	❑	❑	❑	❑
refle10d	Unemployment	❑	❑	❑	❑	❑
refle10e	Decline in the industrial sector	❑	❑	❑	❑	❑
refle10f	Ageing population	❑	❑	❑	❑	❑
refle10g	Sub-urbanisation and urban sprawl	❑	❑	❑	❑	❑
refle10h	Decline of the city centre	❑	❑	❑	❑	❑
refle10i	Noticeable segregation among citizen groups (e.g. along class, race, social lines)	❑	❑	❑	❑	❑
refle10j	Problematic real estate market.	❑	❑	❑	❑	❑
refle10k	Lack of open (green) space	❑	❑	❑	❑	❑
refle10l	Negative image of the city	❑	❑	❑	❑	❑
refle10m	Pollution	❑	❑	❑	❑	❑
refle10n	Budget deficit	❑	❑	❑	❑	❑
refle10o	Problems in the education system	❑	❑	❑	❑	❑
refle10p	Other	❑	❑	❑	❑	❑
refle10q	please specify: _____ _____					

11. Which department in your municipality is in charge of the strategy plan/ programme?

depar11

1 ❑ ICT-department

2 ❑ Mayor's office

3 ❑ Other department(s), please specify

(depar11a):_____

4 ❑ External consultant

5 ❑ There is none.

6 ❑ I don't know

12. Are ICT issues integrated in any way into the urban master/development plan?

issues12

1 ❑ yes

2 ❑ no

3 ❑ I don't know

13. To what extent does the master plan provide any concrete ICT measures with regard to the following urban development problems?

		Very much	To some extent	A little	Not at all	I don't know
		1	2	3	4	5
meas13a	Traffic congestion	❑	❑	❑	❑	❑
meas13b	Housing shortage	❑	❑	❑	❑	❑
meas13c	Lack of land reserve	❑	❑	❑	❑	❑
meas13d	Unemployment	❑	❑	❑	❑	❑
meas13e	Decline in the industrial sector	❑	❑	❑	❑	❑
meas13f	Ageing population	❑	❑	❑	❑	❑
meas13g	Sub-urbanisation and urban sprawl	❑	❑	❑	❑	❑
meas13h	Decline of the city centre	❑	❑	❑	❑	❑
meas13i	Segregation among citizen groups (e.g. along class, race, social lines)	❑	❑	❑	❑	❑
meas13j	Problematic real estate market.	❑	❑	❑	❑	❑
meas13k	Lack of open (green) space	❑	❑	❑	❑	❑
meas13l	Negative image of the city	❑	❑	❑	❑	❑
meas13m	Pollution	❑	❑	❑	❑	❑
meas13n	Budget deficit	❑	❑	❑	❑	❑
meas13o	Problems in the education system	❑	❑	❑	❑	❑
meas13p	Other	❑	❑	❑	❑	❑
meas13q	Please specify: _____					

14. To what extent are the following goals pursued by your city?

		Very much	To some extent	A little	Not at all	I don't know
		1	2	3	4	5
goal14a	Improving telecommunication infrastructure	❑	❑	❑	❑	❑
goal14b	Supplying municipality information via telecommunications networks (internet, teletex, telephone and so on)	❑	❑	❑	❑	❑
goal14c	Promoting municipality services via telecommunication networks	❑	❑	❑	❑	❑
goal14d	Promoting or supporting tele-working programs	❑	❑	❑	❑	❑
goal14e	Promoting or supporting tele-medicine	❑	❑	❑	❑	❑
goal14f	Promoting or supporting tele-education	❑	❑	❑	❑	❑
goal14g	Promoting or supporting computer availability in public places (schools, community centres etc.)	❑	❑	❑	❑	❑
goal14h	Promoting ICTs use in the planning process (GIS or other applications)	❑	❑	❑	❑	❑
goal14i	Using ICTs in transport planning (intelligent road signs, online traffic information etc.)	❑	❑	❑	❑	❑
goal14j	Promoting research about ICTs and its effects on the urban systems, environment, transport, society and so on.	❑	❑	❑	❑	❑
goal14k	Promoting or supporting ICTs training (courses for different groups in the society, programs in schools, courses for the municipality employees)	❑	❑	❑	❑	❑
goal14l	Other	❑	❑	❑	❑	❑
goal14m	Please specify:_____					

15. Is there a formal strategy plan/action plan/program on ICTs or the information society at national or regional level?

form15a ❑ yes, at national level;

if possible, please write the name (form15a1): _____

form15b ❑ yes, at regional level;

if possible, please write the name (form15b1): _____

form15c ❑ no (please continue question 17)

form15d ❑ I don't know (please continue question 17)

16. Does this national/regional plan have any influence on the ICTs activities of your municipality?

acti16

1 ❑ yes; which ?

- ❑ (acti16a) Organisation/Co-ordination of local ICT activities
- ❑ (acti16b) Financial support
- ❑ (acti16c) Research & Development
- ❑ (acti16d) Legal support
- ❑ (acti16e) Others,

(acti16e1) specification others: _____

2 ❑ no

3 ❑ I don't know

17. Is your municipality currently running any projects (e.g. RTD-projects, pilot studies) on ICTs?

projec17

1 ❑ Yes

2 ❑ No, but we had projects in the past.

3 ❑ No, but there are plans for the future (please continue question 20).

4 ❑ No, never (please continue question 20).

5 ❑ I don't know (please continue question 20).

18. Which of the following institutions have funded ongoing and past projects?

inst18a ❑ European Commission

inst18b ❑ Other international funds

inst18c ❑ National funds

inst18d ❑ Regional government funds

inst18e ❑ Municipality budget

inst18f ❑ Partnership with the private sector

inst18g ❑ Other, please specify (inst18g1):

_____

inst18h ❑ I don't know

19. What departments are/were involved in these projects?

invo19a ❑ Urban planning and urban development

invo19b ❑ Economic promotion

invo19c ❑ Communication

invo19d ❑ Transport

invo19e ❑ Environment

invo19f ❑ Social affairs/ Education

invo19g ❑ Other, please specify (invo19g1):

_____

invo19h ❑ I don't know

20. **In which network activities in the field of ICTs, i.e. co-operation with other actors, is your city involved?**

netw20a ❑ Regional city-network

netw20b ❑ National city-network

netw20c ❑ International city-network

netw20d ❑ RTD-Project-related network

netw20e ❑ Disciplinary network related to certain departments

netw20f ❑ Collaboration in the frame of public-private partnership

netw20g ❑ Other, please specify (netw20g1):

_____

netw20h ❑ There are no such projects.

netw20i ❑ I don't know

21. Please give an estimation on the number of PC users in your department

pcuser21

In my department, PC (desktop/laptop) are used by _____ % of the staff.

