THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY ON URBAN AND REGIONAL PLANNING

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Abstract

This article examines the need and possibilities to develop urban and regional planning practices due to both the emergence of the information/knowledge/network society and especially the impact of the information and communication technology, ICT, on spatial change. The findings are based on the views represented in literature and on the opinions of Finnish urban and regional planners.

Current spatial development trends are highlighted by the changing economic basis when knowledge and skilled people are becoming the most important factors in production, and by the new functional and organisational possibilities of activities. As a consequence the traditional ways of running businesses in industry, services and other organisations, as well activities in every day life, will change. Also the prerequisites of locations of different activities will have new determinants.

These developments will have diversified spatial impact. Therefore ICT, as the main driving force of the development of the information society, should be taken into account in urban and regional planning as a new aspect. Planners should recognise this new need and challenge.

The incorporation of the spatial impact of ICT into planning practices does not occur without purposeful actions by those who are responsible for practical planning and by those who regulate and support planning.

There is a need for further information, knowledge and understanding about the spatial impact of ICT and about its consequences on urban and regional development. Planners need updated education and training as well as new planning methods and models based on new spatial and urban theories. Also planning legislation and governmental guidelines should include provisions for the impact of the development of the information society and ICT on planning.

Preface

The purpose of this article is to contribute to the discussion about the impact of the information and communication technology, ICT, on urban and regional planning. In the literature there are a number of publications and articles which deal with the development of the information society and especially with the important role that the development of ICT plays in this process. The spatial impact of these developments has been dealt with mostly only by researchers and scientists and not by those who promote the development of the information society. According to my knowledge also this discussion has been fairly modest among urban and regional planners.

This article is based on my dissertation: "Information and Communication Technology: A New Aspect in Urban and Regional Planning", published in Finnish, both in printed and electronic versions, under the title: "Tieto-ja viestintäteknologiasta uusi näkökulma kaavoitukseen" (Talvitie, 2003).

The aim of the dissertation was to study the supposition that the development of the new information and communication technology and its applications as a new form of traffic will, with time and the development of information society, influence spatial development and should therefore be taken into account in urban and regional planning.

The objectives of the study were to search for,
- relationships between the development of traditional forms of traffic and spatial development, and the role of spatial planning in traffic planning,
- represented opinions about information society and about the spatial impact and significance of the information and communication technology, as a central force influencing the development of information society, on urban and regional planning,
- opinions of Finnish urban and regional planners about the impact of the information and communication technology and its applications on the spatial development of regions, cities and rural areas and on urban and regional planning, and
- possible differences in the opinions of planners on the basis of their education, planning tasks and planning area, age and sex.

The article is not a summary of the dissertation, but contains those basic observations and findings, which are essential from the point of view of spatial planing. I have edited and modified the text to form an independent entity.

The article concentrates on the discussion of the results of the second and third objectives. The findings of the first objective are not discussed because they are country specific. The differences in the opinions of different types of planners were small. Some of these are referred to in the text. In the Appendix there is general information about Finland, its planning system and the Finnish urban and regional planners.

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Contents

1 Introduction

The history of a country, region or local area indicates clearly that the development of new means of transportation and respective networks have had a great impact on the spatial formation of the area concerned alongside with economic and societal progress. The quality and diversity of transportation networks and services have been and are important location factors for many industries and activities. It is therefore only natural that watercourses and harbours, railroads, roads, streets and airports are basic elements in all spatial planning. Through urban and regional planning it has been possible to regulate traffic flows and take into account special transportation needs when defining the locations of activities.

We live in an era of rapid change moving towards the information / knowledge / network society. *e*City, *e*Region, *e*Country, *e*Europe and the like are targets of many authorities round the world. One of the driving forces of this development is the new information and communication technology, ICT. This technology has progressed rapidly during the last 20 years and the pace of development of new tools and applications is intense.

Modern telecommunications can be seen not only as a new way of working but also as a new form of traffic. Therefore analogously one can suppose that ICT and its applications will during the course of time affect spatial development and should be taken into account in spatial planning.

The impact of the development of the information society and especially the impact of ICT on the structures of cities and regions and on spatial development and planning in general is thus now a question which should be widely discussed by planners. Until now this discussion has been modest. One reason for this is probably simply the fact, as Moss (2000) argues, that we do not understand how these technologies will shape the growth of cities and regions. This is understandable. Modern information and communication technology is a newcomer and the application of this technology is still in the early stages, although rapidly increasing.

In the following chapters some of the possible spatial consequences of the development of the information society and especially of the application of ICT will be discussed and some ideas for the development of planning practices will be suggested. The idea is to try to find out how ICT would affect the various main elements of spatial structures and how these structures would develop and thus affect also spatial planning. These examinations are based on suggestions represented in literature and on the opinions of Finnish urban and regional planners. The opinions were surveyed in a questionnaire as part of my dissertation (Talvitie, 2003). The basic reason to choose planners as a test group was the fact that planners are in the frontline to realise new development trends in land use and locations of different activities.

My questionnaire contained 129 different statements about the effects of ICT on spatial development and development of planning practices. Also there were a number of questions identifying the quality of the respondents. I got 310 replies from planners, which represented 39 % from the whole target group. The replies covered the different types of planners very well and the geographical distribution was also good. The validity and reliability of the results of the questionnaire was estimated sufficiently good for the analyses of the results. The questionnaire was sent in February, 2002. The opinions on 72 statements will be represented in this context. Background information, represented in the Appendix, will help in the evaluations of the relevance of these opinions.

2 Understanding Social Progress is the Starting Point

The impact of ICT on spatial development should not be examined in isolation but as a part of the development of the information society. The information society for its part represents a new economic wave in the history of mankind (e.g. Bell, 1974; Masuda, 1981; Castells, 1996/2002). An understanding of the basic features of the development of the information society will help planners in their deliberations to recognise why and how ICT should be taken into account in practical planning.

2.1 Big Economic Waves and Spatial Development

According to many scientists (e.g. Molitor, 1999) the historical development of civilisation can be described with the domination of the basic economic foundation. Scientists have covered until now four, some three (e.g. Bell, 1974), different eras. The names of these eras, agrarian, industrial, service and information/ knowledge/ network, describe the main content of these economic waves. Scientists have defined these eras by using different dimensions indicating the main products, division of labour etc. which dominate the era.

   During the agrarian era rural areas were, generally speaking, the focus of life. The industrial era saw the beginning of urbanisation (e.g. Hall, 1975/2002). The development of new traffic systems has played a key role in the urbanisation process. Especially the automobile is seen to have had a great influence on the formation of urban, rural and regional structures. Urbanisation continued during the service era, although it has taken different forms in different countries and regions.

   What forms spatial development will take during the development of the information era is a question which should be taken on the agenda of wider discussions. Now there exists uncertainty about the future formation of spatial structures. Old theories do not any more work and support the estimates and outlines of spatial structures development. The lesson of the history is that some changes will take place.

   It is important to note that the development of the information society is not the end of history. As Molitor (1999) predicts new big changes are now gradually developing but their dominance will take time before they replace the information society. Spatial change is an ongoing process.

2.2 The Essence of Information Society as a Force of Spatial Change

The concept of the information society has been described by many scientists and futurologists, like Bell (1974), Masuda (1981), Toffler (1980), Naisbitt (1984), Weiner and Brown (1997) and Castells (1996/2002), during the last 30 years. Webster (2002) distinguishes five definitions from the presented theories of the information society depending on their main criterion. These criteria are: technological, economic, occupational, spatial and cultural.

   The technological criterion refers to the development of information and communication technology and its effects on social development. The economic criterion refers to the development of new products and effects on industrial structures. The occupational criterion refers to the development of new types of work places and occupational restructuring. The spatial criterion refers to the development of different types of networks and effects on the organisation of time and space. The cultural criterion refers to the rapid increase in the information in social circulation.

   Although Webster is critical in his evaluation, "Is there an information society?", as a new wave of social development, his analysis about the content of information society is clear. It indicates

well the different aspects, which in real life are all relevant in the development of the information society.

By simplifying and summarising the represented theories about the development of the information society from the point of view of spatial planning it is important to distinguish at least the following aspects:

- the development of the information society is taking place in various ways and at a different pace in all developed countries and gradually also in developing countries. This development will affect societies as a whole and will cause fundamental changes in economic and social life. Knowledge and skilled people will become the most important factors in production,
- the development of the information and communication technology will be the main driving force in the formation of the information society,
- the information and communication technology makes possible to create new ways of working and reorganise the industrial, public and personal activities and structures. Globalisation will play an increasing role in these processes,
- the change in the meaning of space, place, distance and time as the determinants of location factors. (Probably the best known concept of the changing role of space, place, distance and time in the information age is suggested by Castells (1996/2002) when he introduces the concepts of "space of flows, space of places and timeless time". Earlier Masuda (1981) and Naisbitt (1984) had suggested in principle the same ideas when speaking of information space which is connected by electronics. Graham and Marvin (1996) speak of electronic spaces.) As a result we will have a virtual world functioning at the same time with the conventional physical settings.

From the point of view of planning the conclusion is that this development is going to affect also spatial development and thus spatial planning too. In the following all possible spatial impact of the development of the information society will not be addressed. It would be an impossible task. As mentioned, this article concentrates on the possible spatial impact of ICT in the development of the information society from the point of view of spatial planning.

3 The Development of Information and Communication Technology

In this context I suppose that readers are well informed about the development of ICT. However it is important to stress the speed of this development. Within two decades mankind has got the possibility to use computers for handling huge amounts of data, text, voice and picture information which are also integrated into a multimedia product. The capacity of computers is continually growing and their prices are going down.

The diffusion of the Internet and mobile phones is growing all the time and fast. As an example the development of mobile phones began in 1981 when the NMT 450 service was introduced in the Nordic Countries. According to the estimates of NOKIA (http://www.nokia.com) in 2002 the number of mobile phone subscribers rose to over one billion and will reach 1.5 billion during 2005.

The new and continuously developing information and communication technology has given and will give a growing number of people access to a great variety of information sources at low cost and great speed. New tools also provide opportunities for networking and sending different types of information to anybody who is connected. Wireless multimedia is the newcomer. Slogan "at any time at any place" describes the target.

The current ICT-infrastructure as a whole is a very complex and diversified system. As Castells (2001) describes, the geography of the Internet forms a world wide network where the most important elements are located in and between the big metropolitan areas. This system is also vulnerable as recent experiences have shown. The growing number of different types of viruses and the increase of spamming threat the smooth and reliable functioning of the whole Internet system. Also the quality of the ICT-infrastructures and their operating systems do not always meet the growing demand. Some have even argued that the Internet will soon collapse or at least countries, from where a great number of problems have originated, may be disconnected from the net. A universal system has both positive and negative sides. The universal use of mobile phones is not possible without phones which function in different networks. The service standard differs from operator to operator.

However, according to Molitor (2001) the telecommunications industry will face more technological change in next five years than in the past 95 years. He predicts that the most important changes will originate from the development of optical transmission, satellite communications, wireless and mobile communications devices, broadband digital technologies and Internet resources. The reliable functioning and use of new technology is no doubt in the interest of the ICT industry and therefore the technological development is going to include also tools and means which could help in overcoming current and future problems in the ICT services.

Because of the rapid development of ICT the examination of spatial effects of ICT applications can now only be an interim exercise.

4 The Impact of Information and Communication Technology on Spatial Change

4.1 The Changing Meaning of Space, Place, Time and Distance as the Determinants of Location Factors

The discussion about the impact of ICT on spatial development is good to start by trying to define the most important principal factors which are seen to be behind spatial change. Observations made earlier about the changing meaning of space, place, distance and time mean that in many cases distance will no longer be a problem when one can transmit information via telecommunications networks. The same applies to time. All transmissions will take place at once. Wireless communications will allow the making of connections at any place at any time where the service is offered. In principle space and place are thus not any more affected by distance and time factors in the same way than before. At least in theory this could mean more freedom in the location of activities. This question has interested many scientists.

Mitchell (1999) argues that suggestions of the death of distance, the end of space and the virtualisation of everything will obscure the issue. He sees a more useful to recognise the opportunity to organise the inhabited space for multifarious human purposes. Kotkin (2000) suggests that when the freedom to choose the location will increase, companies and people are going to locate to places where they will. Thus the peculiar attributes of locations will play an increasingly important role.

The way how the Finnish planners see the expected changing roles of the determinants of these location factors is shown in Figure 1.
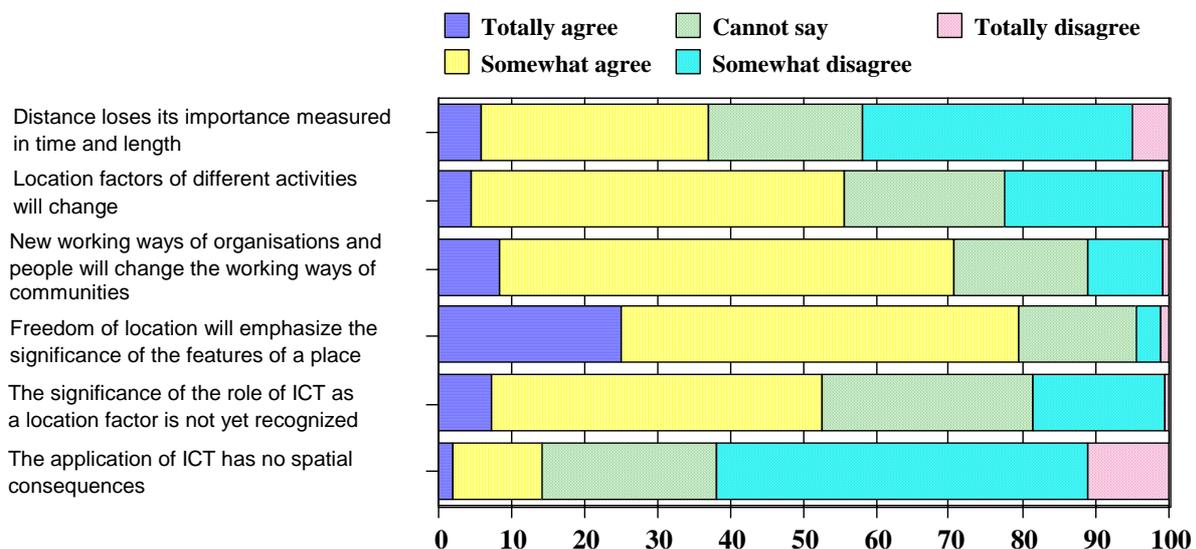
Figure 1. The opinions of Finnish planners on the statements about the impact of ICT on some principal location factors. (n= 306-308). Source: Talvitie, 2003.