(no answer = code 999)

21. **Please mark the frequency of your professional use of the following tools and applications.**

		Daily	Weekly	Less than weekly	Not available
		1	2	3	4
prof22a	PC (desktop/laptop)	❑	❑	❑	❑
prof22b	Word processing	❑	❑	❑	❑
prof22c	Spreadsheet	❑	❑	❑	❑
prof22d	Databases	❑	❑	❑	❑
prof22e	Intranet	❑	❑	❑	❑
prof22f	Email	❑	❑	❑	❑
prof22g	Internet	❑	❑	❑	❑
prof22h	GIS	❑	❑	❑	❑
prof22i	CAD	❑	❑	❑	❑
prof22j	Plotter	❑	❑	❑	❑

23. Please mark the frequency of your private use of the following tools and applications.

		Daily	Weekly	Less than weekly	Not available
		1	2	3	4
priv23a	PC (desktop/laptop)	❑	❑	❑	❑
priv23b	Palmtop	❑	❑	❑	❑
priv23c	Internet	❑	❑	❑	❑
priv23d	Email	❑	❑	❑	❑
priv23e	Mobile Phone	❑	❑	❑	❑

24. Do you find the following tools and applications helpful in your work and daily life?

			Very helpful	Helpful	Not helpful	Nui-sance	I don't use it
			1	2	3	4	5
helpf24a	**Office package or parallel software (e.g. MS Office)**	At work	❑	❑	❑	❑	❑
helpf24b		Daily life	❑	❑	❑	❑	❑
helpf24c	**E-MAIL**	At work	❑	❑	❑	❑	❑
helpf24d		Daily life	❑	❑	❑	❑	❑
helpf24e	**Internet**	At work	❑	❑	❑	❑	❑
helpf24f		Daily life	❑	❑	❑	❑	❑
helpf24g	**Cellular phone**	At work	❑	❑	❑	❑	❑
helpf24h		Daily life	❑	❑	❑	❑	❑

25. If you are connected to the internet, are you connected by:

conne25a	**At home:**	conne25b	**At office:**
1	❑ Modem (telephone line)	1	❑ Modem (telephone line)
2	❑ ISDN/ASDL	2	❑ ISDN/ ASDL
3	❑ LAN/MAN	3	❑ LAN/MAN
4	❑ Cables	4	❑ Cables
5	❑ Other	5	❑ Other
6	❑ don't know	6	❑ don't know

26. Have you used the following applications/services, and if so, how often?

		Daily	**Weekly**	**Less than weekly**	**Never**
		1	2	3	4
appl26a	Groupware	❑	❑	❑	❑
appl26b	Common electronic diary	❑	❑	❑	❑
appl26c	Tele-conferencing (audio and video)	❑	❑	❑	❑
appl26d	Tele-working at home	❑	❑	❑	❑
appl26e	Tele-shopping/e-commerce	❑	❑	❑	❑
appl26f	Tele-banking	❑	❑	❑	❑
appl26g	Other tele-services	❑	❑	❑	❑
appl26h	Please specify: _____				

In the last part, we would like to know some personal data:

27. (person27) **Are you** 1 ❑ **male** 2 ❑ **female** **?**

28. (year28) **Please note your year of birth** _____

(no answer = 9999)

29. What level of education do you have (highest level)?

edu29

1 ❑ Primary/Elementary school

2 ❑ High school / secondary school (twelve years)

3 ❑ Vocational studies (or other non-university studies)

4 ❑ University degree

5 ❑ Doctoral level

30. Please mark the field of your education:

field30

1 ❑ Spatial planning, architecture, geography

2 ❑ Management and economics

3 ❑ Arts and Humanities

4 ❑ Social sciences (other than above)

5 ❑ Computer sciences

6 ❑ Natural sciences

7 ❑ Engineering (other than above)

8 ❑ Other, please specify (field30a):

_____

31. In which field do you work?

work31

1 ❑ Planning/urban development

2 ❑ Economic department

3 ❑ Transportation department

4 ❑ ICT department

5 ❑ Politics

6 ❑ Other, please specify (work31a):

_____

32. What is your function?

func32

1 ❑ Head of the department

2 ❑ Head of a sub-unit

3 ❑ Municipal employee

4 ❑ External consultant

5 ❑ Politician

6 ❑ Other, please specify (func32a):

_____

33. How do you improve/maintain your knowledge of the above mentioned ICTs applications? (you may mark more than 1 option)

know33a ❑ Newspapers, TV and other mass media

know33b ❑ Course, conferences, research (through the workplace)

know33c ❑ Help from work colleagues

know33d ❑ Professional magazines

know33e ❑ Internet

know33f ❑ Help from family members, friends

know33g ❑ Learning by using

know33h ❑ Other, please specify (know33h1):

_____

34. Could you name a person who is responsible for the implementation of ICT in your administration? (resp34)

_____

Thank you very much for your co-operation!

Annex 5: Summaries of the National Results of the Survey

For complete National Reports see Milestone Report MS 2.

1. Austria

Actors, Attitudes and behaviour

Positive ICT-driven change expectations refer typically to improved *communication* and accessibility of information. At the same time, a pattern emerges that shows an awareness of *limitations* and doubts that ICTs will cause incisive societal change for the better. The finding that *tele-applications* and *group-ware* are used within reason might also indicate a limit to the extent to which ICTs are popular to affect social interaction and everyday life habits.

Still, the majority of respondents is rather fond of various ICT applications, they are *appreciated* particularly in the working environment. *The applications most frequently used a at work* are word processing, e-mail and Internet. Respondents are also *well equipped* with ICT applications *at home*. *Cell phones* lead in popularity for private use.

Conventional mass media are most popular to obtain information on the new media. Despite some overall resistance to let ICTs overly affect social interaction, the way to learn more about the development of these devices that is practised the least is getting help form family members or friends.

Actor acceptance by individual and city features

Overall actor acceptance has been calculated based on beliefs about ICT impact and private use of ICTs[1]. In these terms,

actor acceptance in Austria is rather high. Hardly any respondent rejects ICTs.

High ICT acceptance characterises particularly larger city actors, politicians and those who occupy higher status positions:

ICT acceptance tends to be a function of city size: It is higher among actors from medium-sized and big cities. Two-thirds of the respondents from small cities fall into the medium range.

Of the various actor types, acceptance is highest among politicians (four out of ten). Urban planners and economic actors tend to be less enthusiastic.

High acceptance decreases with the status in the functional hierarchy.

ICT policies

We draw our conclusion of ICT policies based on indicators on beliefs, formal strategies and actual practices. To reiterate:

[1] The assumption of the calculation is that acceptance is a combination of attitude and usage. If personal usage in private life is high and attitude includes positive expectations by ICT we assume that the acceptance of that person is high. The variable 'actor acceptance' was constructed accordingly.

Beliefs

The respondents see the *relevance and rationale of ICT deployment* in their cities more often in terms of their economic relevance than as relevant for the advancement of interaction between various actor types and citizens. About half of the respondents come to these assessments based on diffuse perceptions of ICT relevance, the other half has either economic or interaction concepts – or both, in mind when they make these assessments.

City goals in terms of ICTs are most frequently seen from the perspective of the municipal administrations: three quarters of the sample think of supplying municipal information via telecom networks and two-thirds of the urban planning process, six out of ten identify the more general goal of improving the telecom infrastructure. Different cognitive schemata form the background of these assessments: six out of ten respondents have the general concept of creating urban information societies in mind, three out of ten focus on selected ICT goals and a few respondents are less typical in their narrow focus on tele-applications.

The respondents *assessments of the existence and extent of ICT policies* in the own city show a strong conviction that the cities have ICT policies (nine out of ten respondents). Fewer hold strong beliefs that these are ICT-specific (six out of ten). As are as the contents of ICT policies are concerned, beliefs that they are either comprehensive or targeted at certain areas range for the majority of respondents merely at a medium level of agreement (eight out of ten regarding comprehensiveness, seven out of ten with reference to ICT policies for specific areas).

Formal Plans

Twelve out of twenty cities have *ICT-specific strategy plans.* The most frequently named issues these plans address are lacking land reserves, declining city centres and municipal budget problems.