We can notice that the majority of Finnish planners agree with most of the suggestions presented about the principal spatial effects of ICT. Opinions are split regarding the changing importance of distance as this is the also case among many scientists. A more detailed analysis of these opinions indicates, that 64 % of planners under 41 years totally or somewhat disagree this statement when the same figure of planners of 41-50 years is 31 % and of planners over 50 years 43 %. This result gives room for different interpretations. Either experienced planners understand better than younger

ones the changing meaning of distance or vice versa. In any case the result clearly indicates about the uncertainty we have in evaluating this impact.

Although some 55 % of the planners accept the statement that the location factors of different activities will change, there exists an interesting phenomenon in the opinions among planners of different planning tasks. The support for this statement grows when moving from the opinions of detailed land use planners (39 % totally and somewhat agree) to the opinions of master (71 %) and regional (82 %) planners. This result indicates, that the impact of ICT is easier to understand in overall than detailed planning.

Over 50 % of the planners accept the statement that the role of ICT as a location factor is not yet recognised. Nearly 30 % hesitate to take stand on this statement. There were only a few who accepted the statement that the application of ICT has no spatial consequences.

4.2 Spatial Impact of the Application of ICT on Production and Services

As mentioned earlier the consequences of the application of ICT in production and services will change the traditional ways of running businesses in industry, services and other organisations as well in everyday life (e.g. Toffler, 1980; Mitchell, 1999; Castells, 2001 and 1996/2002). These developments form the basic driving force on spatial change and have been discussed by many scientists and futurologists.

The automation of industrial processes was one of the first applications of ICT (Naisbitt, 1984). It led in many cases to the reduction of labour. Subsequently ICT has been used in the structural reforms of production. Mass production has often been replaced by customised production and enterprises are restructured into network companies (e.g. Castells, 1996/2002). This has led to the relocation of production to cheaper places. However, new technology has also provided new opportunities for old and small industries to compete by networking with other companies thus strengthening their positions. Marketing of products has also benefited from this new tool and in this sense a remote location is not a big problem.

Industries that develop ICT have special requirements for location. The vicinity of universities, qualified labour and good housing are some of the location factors identified in many studies. This means that the ICT industries are not easily spread but rather concentrated to selected cities. Enterprises producing devices are normally globally structured and have plants in different continents. This does not necessarily apply to the software industry because they can deliver their products via the Internet.

The spatial consequences among traditional industries who only use ICT are not necessarily the same as with the ICT industries. Traditional industries can benefit from the possibilities to reorganise their activities and from the greater freedom in selecting the locations.

The spatial impact of ICT on services is very diversified and developing fast. Electronic banking is a good example. For example in Finland most financial transactions are made with computers or mobile phones. A great number of branch offices have been closed. Electronic commerce is mostly used by businesses. It is also becoming more common for ordinary people especially as regards buying and selling intangible products, like flight tickets, music, insurance etc (e.g. Mitchell, 1999). When buying goods you need to have a good delivery system.

Public services is an area where ICT provides limitless possibilities. In many countries central, regional and local authorities are now offering a lot of information about their services, and often online two-way communications are made available for citizens. Libraries offer online services. Virtual education and telemedicine are developing fast etc.

In many cases services provided via ICT will improve the service standard, especially in small communities and rural areas. It will also save time and travelling costs. The location of all services will not be as important as earlier.

In many countries there are governmental programmes to promote the application of ICT. Also the European union has a special programme "*e*Europe" for this purpose. (More information at: http://europe.eu.int/information_society/index_en.htm).

How Finnish planners see some of the possible spatial consequences of these development trends is shown in Figure 2.
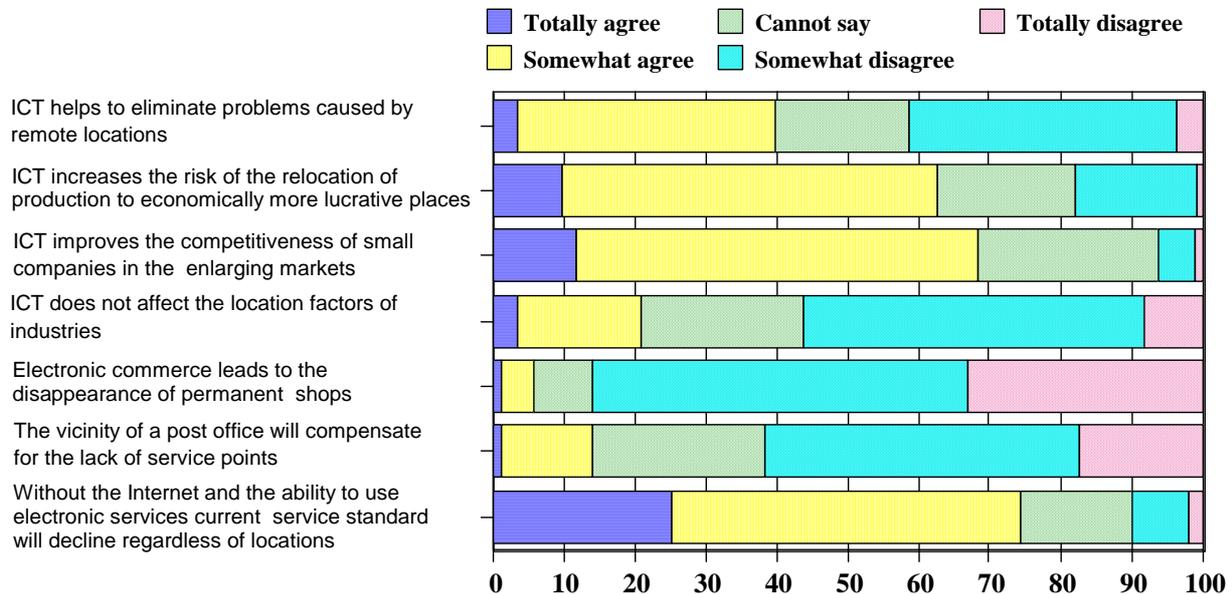

Figure 2. The opinions of Finnish planners on some proposed spatial impacts of ICT on industries and services. (n=302-307). Source: Talvitie, 2003.