While only six out of ten cities have ICT-specific policy documents, it is rather typical for Austrian cities that they integrate *ICT issues in other plans.*

Actual activities: Equipment, projects and networks

Overall, Austrian cities are *well equipped* with ICT applications.

Typically, they also are or have been involved in ICT-related *projects*. The respondents appeared better informed about potential funding sources than about their cities' project involvement. Both, actors who are aware and those who are not aware of municipal project involvement indicate that municipal budgets and regional government funds are utilised most frequently.

Almost all cities appear to be involved in some form of *network activities* albeit to varying degrees.

Awareness levels

A limited number of city actors, however, knows of the various elements of ICT strategies and their implementation. Knowledge levels are highest about more ICT measures integrated in more general urban master plans (eight out of ten know). A medium level of knowledge (four out of ten respondents know) we find for ICT-specific plans, regional plans, projects and, given the vagueness of knowledge about ICT networks, we probably can also assume that the knowledge about this particular type of activity ranks at that level. The knowledge about national level policies is the lowest (one out of ten respondents knows). Not surprisingly then are the notions on the influence of national (but also re-

gional plans) the vaguer the more specific the questions about potential areas of influence were phrased.

Typology of ICT strategies by individual and city features

To assess ICT strategies, we had to arrive at an indicator that includes both planning and implementation, policies and practices. Given that practically all cities have ICTs mentioned in urban master plans and are involved in projects and networks (and given that the cities for which we cannot make this assumption are also those from which we do not have enough reliable respondents), the *distinctive features among Austrian cities* from which we can derive a typology of ICT policies and practices are (a) whether cities do or do not have ICT-specific strategy plans, (b) cities' level of network involvement and (c) their complexity of funding structure for ICT projects.

Based on those indicators, we constructed a rating system to categorise the overall *comprehensiveness of ICT policies* via a point system, i.e. cities with ICT-specific strategy plans, a high level of funding complexity for ICT projects and a high level of network variety lead the ranks. In these terms, we find high, medium and low comprehensiveness of ICT policies.

We can categorise three-quarters of the cities along these lines. The ICT strategies they display are at a medium level comprehensiveness for almost half; a third of the cities displays a high level of strategic comprehensiveness - these may or may not be capitals of federal states, so functional importance is not a discriminatory feature that predicts a high level ICT strategies; and two out of ten cities show a rather low level of comprehensiveness in their ICT strategies as they are reflected in the discriminatory indicators of policies and practices we have identified.

In sum, to the extent we can make such judgements at the city level, Austrian cities tend to plan and to practice ICT strategies. Both, some form of planning and a range of variants in activities, are the rule rather than the exception although their extent varies. Typically both top-down and bottom-up approaches, in the format of strategy plans and activities, respectively, are combined. Medium-level comprehensiveness of ICT strategies is most frequent among the Austrian cities.

As to the *variations across various actor and city features* (both objectively verifiable indicators like city size as well as in terms of perception items) on one hand, and the likelihood to judge the own municipality as outstanding in their efforts to implement urban information societies, on the other, we find the following:

Respondents from big as well as from medium-sized cities (although not from small ones) are more likely to report that their cities display a high level of strategic comprehensiveness.

Some actors tend to stress a high level of strategic comprehensiveness more than others, namely politicians, which fits neatly into the fact that creating information societies has been a much pursued horizontal political objective certainly at the national and European level but apparently also locally.

Department heads appear to capture the most frequent level of comprehensiveness customary in Austrian cities best.

The level of actor acceptance tends to correspond with the indicators that let to the assessment of levels of strategic comprehensiveness.

Verified against the cognitive schemata in the perception of city problems we find that, unlike the other types, the 'urban planning critic', the type likely to perceive city problems in terms of socio-spatial con-

cerns, is not inclined at all to suspect low level comprehensiveness of ICT strategies but other than that differs little from the other types.

Those who see their cities' ICT goals in general terms tend to identify a medium level of the comprehensiveness of the urban ICT policies which in fact describes Austrian cities more often than not. In contrast, those having a very specialised perspective related to ICT city hold that the ICT-strategies are highly comprehensive.

The relationship between strategic comprehensiveness and city type perception shows a higher level of sophistication in that regard in industrial centres than in tourist centres.

Summary and conclusion perception of driving forces and ICT impact

Influential actors

With reference to the process of ICT deployment the respondents perceived of either no particular *actor type as salient motor for urban ICT deployment* (a third); or they believed in variations of interaction between interest groups, public and private actors (not quite a quarter); four out of ten respondents believe that a single actor type is crucial (particularly private actors).

ICT impact by individual and city features

As for the consequent *impact of ICTs*, it is attributed to a higher extent in relationship to *urban economies than it is to urban structures* more generally. Regarding urban economies, the respondents considered ICTs more promising for service industries than for industrial enterprises. The influence on cities more generally was thought to be effective in larger cities most frequently.

The smaller a city from which a respondents originates the higher is the belief in ICT impact.

More often than the other actor types do politicians state a strong belief in ICT impact on urban structures more generally (two-thirds of them). Interestingly, economic actors tend to state a belief in ICT impact on urban economies less than the other actor types.

Across municipal hierarchies, the strong belief of municipal employees in economic impact stand out. Regarding ICT impact on urban structures more generally, it is department heads who are less convinced that this is the case than those in lower positions.

The impact of ICTs tend to be higher estimated among the respondents from cities which are perceived as developing more comprehensive ICT strategies. This holds for both impact on the urban structure and on the urban economies; beliefs and deeds seem to correspond to some extent.

As we have shown above, actor acceptance of ICTs is generally high. Acceptance levels correspond with levels of impact beliefs. Notable in this context is that practically the entire sample shows high or at least medium acceptance but high confidence in ICT impact on urban structures and economies is less prevalent (only half and two-thirds of the sample, respectively).

The relationship between the three main indicators we arrived at for this chapter – perceived driving forces and ICT impact on both urban structures and urban economies shows that respondents who belief that single actor types (typically they referred to private actors) affect ICT deployment are also somewhat more likely to hold strong beliefs that ICTs will have an impact. Those respondents who had no clear perception about who the influential actors might be were also less often convinced that ICTs have an impact.

In other words, the more concrete and focused beliefs are about the process of deployment, the more impact is attributed to the consequent impact of ICTs.

2. France

This enquiry on the perception and spread of ICTs within local authorities shows that many towns and cities are trying to get more involved in this area. The reasons for this involvement are various : either they are trying to improve the image of the town in general, or they are trying to respond to an economic decline, or they are taking advantage of opportunities offered to them by private operators wishing to establish themselves in the municipality. However, larger cities of over 100,000 inhabitants for example, are not investing enough in these new technologies, since they believe that this job falls to the private operators.

Although our initial sample size envisaged 440 questionnaires, the results of the enquiry on 114 questionnaires show that great care must be taken in the interpretation of the results. For many people, ICTs will play an important role in the years to come amongst other decisive variables. However, ICTs are only classed in fourth place behind more important factors such problems of accessibility (town centres and peripheries), quality of life, environment (pollution) and economic development.

In general, it seems that cities of more than 100,000 inhabitants do not feel themselves to be directly concerned by ICTs. However, this statement should be qualified in that cities who are aiming for a high class, modern image, such as Sophia Antipolis and Grasse-Canne-Antibes (354,032 inhabitants) develop a strategy of economic development and improvement of their image, relying heavily on ICTs.

In the case of Paris, things are considerably more complicated since some peripheral suburbs such as Issy-les-Moulineaux, have developed up to date and innovative strategies for developing ICTs, while the city of Paris has practically none. On the other hand, in other communities, local authorities have developed strategies in the field of ICTs because they were solicited by private sector representatives proposing cable, or special equipment, or particular services, because of their strong financial potential. In this case, the cities in question seized the opportunity presented to them by the private sector.

3. Germany

As shown in the study, the different units of analyses correspond to each other in various ways. The crucial and most interesting relations, according to the results, are the interlinkages between the public actors and their perceptions of the interplay of ICT and urban development on the one hand and on the other hand between the various city types and the ICT policies. Both thematic complexes will be placed into the focus of this résumé.

Analysing the data one can differentiate 1. groups of persons on the basis of their ICT acceptance, 2. departments on the basis of professional communication milieus and 3. city types on the basis of their structure and their ICT policies. In all three areas people, groups or cities range from pioneers to latecomers in the urban process of the diffusion of innovation. The respective attributed or adopted role within the innovation process, than, has an effect on the patterns of perception and the strategies of action.

Actors and perceptions

The distribution of ICT is generally seen as an important factor of modernisation (high values in questions of ICT importance). But at the same time the discussion of the development seems not to be a central issue in everyday communication within the administrations. The high number of „I don't know" answers which refer on concrete projects and policies seems to confirm that. (see also Floeting/Grabow 2000)

The most responses derive from employees of the urban planning department. So, the response shares of the departments are revised to the ICT acceptance. So, one could ask, if not exactly the insecurity and the scepticism to the new technology is the reason that makes the respondents open and interested to the issue.

According to the interrelation of ICT and urban development, improvements of the communication and the efficiency of the administrative action are expected. Spatial and positive social effect caused by ICTs are clearly rejected. The respondents see also no relation between ICTs and environmental protection issues. (see Burmeister/Hokkeler 1998).

The highest level of ICT-acceptance was found for politicians, followed by the economists. Both groups of respondents – but in revised order – have also the highest level of equipment and usage and the most positive expectations to an increasing use of ICTs.

It is shown that different professional milieus deal with the subject of informatisation of the city in different ways. This is due to professional role definitions and respective patterns of agency and communication. Especially in comparison between economic promotion and urban planning global or local orientations can be divided and different technological styles can be stated. Differences in the mode of communication and corresponding to that different orientations of action occurred between administrative employees and politicians.

In reference to the interrelation of ICT acceptance, departments and ICT policies, a further commitment of the employees to implement municipal ICT policies can be expected if they have broad experience with the new media and the benefit is obvious to them. However, this factor goes hand in hand with the fact that the use of technology happens in a milieu specific way which includes that socio-technological interrelations (as ICT and urban development) are perceived and digested differently. This differentiation leads us to the intra-administrative ICT policies.

Besides others the ICT strategy of cities includes equipment and qualification of the employees. Other studies discovered deficits of qualification as well: Often the ICT training is left to the initiative of one's own. (e.g. KPMG 2000, Floeting/Grabow 2000). Examples for qualification measures which goes further than merely EDP courses could be discussions about ICT expectations and models across the borders of departments and across the borders between legislative and executive. This could contribute to overcome the remaining in specific professional communication circles.

Cities and ICT policies

Generally the goals of ICT policies can be distinguished by the communication relations which they aim to promote. Aims of ICT-policies can be: 1. the improvement of the relation between citizens and administration/government, 2. the improvement of the relation between politic and administration and 3. the improvement of the relation between economy and administration. In a more general sense, the improvement of the economic attractiveness of the location is a target which plays a role in all activities but especially in measures like e.g. the providing of ICT infrastructure by the municipality. Further, the improvement of the efficiency of the administration can be a target.

Mostly, ICT policies – as the exist mostly in European multifunctional Cities - try to address all those targets. However, the focus of the public activities is in most cases the improvement of the relation between economy and administration and the improvement of the economic attractiveness of the location. So, the municipalities support primarily ICT project which aim to promote the economic development by concentrating on infrastructure, information platforms, business oriented services and the marketing of business estates.

In different city types different attention is given to the various areas of ICT activities. Especially European Multifunctional Cities (EMC), National Multifunctional Cities (NMC) and Rising Successful Cities (RSC) invest in an integrative ICT approach with a focus on economic promotion by infrastructure projects, marketing and business oriented services. Mostly a lack can be discovered in the activities addressing the relation between citizens and administration.

The EMCs are generally more active, better equipped and their average employees have a higher acceptance of ICT than smaller or less important cities. If we assume that the ICT competence leads a city to a competitive advantage and, due to that, to a further economic prosperity, is seems to be probable that the different ICT policies lead to a further polarisation of the urban system. Important, successful and progressive cities are able to use the advantages of ICT while cities which suffer under large problems are not able to do that.

The fact that RSCs of all cities only put average commitment on ICT policies and – in comparison to other surveyed cities – promote only a few of ICT projects, raises the question, what makes the RSCs so successful? To put it the other way around: Does an ambitious ICT policy really support economic success of a city?

The following characteristics distinguishes the RSCs from other city types: 1. average IKT policy (activities mostly between EMCs, NMCs one the one hand and SICs and IDCs on the other hand) 2. only few ICT projects are implemented by the municipality, 3. a commitment above average can be stated in the area of planning and traffic, 4. they participate in regional citynetworks, and finally 5. the actors have average expectations toward ICT. But if ICT policies can be found in RSCs the concepts are comprehensive and integrative.

Surely a modern infrastructure is a necessary condition but ICT alone seems not to be the key to success. The attractiveness of a city is still determined by other factors. For RSCs it is enough to act in the average in different interlinked policy areas in connection to citynetworks to attract entrepreneurs and (young) citizens.

The stronger commitment in the EMCs and NMCs and the weaker commitment in the SICs and IDCs raises the question about the necessity of a correction or about the problem adequacy of the respective policies. Surely, we can assume that in cities of national and international importance an involve-

ment in ICT policies is adequate to their multifunctional and central role. Possibly SICs and IDCs risk a deficit of innovation on the long run. Saying that, we have to keep in mind that an ambitious ICT policy can not be the solution for problems like unemployment, decline in the industrial sector, ageing of the population and negative images.

At that point, the improvement of the communication between citizens and the municipality, which mostly estimated as of secondary importance, could be an approach to stable not only but especially cities with problematic economy and social structure. Also Graham/Marvin (1996; 343) conclude that „attention needs to focus on the social organisation of telematics systems". The technology at it's own can not lead to a successful development.

Also the interviewed actors perceive a deficit in considering the effects of ICT on participation and democracy, ecology and traffic as well as on communication and interactivity. Perhaps exactly the promotion of such „soft" location factors could be a special performance of the new technology and their usage in cities.

It is also astonishing – especially because of the concentration on the economic potential – how seldom public private partnerships play a role in the implementation and funding of ICT projects, although nearly all groups of interviewees stated that private companies and investors are the most important actors in the process of infomatisation.

Finally it seems to be remarkable that the local actors attributed a very low importance to the national governmental level in both the financial support of local ICT projects and as actor in the process of informatisation in general. Also Graham/Marvin (1996; 345) state the reserve of the national state in the implementation of urban ICT policies. They compare the centralised politics of technology (e.g. in France) with the decentralised politics of technology (e.g. in Great Britain or Germany). As example the describe the successful promotion of the telecommunications infrastructure by the French government and they demand an appropriate support of the municipalities in Great Britain. Finally, they assume, such a kind of promotion would be an important condition for a future oriented politic of technology, especially seen in the light of globalisation, where importance shifts from the national to the global and local levels.