The opinions of Finnish planners are split on the statement that ICT could help in eliminating the problems caused by distance. The result reflects the uncertainty we have about this matter. The majority agrees that there is the risk that ICT may cause the relocation of firms to cheaper places and with that, that ICT may help small companies to survive in a global world. Thus it is understandable that the majority rejects the statement that ICT does not affect the location of industries. The statements about the effects of electronic commerce on shops and the role of post offices as a delivery point of goods are rejected. Probably one reason for these opinions is that currently electronic shopping by ordinary people is still low in Finland, although growing.

The opinions about the importance of the Internet as a service provider indicate clearly that this possibility is essential in all places, not only in remote areas. This result is easy to understand at least in Finland, because a growing number of services are offered in the net and some service providers, like banks, are forcing customers to use the Internet. Desk services are available, but are more expensive.

4.3 Spatial Impact of the Application of ICT on the Location of Offices

When ICT offers possibilities to deliver some services via the Internet regardless of the location of the service provider this possibility has naturally caused a need to reconsider the suitability of the locations of these workplaces.

The first phenomenon was probably the establishment of so called " back offices", when some of the office activities were relocated from central offices to cheaper places and away from the city centre (e.g. Graham and Marvin, 2001). "Call centres" are now a very common new type of office

where services, which can be given by phone or e-mail or via the Internet, are located to places of low cost labour and cheap office premises (e.g. Castells, 2001).

Airports are also becoming places of many offices and some production facilities. Good and fast connections attract special enterprises to these locations. Terminals themselves provide good, office standard network connections to passengers.

In Finland the government has introduced a special legislation which requires central government offices located in Helsinki area to clarify possibilities to relocate some services outside the metropolitan region. This is part of the regional policy of the government and the target is to promote the development of the areas suffering economic decline and to ease the concentration of to the Helsinki region. The purpose is not to force workers to move from the current locations but use the opportunity in locations of new activities and in situations when workers will retire (Talvitie, 2003).

As an example of a special consequence is the suggestion, made by Mitchell (1998), that companies could create resort offices with good telecommunications for an intensive short time team work. This type of practice has been commonly used for years by many companies in Finland, at least in cases of high level negotiations.

The opinions of Finnish planners on these practices are shown in Figure 3.
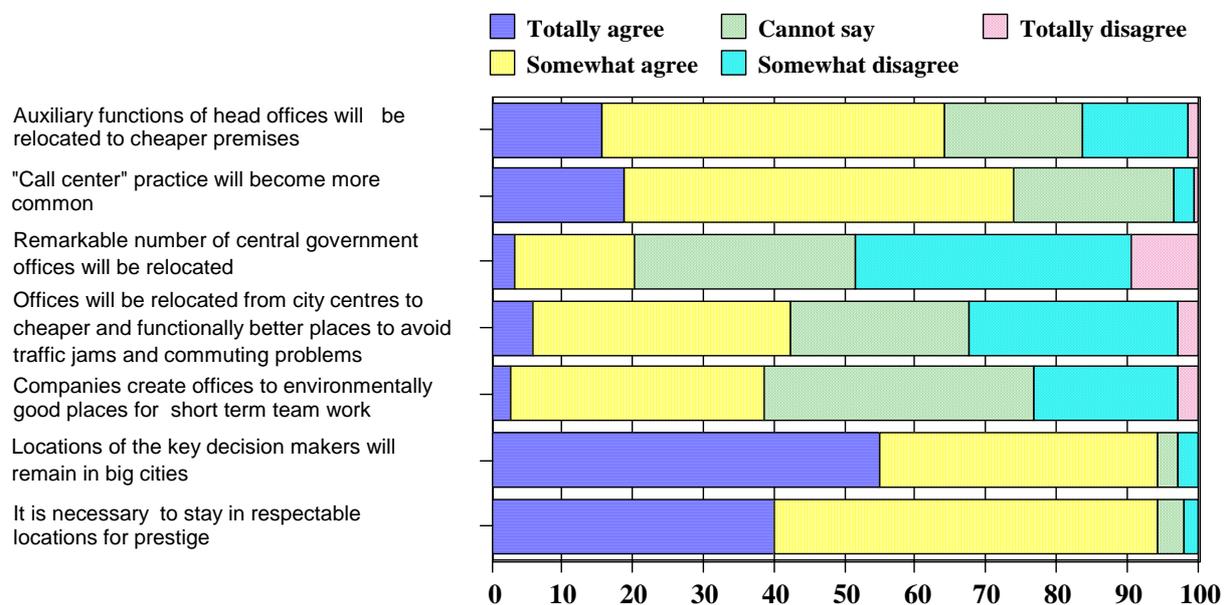
Figure 3. The opinions of Finnish planners on some proposed spatial impacts of ICT on the location of offices. (n= 303-307). Source: Talvitie, 2003.

Most of Finnish planners share the suggestions about the relocation of auxiliary functions of head offices and also the development of call centres. The majority of planners does not believe or hesitates that the Finnish government will succeed in relocations of some central government activities from the capital region. Opinions are split on the statements that offices will be relocated from city centres because of traffic and commuting problems, and in the policy to build office premises in environmentally good locations for temporary working possibilities. Many planners see those statements difficult to answer but about half accept them.

Nearly all expect that big cities will be also in the future places where important decision makers will work, and that the image factor will determine the need to stay in respectable locations.

4.4 Spatial Impact of the Application of ICT on New Working Practices

ICT has affected and still affects very much the content of work and working practices. Think only what and how the use of the Internet, e-mail, mobile phone and laptop computer has changed current working practices. Castells (1996/2002) expects that ICT as such does not cause unemployment but the nature of work and work places will change. This leads to the changing quality requirements of labour. The spatial dimension of new working practices is probably one of the most discussed topics in the evaluations of the spatial impact of the applications of ICT.

Teleworking/telecommuting/e-working/distance working was one of the first new applications of ICT that could affect traditional ways of working. Toffler (1980) introduced the concept of "The Electronic Cottage" and expected that a number of people would start to work from home provided that they have good electronic connections. At the time there were people who argued that people need face to face contacts in their work (e.g. Naisbitt, 1984).

Now there is more information about what has happened. Teleworking is applied in different forms depending on the content and quality of work and naturally on the preferences of employees. A common practice is to telework only a few days a week and thus keep contacts regularly to main office. There is also that type of work which is mainly done at home or in the field meeting customers etc. The European union has adopted a policy to promote teleworking as a part of the policy to promote the development of knowledge society. (More information at:
htpp://europa.eu.int/comm/dgs/employment_social/teleworking_en.htm).