The European Union respectively the European Commission seems to play a role which is certainly not intended in that way: Obviously primarily projects are funded which take place in rather successful cities with international importance, while peripheral and problematic cities are rather neglected. Should that impression be confirmed in further investigations the European Commission would promote the polarisation of the urban system by their practice of funding.

4. Ireland

The overall aim of the TCV project is to answer the question of whether we can expect old and new ICTs to change the shape of European cities. Thus the project set out to examine the extent to which those key actors involved in urban development and planning intend to use ICTs as central elements of future development plans. Our working assumption in designing the questionnaire was therefore that the *perceptions* of those key actors with regard to the cities' needs and the potential of ICTs to address those needs would be determining factors in deciding whether or not ICT-based initiatives would be central planks of any current or future urban development plan. It is important to stress that

we were *not* seeking to conduct a survey which would indicate whether there were any “objective” city problems which could be alleviated through the applications of ICTs.

Looked at in the abstract it was initially logical to anticipate that where our respondents identified problems that were amenable to alleviation through the application of ICTs then plans and strategies would be developed accordingly. In practice this proved only partially the case.

Looking to consider the problems it was telling that the towns had a strong positive self-image as "places to live" and their attractiveness to commerce. They were also optimistic about their ability to compete with other municipalities in the future. (This was especially marked amongst the medium-sized town respondents. There appeared to be a perception that certainly Dublin and to a lesser extent Cork have already attained a mature level of development but that Limerick and Galway will henceforth lead the charge in development terms. To a lesser extent those sub-50,000 population towns also expect to develop at a faster rate that the two largest cities although not at the same rate as the medium sized cities.) The towns disagreed with that they were ict/multimedia centres and agreed that relative to the European core they were situated in a peripheral position: however, neither of these descriptions was identified as a problem.

Of the list of potential problems we placed before the respondents "traffic congestion", "housing shortages" and "socio-spatial segregation" were singled out as either “very” or “to some extent” problematic. Moving to consider the respondents’ assessment of the relevance of ICTs to the problems it’s important to stress again the remarkable and widespread faith in ICTs as being in some way influential in the future of cities just about every area placed before the respondents in question 4. The one exception to this related to one of the previously identified municipality problems - socio-spatial segregation - which the respondents felt would not be influenced by ICTs (although elsewhere the majority of respondents made it clear that they felt ICTs would increase the gaps between rich and poor). Nonetheless a majority of respondents clearly expressed the view that traffic congestion could be influence by the application of ICTs. As for our third problem – housing shortages – we didn’t directly ask respondents in questions four and five if they felt ICTs could in some way alleviate this problem but a combination of responses to several statements allowed us to infer that the respondents agreed that ICTs allowed individuals to be more flexible about where they lived. Thus one *could* interpret their responses as acknowledging that ICTs offered a partial solution to the housing shortage problem. In sum, one of the three problems was clearly identified as being amenable to an ICT-based solution, one was partially amenable and one was not.

Beyond this the respondents identified a range of functions which ICTs could improve but which we had not put forward as problems in the earlier questions. ICTs were identified as critical to future success in attracting commercial enterprises to the municipalities (especially service industries) and as being very useful for disseminating information about municipality services to the public (although much less confidence was expressed in their ability to improve two-way municipality-citizens communications). Thus we can identify some needs for which ICTs are clearly or partially identified as offering solutions and some ICT “solutions” for areas that the respondents do not apparently regard as especially problematic – economic development and citizen-municipality communications.

Bearing this in mind as we come to consider the cities’ ICT plans, it is immediately notable that the “solutions in search of a problem” are far more prevalent in city development plans than solutions addressing the expressed infrastructural difficulties of traffic congestion and housing shortages. Relating this back to the central question of the TCV project there is little in the questionnaire responses that

would encourage us to believe that planners intend adopting ICT-based solutions to perceived municipal problems in any comprehensive manner. I.e. ICTs, at least on the basis of this small sample, seem unlikely to bring about radical change in the shape of our cities.

Before concluding we must - at least briefly - consider why there is such an apparent mismatch between identified problems with possible ICT solutions and actual strategies/plans.

The first point to raise to note that simply because ICTs offer *a* possible solution to the problems identified does not mean that *they* will the solutions adopted. It may be the case that our respondents (who, let us recall, are the key actors who will determine actual policy) feel that there are more effective means available of addressing these key issues. In the case of traffic congestion, for example, there is a major push to develop the public transport system and to encourage a massive shift from usage of private to public transport. With regard to the housing shortage there have now been three major reports in the past three years which have stressed tax-incentive based solutions or encouraging increased housing density (although admittedly none have succeeded in addressing the shortage itself).

Moreover the "solutions" offered by ICTs are far from straightforward technological fixes. True ICTs could alleviate the housing shortage by obviating the need to live in urban areas close to one's workplace. Yet a solution to a housing shortage which demands that a large population segment (perhaps hundreds of thousands of people) move outside cities would hardly be the first option considered by planners (who in the Irish case study would in any case be cognizant of previous negative experience with city centre population decline during the 1970s). Indeed such a technological fix might well simply raise new difficulties. Thus for example by permitting teleworking and reducing the need to physically travel to municipalities ICTs offer a partial solution to the problem of housing shortages in urban areas by facilitating a demographic shift to living outside municipalities and their suburbs. (Indeed such a shift would address the related problem of rural depopulation.) Yet there may be other reasons for wishing to live in or close to a municipality – the strong disagreement with the statement that ICTs will improve the quality of social relationships is just one example of this.

Finally we would point to the most straightforward explanation for the needs/solutions/strategies mismatch: simple lack of familiarity with ICTs and their potential. Although the responses to questions 21, 22, 23 revealed that PCs, word processing, email and the internet were in common usage amongst our respondents (and indeed were positively assessed by most respondents), the responses to question 26 on more advanced applications and services indicated that direct experience of "non-traditional" ICT use is limited. Between 72% (Common Electronic Diary)and 85% (teleworking at home) of our respondents either failed to respond to the question or had never used these applications (i.e. only 15% to 28% of our respondents had ever used these technologies).

5. The Netherlands

At the beginning of the research two hypotheses were set. In the following we will relate the dutch findings to these two hypothese:

Hypothesis number 1 (Actor-perception):

The rather low expectation among the administrative actors, concerning the interrelation of ICT and urban development, leads them to underestimate the possibilities and impacts of the information society on the process of urban development. This can lead to the application of unsuitable strategies.

Based on the interviews that were taken prior to the quantitative questionnaires, the impression was that local actors have rather low expectations with regard to the role of ICT as a shaping factor. However, the questionnaires present a more complicated picture. It seems that the respondents assign different importance and significance to role of ICT in different aspects of urban life and activities. Indeed, we could identify respondents with very low expectations with regards to ICT effects, but the majority of the respondents considered ICT as an important factor. 76% of the respondents think that ICT will have high influence on the importance of their city. Furthermore, 67% of the respondents think that ICT will have high effect on the potential to attract potential services companies. It suggests that most of the respondents perceive ICT as an important factor for their city although not all of them believe that the city should initiate special policies for that. 42% of the respondents think that the municipality has high influence on ICT applications in its city and just 17% thinks that it has a rather low influence.