According to Lorek (2002) during the last decade many companies in USA have introduced formal telecommuting programmes to promote teleworking among employees. The experiences have been good. From the point of view of the employers the productivity has increased and also the need of office space has decreased. Employees enjoy the new freedom they have in their work. Thus ICT can also bring about flexibility to work. This means that the role of home will also change. It will also become an office (e.g. Mitchell, 1999). When employers can save money by having smaller office space the employees have to provide space at home for teleworking. More people have also established their own businesses and work from home.

There are also some other types of teleworking. ICT provides possibilities to use cheap foreign labour in some work phases (e.g. Graham and Marvin, 2001). Also online activities are possible. Pelton (1992) calls this types of workers "electronic immigrants". Also opposite types of teleworking are possible. A Finnish company METSO, which produces e.g. pulp and paper machines, provides online remote diagnostics services for controlling the functioning of machines. This service is available to their customers round the world (http://www.metsopaper.com). Benefiting from the different time zones in implementing some work phases is also becoming a common practice (e.g. Mitchell, 1999). Companies who operate in global markets are some who apply this practice.

An important phenomenon is shown by the concept known as "24/7" when activities are functioning 24 hours a day, seven days a week. It is the result partly from the changing working habits and partly from a global working environment (e.g. Mitchell, 1999). Countries, where it has been a custom to have summer holidays during the same time period, have faced problems in providing services continuously. Because of this reason holiday time practices have been changed. Probably we should start to speak about 24/7/52 practice, 24 hours a day, seven days a week, 52 weeks a year.

It is obvious that time will bring about different new combinations of working habits when organisations and people recognise new possibilities to benefit from ICT. How Finnish planners take a stand on some of these phenomena is shown in Figure 4.
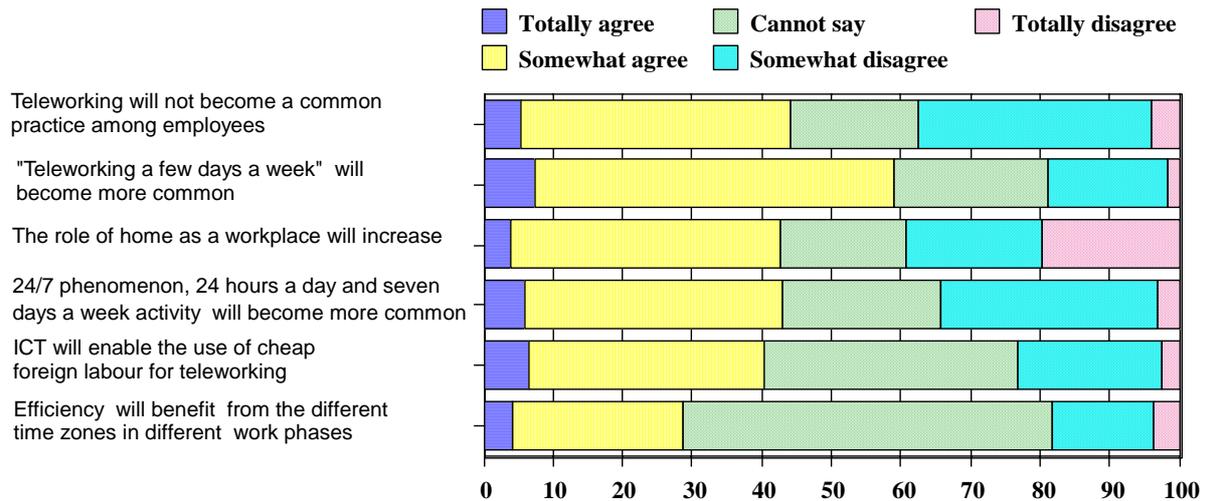
Figure 4. The opinions of Finnish planners on some statements of the spatial impact of teleworking. (n=302-305). Source: Talvitie, 2003.

In general the opinions indicate some kind of uncertainty about what will happen. The views are divided roughly equally to for and against in all statements. Part time teleworking has most supporters. There is also a clear number who strictly oppose the idea that the role of home as a workplace will increase. The use of cheap foreign labour via telecommunication as well as the attempt to benefit from the flexibility of the different time zones could offer in the organisation of work were difficult statements to answer. This is understandable because there are not commonly known experiences about these practices in Finland.

4.5 Spatial Impact of the Applications of Wireless Communications

Wireless communications tools can form a mobile work station not only in a car, but also when travelling on foot, by train, bus, ship and air, with some restrictions. One can also work with good connections to home base in hotels, airports etc.

Wireless communication is a good tool for those whose work is very mobile. Connections to clients are easy, information is easy to send to main office. Representatives of insurance companies can send photos from car accidents and fires. Mobile phone, GPS-receiver and digital maps have enabled the organisation of transport in a new way. Possibilities to make working easier and more efficient are many more and new opportunities are discovered all the time.

The development of new tools and services for wireless and mobile communication is now very intense. The freedom from location and to be connected is seen an important target for many businesses. The availability of these new possibilities depends on the services operators offer. This means that the service standard will not be the same in all areas. In Finland most likely the new UMTS-networks will not cover all urban and rural areas but will concentrate to serve densely populated areas.

Ordinary people can also benefit from this development. The possibility to order the latest news or weather forecasts to a personal mobile phone, to send a query about the nearest restaurant, service station, bank etc., or to ask how to get from one place to another by public transport and get a reply which includes the route and schedule information, are some examples of these services. Only imagination will limit the development of these services and of course the costs that customers are willing to pay for them.

The opinions of Finnish planners on some of these possibilities are shown in Figure 5.
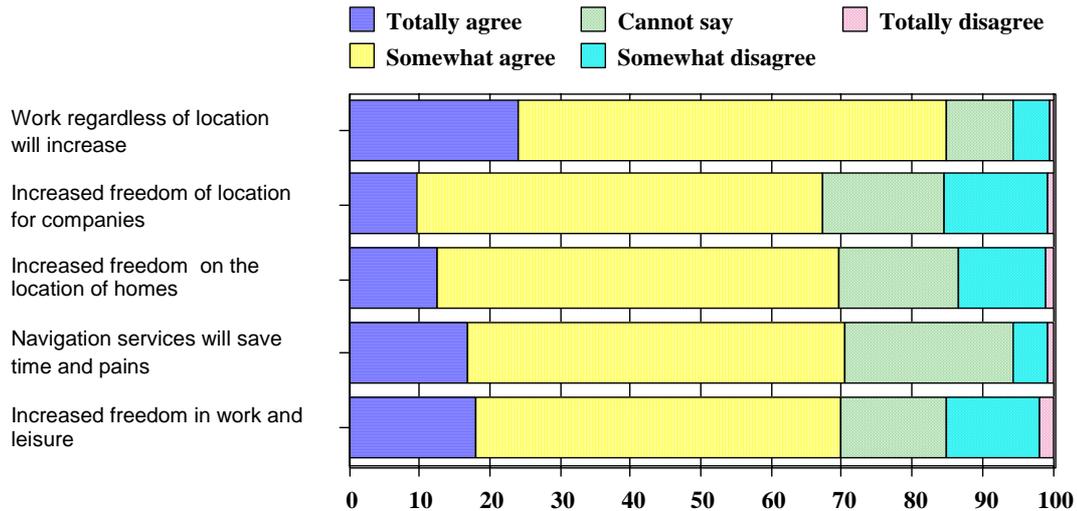
Figure 5. Opinions of Finnish planners on the spatial impact of wireless and mobile communications. (n=302-305). Source: Talvitie, 2003.