One sub-hypothesis was that the degree of ICT acceptance of the respondent might affect their perceptions of the role of ICT for the future city. In order to test this hypothesis there is a need to characterise the respondents according to the level of ICT acceptance. When trying to measure the degree of ICT acceptance of the respondent, the assumption is that acceptance is a combination of attitude towards ICT and its usage. Four variables were chosen to represent attitudes and usage:

State5a: "ICT will change the policy making process in our municipality" (strongly agree, agree, disagree, strongly disagree, don't know)

State5j : "ICT provides all segments of the population with equal access to education, employment and social services" (strongly agree, agree, disagree, strongly disagree, don't know)

Help24e: do you find Internet helpful at work? (very helpful, helpful, not helpful, nuisance, not using)

Help24f: do you find Internet helpful at daily life? (very helpful, helpful, not helpful, nuisance, not using)

Three levels of acceptance were determined: high, medium and low. 30% of the respondents match to the definition of high acceptance of ICT, 61% with medium acceptance and 6% with low acceptance.

33% of the respondents strongly agreed with the statement that economic development is a very important area for the deployment of ICT. However, when testing the agreement with this statement according to acceptance level of the respondents it seems that the respondents with high acceptance tend to agree strongly with this statement more than respondents with low or medium acceptance (45% of the respondents with high acceptance compared with 31% of the respondents with medium acceptance and non of the respondents with low acceptance).

With regard to the role of municipality as affecting ICT applications in the city, 42% of all the respondents think that municipality have high influence. Differentiation among different levels of ICT acceptance show that 50% of the respondents with high acceptance level attach high effect to the municipality role, compared with 38% with medium acceptance level and 25% with low acceptance level.

As has shown in the previous sections, the respondents acknowledge many possible impact of ICT on the urban administration, policy-making, social equity and urban life (table 2.3). Also here, anticipating future changes does not necessary mean that the respondent believes that the municipality should intervene in the process by initiating ICT policies. Therefore, even when a respondent believes that ICT will have overwhelming effects on the city and its society, it is not clear whether this belief is accompanied by a clear view about suitable ICT policies. For instance, although 67% of the respondents

think that ICT *will not* provide all segments equal access to education, employment and social services, just 37% of those respondents think that improving telecommunication infrastructure is a very relevant goal for their city. Moreover, just 47% of them think that supplying municipality information via communications network is a very relevant goal to their city and just 31% of then see a promotion of municipal services via telecommunications as a very relevant goal for their city.

Another example is that 46% of the respondents think that ICT will increase even more social gaps. However, just 15% of them think that supporting computer availability in public places is a very relevant goal to their city, and less than 1% think that promoting or supporting ICT training is relevant.

In spite of that, most of the respondents disagree with the statement that private sector decisions and activities are not affected by municipal ICT activities (though 39% do agree with that statement).

Thus, the question whether urban decision-makers attach importance to ICT is divorced from the question whether these decision-makers think that there is a need for municipal ICT policies. Some of them may think that ICT are expected to be very influential, but that the municipality has a little to do with it. 11% of the respondents who think that ICT will have high influence on the importance of their city also think that the municipality has low (or non) influence on the application of ICT in the city and 23% of them think that private sector decisions and activities are not affected by municipal ICT activities.

The question of suitable strategies for the city can also be divided into separate issues. On the one hand there is a need to check whether there are ICT policies and whether it suitable for the city. These aspects should be examined at the city level and be evaluated in the light of the specific need of the city. Unfortunately, as explained above, the questionnaires do not allow us to evaluate the policies in the different cities since the information is too subjective and thus often contradicting and misleading.

On the other hand, examining the decision-maker's perspective, allows us to check the awareness to ICT policies and initiatives. It may indicate, again here, the importance they attach to such policies and to what extent ICT activities in the city are known and acknowledged. In general, the awareness for ICT initiatives is rather low. 20% of the respondents had no information whether there is exists ICT strategic plan for their city and 71% percents had no information about ICT policies at the national level although there are many national initiatives. Furthermore, 26% of the respondents did not know whether ICT measures are incorporated in other city plans.

In addition, many more respondents claimed that there is no ICT strategic plan for their city, where there is a place to suspect that there are such plans (according to other answers for the same city). One possible explanation for such contradicting evidences can be a different interpretation for "strategic plan" by the respondents. What one respondent may see as a strategic plan, other respondent may not consider as strategic. However, another possible reason for such contradiction is the low awareness for ICT activities by some of the respondents. Low awareness can indicate the relative importance of ICT policies and initiatives when comparing it to other policy fields. Naturally, activities and issues that are considered as important are better known and get more attention than other issues. In that case, although positive attitudes towards ICT and anticipation for positive effects of ICT developments are evident, it is not fully reflected in policies and the interests of the respondents in such policies.

As mentioned above, it seems that high expectations from ICT do not necessary lead to the belief that the municipality is an important actor, or that the respondent is involve in or aware of any ICT activi-

ties. From the opposite side, not all the respondents with low expectations think that the city does not play a significant role at the ICT arena. Substantial part of the respondents that attached low or non-influences of ICT on future urban trends also think that the municipality has high influence on ICT application in the city and that private sector activities are affected by municipal ICT activities.

2.5.2 Strategy-Adequacy-Hypothesis (Revised Form)

In order to be able to react appropriately to new demands, which are placed on cities by the developing information society, and to use innovation opportunities, cities have to select and apply ICT policies that correspond to the specific problems and structures as well as to the actors commitment.

Clearly, the questionnaire results show that there is a little correlation between city problems and ICT policies and measures. Most of the respondents that had information about ICT strategic plan or the incorporation of ICT measures in other plans could hardly relate such plans to the specific problems of the city. One explanation for that can be lack of information about the plans and activities thus cannot supply us with detailed information about these plans. Alternative explanation is related to an interesting feature of ICT policies. It seems that at least part of those policies are taken without aiming to solve explicitly a specific problem, but are based on the general uncritical assumption that such a policy is beneficial. In other words, the reason for the existence or implementation of ICT policies is (in many cases) not to be a late- comer. Thus, it is not surprising to find that ICT plan are not related to a specific problem or to a specific desired goals.

6. Norway

Regarding urban problems and needs (one aspect of the meaning dimension) we only asked about possible infrastructural or economic problems. In the area of economy we found a good deal of local patriotism and optimism. In each city separately, the key actors are convinced that ICT-developments will increase competition between cities and that their own city will do well in that competition. The actors were, with few exceptions, not worried about other economic issues, such as unemployment or decline in the industrial sector. To the extent that any of our questions on potential problems hit the mark, it was the question of traffic congestion -- an infrastructural problem. Also other infrastructural problems, such as housing shortage and pollution, were perceived as problems in some cities.

Perceptions of ICT possibilities give a slightly different picture of where plans and efforts might pay off. The actors believed only slightly or to some extent that ICTs might have an impact on traffic problems. They did, however, believe that ICTs could build a more effective municipal administration, serve as useful planning tools, and give improved information “outwards” to the public. (They were less convinced that ICTs could serve as a useful channel for public influence “inwards” towards the administration.) They were also convinced that ICTs would contribute to their cities’ anticipated growth. On the other hand, they felt that ICTs would NOT contribute to improved cultural activities or social life in their cities. We had not asked about potential problems in the area of culture and social life, but dared to suggest that if competition between cities is to become stiffer, then perhaps the area of cultural and social life, which still requires our physical presence, will become more of a competition factor among cities and thereby become an area where measures are warranted. We therefore put a question mark in the needs column of the culture and social life row and a minus-sign in the column for ICT possibilities.

How do these perceptions of needs and possibilities match with the reported practices and plans? Practices and plans match well with perceptions of possibilities, but less well with perceptions of problems and needs. Towards the end of the questionnaire we had a list of various ICT applications, asking whether they were available to the respondents and in use, at home and/or at work. We had expected that some of the more recently developed applications would not be available or in use in all cities, thus making it possible to differentiate between "more advanced" and "less advanced" user environments. This expectation was not fulfilled in Norway. All cities report that even the most advanced ICT usages we inquired about are in use on a daily basis in the administration in general and in planning departments specifically (results we have not discussed above). Non-planner respondents did for the most part report that they did not have access to or experience with GIS, but that was as expected since these are planning tools. In addition, 83% of all respondents, including respondents from all cities, reported that their city had as a goal to "[promote] ICT use in the planning process."

The actors were also clearly agreed that their cities held the goal of using ICTs to inform the public, but were less enthusiastic about using ICTs as a channel for the public to influence municipal policy processes. We can therefore set a single plus sign in the field for plans and practices relating to public participation. There was also a clear majority of actors who saw their cities' ICT plans as important for the cities' economic development, for attracting new enterprises, and for improving the cities' competitive standing *vis á vis* other cities.

However, there were few who reported that their cities had ICT plans or measures directed at infrastructural problems (e.g. traffic planning or steering) or cultural and social life (with the exception of ICT training and tele-education).

The assumtion that plans and practices do focus on areas assessed as offering strong possibilities holds true for the areas of administration, planning and political participation. However, there are some striking mis-matches when it comes to the relations between assessments of needs and plans/practices. In the area of infrastructure, there are clearly felt needs and assessments of at least some possibilities, but virtually no plans or measures. In the field of economics, it seems that possibilities assessments are driving the development of plans and practices even in the absence of strongly felt needs. And in the area of culture, it seems we are so far relatively alone in seeing the absence of presumed ICT-effects as a signal that non-ICT plans and measures may be important in confronting an emergent ICT-urbanity. The cities probably do have plans and measures in place in this area, but they do not report them in this context as ICT-relevant.

In a single-round questionnaire study, we could not directly observe the learning process. However, it seems a reasonable hypothesis that this is where the explanation may lie for the matches and mismatches we find between the meaning and doing aspects of municipal ICT-domestication. Could it be that the actors most readily perceive needs and develop plans and practices in the areas where they already beforehand have had most experience? Could it be that they do not direct ICTs towards infrastructural problems and have only vague notions that ICTs might offer solutions in that area because they lack experience of precisely how ICTs might help? Could it be that ICT plans are directed towards economic aspects in spite of only weakly felt needs because this is an area in which planners have long traditions and have developed much knowledge?

7. Spain

Actors:

There are not very deep differences among actors in their use of ICT. Even so, the informants with higher responsibilities within the local administration show a bigger ICT-acceptance while those with medium level ones are most technical.

When asking about foreseeable ICT's impacts, respondents are in favour of information and communication provision and truly sceptical about the social benefits or ICT. Taking into account the size of cities analysed, a better access to public opinion seems to be the dominant opinion among actors living in bigger cities, but in the smaller ones the expected impacts have more to do with serving citizens. But, when applying a cross tabulation analysis with the Subjective Actor's Typology, the main expected impact following the respondents' opinion is clearly the possibility of providing service to people.

When looking at respondents' department and function, a better access to public opinion is more frequently used among those belonging to urban planning, besides the politicians and heads of sub-unit; the other respondents more frequently mention the possibility of improving communication.

The usefulness of tools and applications at work and in daily life offers in the respondents' mind a great contrast depending the kind of tools and the three variables used for correlating: size, department and function. In general, big cities urban planning departments excel in the use of a wide range of tools, but no supremacy is clearly showed in the case of function; in this case a rather clear-cut view of use comes out, both at work and in private life.

Approaching the professional use of tools and applications, the most sophisticated ones (intranet, plotter, CAD or GIS) are not very used by our actors, even in big cities, urban planners and head of sub-unit are the heavier ICT users; in the opposite side are the municipal employees and external consultants; the politicians, even not being very heavy users, can be labelled as greater users than the average.

Cities:

According to the types of cities, the major conclusions are as follows:

The image and importance of a city is normally perceived as being better that really is. This can be also noticed when asking about the different urban functions performed by the questioned cities; normally they overestimate the ones considered as more advanced (producer and highly qualified services) and tourism. Some differences can be found when considering urban size, as larger cities are competing strongly to strengthen their position at regional or national level. The optimism arises to its higher level when asking about the idea of being an ICT multimedia centre, mostly in cities over 100.000 inhabitants. A quite different opinion about this subject can be found in the cross tabulation with the respondents' department, being the most optimistic these belonging to the planning department; the position gives the opposite results in the case of people working in the economic department. As a matter of fact, there are different levels of enthusiasm when responding about the urban position in any specific field.

The attention must be drawn to the fact that almost half of the Spanish cities surveyed labelled themselves as tourist centres, even if this opinion fit more development strategic desires that the reality; medium and small-size cities do not clarify themselves so easily as tourist centres.

When answering to the question of the position of their own city within the European and national context, the actors' answers are quite balanced but with a tendency to overestimate the place in the hierarchy occupied by their specific city doesn't matter which scale is considered (regional, national or European).

Having in mind the problems of the surveyed cities, the answers emphasise two major problems: the traffic congestion and the problematic real estate market.

About traffic congestion, only small-size cities and somehow the medium-size ones show a balanced answer among the informants, being curiously the people working in urban planning departments the less conscious about the traffic congestion problems.

When asking about housing shortage and comparing the answers to this question with those related to "problematic real estate market", a conclusion can be obtained: that it is more a question of lack of housing accessibility for some social layers than a real scarcity of housing. Small cities are also surprisingly worried about housing shortage and, among the professional groups there are quite similar responses.

According to the cities' expected developments, the local actors give a great importance to ICTs for those aspects linked to the general idea of urban importance, mainly in the case of large-size cities. Bearing this in mind some guidelines are specially highlighted: the competition with other cities, their potential to attract service companies and to keep the importance of the CBD. Only the environmental protection seems to be the exception to the beneficial effects of ICT introduction, while the traffic is far from being equally affected. Other aspects of urban development seem to be less affected by ICTs, among them the capacity of attracting new residents and controlling the people mobility but especially the ICT's capacity to lead physical and social trends like suburbanization and socio-spatial segregation appears clearly underestimated.

The potential of cities to attract companies is positively assessed in most cases beside the attention paid to the influence of ICT on the cities' capacity in order to compete to secure a better position in urban global hierarchy. Not all the cities are equally optimistic at this point while economic departments keep, paradoxically, a conservative position, just the opposite to the politicians, undoubtfuly the most optimistic. On the contrary, the potential of cities to attract industrial enterprises deserves a rather low attention among local actors. The medium and small-size cities are the ones showing the biggest expectations about their future development, a vision shared by politicians and mistrusted by respondents from economic departments.

Contrary to the current trends the local actors do not forecast increasing process of suburbanization and socio-spatial segregation in Spanish cities; a very small part of the respondents says that the influence of ICT on suburbanization is high. Obviously, the respondents rely more upon housing and employment policies than upon ICT potential in order to solve socio-spatial problems. Having in mind the city size, medium and small-size cities value the suburbanization as a process between moderation and stagnation. A sharply contradictory position is that of urban planners, clearly supporters of stopping and reversing suburbanization processes, the opposite to economist, basically attached to the idea of increasing it.