The great majority of planners agree with all the presented statements. The opinions convince that wireless and mobile communications increase the freedom in work and play and in some cases the freedom in selecting the locations of companies and homes. Mobile communication also makes life easier when one can get services when needed and on the road. One reason for the clear opinions is probably that, that the Finns have been used to using mobile devices for years.

4.6 Spatial Impact of the Application of ICT on Housing

Traditionally employment has had a great impact on the decision of the housing area. As discussed earlier the situation will now change. People who can work by using telecommunications systems can locate anywhere. Pleasant climate and environment, sufficient service standard and others could be some criteria for good location. Naturally also a good service standard of ICT should be available. There are examples of these types of solutions and in most cases these places are famous resorts (e.g. Mitchell, 1999). Also other types of locations could be possible, depending on people´s preferences.

Those entrepreneurs whose customers are spread in a wide area could also have a great freedom in choosing their place of residence. An interesting aspect is the impact of the availability of skilled people on the locations of enterprises who need qualified labour. Kotkin (2000) expects that if enterprises want to safeguard this, they will have to locate to the vicinity of places where the well educated people like to live. Kotkin and DeVol (2001) have noticed that also the prices of houses and the changes in life styles have, in the USA, had an impact in the choice of the residence. This development has also affected the location of enterprises.

Atkinson (Lincoln Institute of Land Policy, 2001) refers to the situation in USA where people want their own house and want to live in a good environment with a short commuting distance. He expects that this fact with help of the possibilities of ICT will also affect the location of enterprises.

How teleworking could affect housing and places of residence was discussed earlier. It should be mentioned that Mitchell (1999) argues that digital revolution will bring home and work back together. Homes have to be planned to enable both housing and working functions (e.g. Mitchell 1999; Moss and Townsend 2000).

The impact of ICT on housing is in many cases indirect. ICT enables people to implement some of their objectives which earlier has not been possible.

How Finnish planners see some of these new development possibilities is shown in Figure 6.
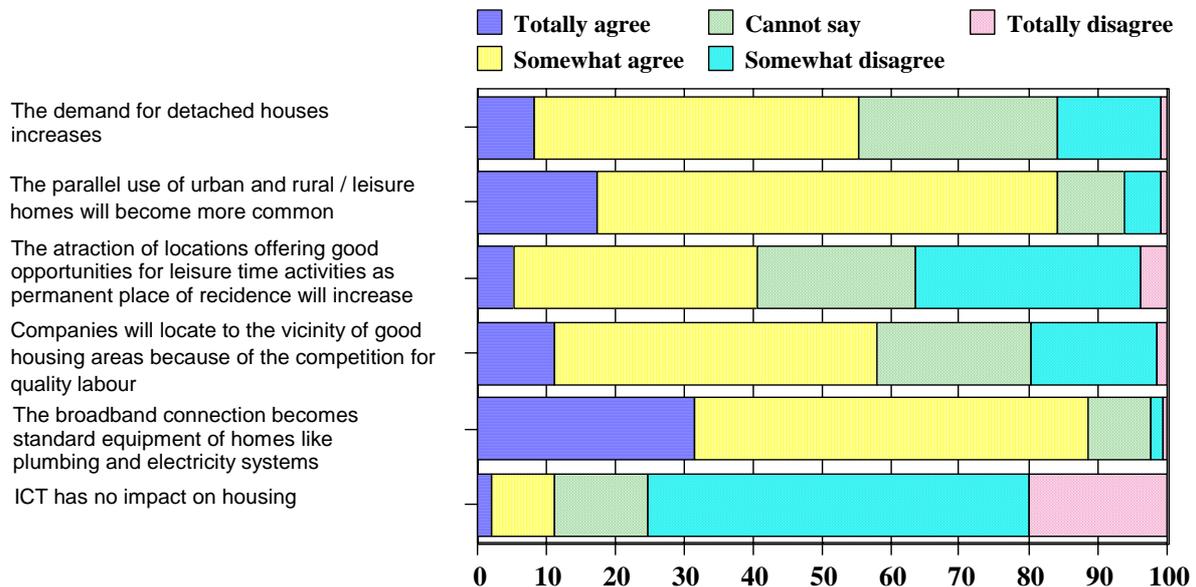
The Figure 6. Opinions of Finnish planners on some possible impact of ICT on housing. (n=305-306). Source: Talvitie, 2003.

Two first of these statements concern especially Finnish conditions. During rapid urbanisation in the 1960s and 1970s cities and developers favoured apartments and it was difficult to get lots for detached houses in big cities (Finnish scale). Now the situation is changing, especially in cities and municipalities round big cities. One reason for this is the growing demand and for sure, partly because of ICT. The other interesting development trend is that a great number of summer cottages are transformed suitable for year round use. Behind this is the idea of the parallel use of the city and rural homes, especially when the distance between these places is not too great. ICT has made it possible to be connected and work in both places. The majority of Finnish planners agree with these two statements, which in a way also reflects new life styles.

The opinions are divided on the statement that good possibilities for leisure time activities would affect decisions on locations of permanent residence. Some 40 % agrees with this statement, which indicates that the idea is recognised by many. The majority of planners agree that good housing environment will affect also the locations of companies. Nearly all see that broadband connections will soon be a standard equipment in all homes. The majority also reject the idea that ICT has no impact on housing.

4.7 The Impact of ICT on Conventional Traffic

Höjer (2000) argues that the indirect effects of ICT on transport demand come e.g. from changes in land-use and in the organisation of activities. This opinion reflects the findings represented earlier. Telework, e-commerce, services provided in the Internet, e-mail, changes in life style etc. will have impact on traffic. In some cases the need to travel will diminish when one can get things done by using electronic communications tools. Sometimes the need of transport will change like in e-

commerce. The customer can order goods in the net but the seller has to transport the goods to the buyer. In the case of intangible goods, all transactions take place in the net.

Changes in transport demand due to the use of ICT are difficult to predict. Very much will depend on how well people learn to benefit from the opportunities ICT offers. The human need for face to face contact will guarantee that all that kind of transport will not be replaced by ICT which in theory could be possible.

The opinions of Finnish planners on some statements concerning the impact of ICT on traffic are represented in Figure 7.
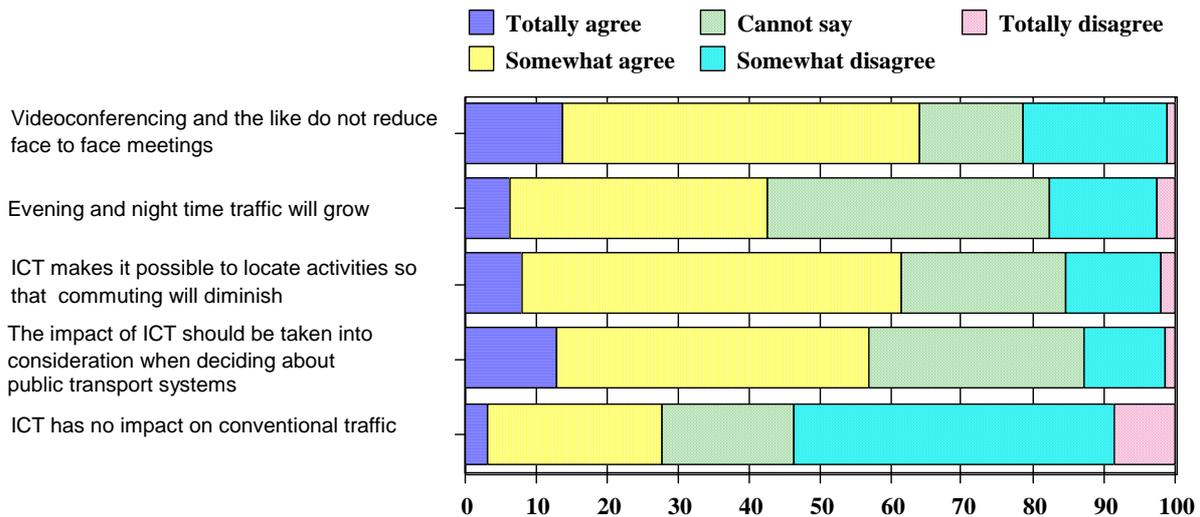
The Figure 7. Opinions of Finnish planners on some possible impact of ICT on traffic. (n= 306). Source: Talvitie, 2003.

The clear majority of Finnish planners do not believe that videoconferencing and the like would diminish the need for face to face meetings. Some 40 % of the planners expect that evening and night time traffic will grow. Nearly as many were unsure what will happen. The results indicate that the consequences of the 24/7 phenomenon are not yet generally noticed or recognised by planners.

The majority of planners see that ICT makes it possible to locate activities so that the need for commuting will diminish. As a consequence the majority of planners accept the statement that the impact of ICT should be taken into account in the solutions on public transport systems. Over 50 % of planners reject the statement that ICT has no impact on conventional traffic but nearly 30 % accept the statement.

4.8 General Overview of Spatial Development

Centralisation versus dispersion
When estimating general changes in spatial development it is common to ask the question: does the development point more towards centralised or dispersed direction? A simple answer is that in principle both trends are possible because ICT gives more freedom for the locations of different activities and the outcome depends on how this freedom is applied.

The Roundtable Participants of the Lincoln Institute of Land Policy (2001), under the heading "The New Spatial Order?", discuss the centralisation versus dispersion theme. Atkinson thinks that in the USA there exist two development trends. Inside the metropolitan areas the development is leading to decentralisation and on the other hand some activities are moving from big metropolitan

areas to smaller ones. Gillespie does not believe in any future competition between centralisation and dispersion but thinks that it is rather the question to seek balance between the forces behind the change. He expects that the rule of capitalism requires the identification of cost savings which leads to decentralisation. According to Moss one reason for dispersion is the lack of space in big cities. Hurley refers to the impact of the possibilities to be connected to the net, which is not equal in all locations.

Metropolises versus small communities
The discussion about centralisation, decentralisation and dispersion leads to the discussion about the roles of urban and rural areas in this development. Hall (1999) agrees with those who believe that the role of cities will remain. Hall expects, that "cities and their cores will retain their unique attraction for a wide range of activities that require face-to-face contact for production or consumption, or both". Cohen (2000) speaks on behalf of cities by arguing that to minimise risk it is wise to invest in already dominant areas. Castells in his book "The Internet Galaxy" (2001) argues clearly that the discussion about the death of cities is a myth which can not be based on any firm arguments. Instead he sees that urban and metropolitan areas continue to grow because of the spatial concentration of jobs, services and income-generating activities. Also the best human development opportunities are especially in big cities. As a result the population will increasingly concentrate in a very large metropolitan regions. The Internet allows global networking of these regions. Castells also reminds that the big metropolitan areas are very complex regions having normally no administrative status but consisting of many different types of communities, many with their own administration.

Kotkin and DeVol in their research "Knowledge-Value Cities in the Digital Age" (2001) deal with the developments of the cities in USA. They stress that opportunities are different in different cities because different types of activities have special requirements for locations. However they argue that despite these differences there are some basic factors which are critical in all cases. The most important of these is the preferred lifestyle, to provide environment where people want to live. The second important factor is the availability of skilled workforce. Good living environment attracts skilled people which together form a magnet to workplaces. As a conclusion they expect that at the end the guarantee for success is the quality of the community, it should be good for living in every possible sense.

Graham and Marvin in their book "Splintering Urbanism" (2001) argue that in the big metropolises development goes towards splintering and internally divergent urban structures. This leads to the development of "premium network spaces and glocal sosio-economic enclaves" and less developed areas. Many other scientists (e.g. Castells, Hall, Kotkin) have also warned about the danger of the "dual city" phenomenon, when a city will be divided both socially and spatially to different areas. This danger should be avoided by the means of proper urban planning.

The discussion of the future role of cities in the information era is mostly concentrated on the destiny of big cities and metropolitan areas. Small cities and communities are often parts of the big city regions but live their own life in many ways. They may be only residential areas and people go to work in the big centre. Now it is possible that these small cities may attract also workplaces to be located probably to cheaper premises and closer to the employees or because of the quality of life factors. Because of the same reasons traditional old towns and other small communities who are not influenced by big urban areas may also find a new future. Call centres could form a good starting point in generating new jobs.

Although there are many who do not believe that rural areas would benefit noticeable from the possibilities ICT offers, it should be noted that probably a more important factor for the future of these areas is the improvement in the service standard ICT will bring along. This does not only make life easier for current residents but also enhances the competitiveness of rural enterprises. What effects these have in the long run on the future of rural areas is difficult to predict. It would be possible that changes in lifestyle could to some extent favour rural areas.

The expanding of metropolitan areas, decentralisation trends and the attraction of rural areas may diminish the differences in lifestyles between urban and rural areas and also make it difficult to define where the border physically exists. Weiner and Brown (1997) call this transition zone "rurbania".