Visions are quite different when asking about socio-spatial segregation in Spanish cities, this process would stay unchanged in medium and small cities, a theory supported by economic development departments. On the contrary, planning departments' respondents seem to be more optimistic as they agree with the idea of its stagnation and fall.

Regarding the city typology coming from the application of subjective gathered indicators after a factor analysis procedure, the result has been seven groups of meaningful variables, which have made possible to identify seven types of cities. It must be said that through this methodology some advance can be achieved to a better understanding of the different levels of knowledge and awareness of the ICT's impact on the process of urban development among the municipal actors.

Surprisingly, no city fits the category of decaying industrial city, as Huelva and Baracaldo were excluded from the typology because not having fulfilled at least three questionnaires. The label of prospering service cities can be applied only to both national metropolis (Madrid and Barcelona), besides two service cities and provincial capitals, Salamanca and Granada, the last one being the capital of the province with the lowest per capita income in Spain. Following the answers of our municipal actors, only ten cities seem to meet the requirements to be classified as prospering industrial cities, among them two regional metropolis, six industrial cities and two services cities.

Policies

When approaching the answers concerning the implementation of ICT policies within the surveyed municipalities, some results must been highlighted through the analysis of frequencies:

Concerning the existence of an integrated ICT policy, the polarisation of answers between the 'agree' and 'disagree' is outstanding, bearing in mind the three levels of analysis: cities, departments and functions. When asking about specific ICT policies, those agreeing are medium-size cities, planning departments and heads of department. The statement of a lack of specific ICT policies is clearly supported by the economic development departments.

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

According to the existence of any strategic plan of ICT implementation at municipal level, the answers show the contradiction between the economic departments (negative) and the heads of department (positive). About the integration of ICTs in urban planning the positive answers come from large cities and urban planning departments.

Influence of ICT in urban trends

When comparing the perception held by our informants about the influence of ICT in urban trends, some conclusions can be found out; we will classify them following the variables of city size, department and function of the respondents:

The cross tabulation with city size offers some remarks worth to be mentioned: The attraction on new activities thanks to ICT is medium-high. Large-size cities support the idea that ICT 's influence on effectiveness of environmental protection is high.

Small-size cities agree with the idea that ICT will change the policy making process and will favour a more efficient decision-making process; moreover, they think ICTs give to the local administration a better access to the public opinion and consequently they help to take greater account of it in forming policy; all that will enable citizens participation in decision making policies.

Other positive assessments among small-size cities of ICT influence are: On the influence of pressure groups, on the influence of ICT private sector, in a lower position the influence of global player.

On the contrary, small-size cities disagree with the idea that ICT will provide all segments of population with equal access to employment and social services, with the idea that economic development is a very important area of ICT, instead of that they have the opposite opinion about the idea that improving citizens-municipality relation is a very important reason for the deployment of ICT at local level, and with the idea that ICT reduce the need for people to travel.

The medium-size cities' vision about the capacity of improving, with the help of ICT, the communication within city administration, the ability to serve citizens and the citizen's access to useful information is very positive.

The medium-size cities also hold a similar position to that of small ones in such an aspect as the potential of attracting services and the importance of communication within city administration, but they support a lower influence of ICT on traffic and flow of goods.

Both small and medium-size cities share with other actors the following assessments:

ICT improve the ability of their cities to serve citizens. ICT increase even more the gaps between poor and rich. ICT would improve the quality of social relationship. Private individuals and social partners have a low influence with regard to the application of ICT and this influence is medium in the case of national authorities.

The cross tabulation with the department to which the respondent belong discloses some interesting findings:

Concerning the expected urban developments perceived it's worth to be taken into account that: The best-represented department is the planning one, followed by the economic and the politic ones. The objective aspects of the cities surveyed are more clearly noticed by those actors working in economic departments: Their opinion is not very optimistic about the ICT's capacity of attracting new activities and residents. They also see a low influence of ICT on segregation, traffic and flow of goods and people. They find just a medium ICT influence on environmental protection. They share with the planning departments the idea that the influence of ICT on their cities is medium.

The politics departments are quite reluctant to show their opinion and this is normally the opposite of the economic ones. For instance on the topic of suburbanization (high for them, medium for the economists) or the flow of people (high for them, low for the economists)

When the influence of ICT on several expected urban developments is valued the main results are as follows:

Focusing on the planning department's actors these are the main findings: They agree with a more efficient implementation of local policies thanks to ICT. But at the same time they find that because of them the gap between poor and rich will increase even more. Surprisingly, they share the opinion that ICT will improve the quality of social relations.

On the other hand, people working in economic department's gives the following answers: A modest optimism about the improvement of communication within their municipal administration through ICT. A higher optimism about a better citizens' access to useful information. A clear disagreement of the ICT's capacity to lead the administration towards a greater account of public opinion. A great disagreement on the ICT's capacity to provide all segments of population with equal access to education, employment and social services.

The politics departments' informants display a high consistence with their role into the municipal structure when agree that: ICT improve communication within city's administration and serve citizens as well. ICT will lead the local administration to take greater account of public opinion in forming policy through the incorporation of citizen's participation. But, surprisingly, they disagree about the reduction through ICT of the need of people to travel and their parallel effects on working at home.

The cross tabulation with actors' function offers the following results:

The heads of department's vision is mostly positive because: They accept that ICT will change the policy making process. But they disagree that they will reduce the need for people to travel. Through ICT the quality of social relationship will be improved.

The heads of sub-unit's opinion support the following statements about ICT:

The implementation of policies is more efficient, a better access to public opinion is made possible, anda better access to professional services without living in the city is made also possible, but, on the contrary, ICT will not improve quality of social relationship.

The municipal employees' opinion is the most suspicious about the subjects proposed as can be found out through their level of agreement or disagreement:

They disagree about ICT changes in policy making process, agree on the ICT improvement of communication within their cities administration. An enthusiastic agreement is given about a better access to useful information through ICT and a moderate agreement to the access through ICT to professional services without living in the cities. Their agreement level is higher about the reduction of the need for people to travel thanks to ICT.

In the case of politicians some polarization about ICT effects can be found in their responses:

They agree with the improvement of communication within their cities administration, strongly with the improvement of their cities' ability to serve citizens, but on the contrary, a strong disagreement both on the ICT capacity for the administration to take into account public opinion in forming policy and the improvement through ICT of the quality of social relationship can be stated.

The valuation of the influence of urban actors on ICT application, being provided the high answer dispersion and the few questionnaires with these questions filled in, is an important problem and no clear guidelines can be found out in the responses collected. As a first finding we must highlight a low enthusiasm among our informants about the questions proposed, even when they give an answer, this is never higher than medium.

The cross tabulation with the actors' department offers some more expressive findings:

The economic department's respondents are reluctant about the urban actors' incidence on ICT. On the contrary, those interviewed belonging to planning departments think that municipal government; ICT private sector and global players have a high influence on ICT implementation. The informants

working in the area of politics are undoubtedly the most enthusiastic about the urban actors' influence on ICT implementation, their opinion is very positive especially in the case of Central Administration, private sector related to ICT and business agencies/local development funds.

The cross tabulation with the informants' function shows some noticeable answers:

Municipal employees are the only ones showing a very positive valuation about some urban actors' influence on ICT: private investors and global players (curiously no public one).

Even if it sounds somehow contradictory, it is quite reasonable that politicians' opinion is very positive about both the influence of national authorities and private investors.