Opinions of Finnish planners

How Finnish planners experience some of these expected consequences in spatial development is shown in Figure 8.
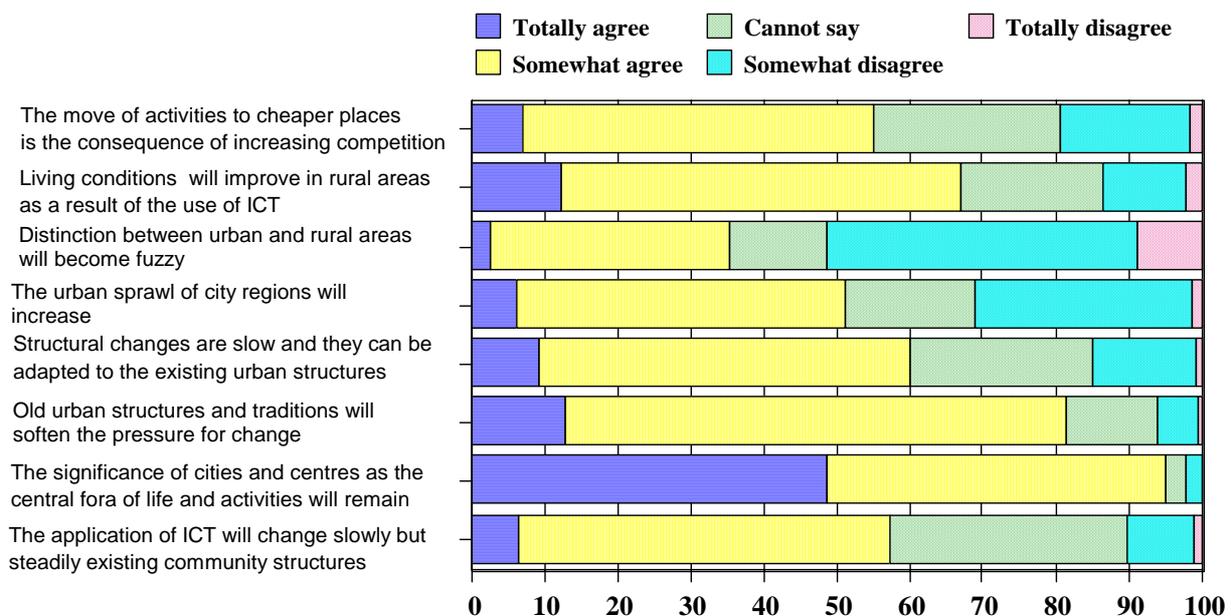

Figure 8. The opinions of Finnish planners on the statements of some possible consequences in the spatial development caused by ICT. (n= 302-306). Source: Talvitie, 2003.

The majority expects that competition will be a driving force to move activities to cheaper places and that also rural areas will benefit from ICT. The majority does not believe that the distinction between urban and rural areas would disappear. The majority believes in the growth of urban sprawl in the city regions. An interesting result is the strong belief that the spatial changes can be adapted to the existing structures and that old traditions will also soften the pressures of change, as Mitchell (1999) has argued. The belief to the power of cities and centres to remain as the focus of life is nearly unanimous. However, the majority believes that in the long run ICT will change the existing urban structures. From the planning point of view it is essential to note that planners are thus not expecting any big changes rapidly

Concluding thoughts

As a whole the possible consequences caused by ICT in spatial development as discussed above do indicate clear expected changes. The role of big cities and metropolitan areas is expected to remain important and even grow. On the other hand the decentralisation within these areas is seen to take place. Activities will thus spread and form larger entities.

The future of small towns and rural areas has not been discussed very much. In principle these communities can also benefit from new development trends. New lifestyles and cheaper costs of living together with a pleasant environment could form a good combination as a driving force to promote the development of small communities and rural areas.

It is natural that we still have little empirical evidence about the development trends caused by the emergence of the information society and impact of ICT on spatial change. Only during the last 10 - 15 years this technology has been widely used in the developed world. Most of the expected changes are ahead. The pace of these spatial developments depends on the time people and organisations need to recognise new possibilities for locations of their activities. Remarkable changes in physical structures will also take place slowly, although the relocations of enterprises may happen nearly overnight. Therefore these findings discussed above are not the final word but just the beginning.

5 Incorporation of the Impact of ICT into Urban and Regional Planning

What are the conclusions planners should draw from the results of the analyses of the impact of ICT on spatial change and how to take these development trends into account in practical planning are now the main questions planners face. These questions should be presented also by the authorities, institutes and organisations who regulate and support urban and regional planning practices.

The opinions represented in literature and opinions of Finnish planners explained in previous chapters prove clearly that ICT is now a new factor which affects spatial change and the consequences can be surprising and different compared with past developments.

The situation is challenging for planners. Probably in most cases one of the main goals of regions, cities and all communities is to safeguard their competitiveness in the changing world as the location of enterprises and inhabitants. Urban and regional plans are means to be used for this goal.

Spatial change from the point of view of urban and regional planning is always both an opportunity and a threat. Now the change offers opportunities to use new possibilities which ICT gives for new types of development for regions, cities and rural areas. New development trends can also threaten the future of these areas. Therefore planners have to find means to try to forestall possible negative effects to the future of their area.

The situation is also challenging and demanding for those who regulate, support and advise planning authorities because of the same reasons.

To include a new aspect into an old planning system is not an easy task. The impact of ICT can not be recognised like the automobile traffic. This impact is very diversified. Therefore a systematic approach is needed to incorporate the impact of ICT as a new element into the urban and regional planning and respective plans. It requires purposeful actions by those who are responsible for practical planning and by those who regulate and support the planning.

I would suggest at least the following actions to be taken by those who prepare the plans:
- a study of spatial impact of ICT should be included in the planning process,
- the development of ICT-infrastructure should be included as an essential part to the planning and to the content of plans,
- the current planning principles should be updated and opportunities for gaining new insights into planning should be seen as a challenge for the planners.

To the support organisations I would recommend at least the following actions:
- the programmes of planning education and training should be updated,
- the research on spatial consequences of the development of the information society and the impact of ICT on this development should be intensified and new spatial and urban theories and planning methods and models developed,
- the content of planning legislation and guidelines should be updated.

These aspects are discussed below.

5.1 Actions to Be Taken in Practical Planning

The first thing the authorities responsible for practical urban and regional planning should do is to make a clear decision, that the incorporation of ICT as a new element of planning and plans should be recognised and taken into account. They should decide at the same time which the main actions should be implemented in order to promote the achievement of the adopted principle. These actions should at least include those mentioned above and discussed below.

This type of decision is needed if the ICT issue has not been dealt with earlier. For instance only 19 % out of 291 Finnish planners told that the possible impact of ICT has been an item in the dis-

cussions by the political decision makers in the deliberations on the planning policy of their area. Also some other findings (e.g. Lake, 2003; Townsend, 2003) support the expectation that planners have not taken much notice of the impact of ICT on practical planning.

The adoption of the proposed decision can also be difficult. Attempts to convince the decision makers, that it would be a big mistake to rely nowadays only on old planning principles, may fail. New principles would change current situation, affect the values of properties and in general economic expectations of many actors. Decision makers may think twice before they accept new approaches. However, the continuation of old practices will in the long run most probably fail and cause also economic losses if decision makers and planners have not been prepared for the changes.

In order to be able to adopt new principles in old systems and also to evaluate the relevance of existing policies, planners including decision makers should be better informed about the future development and should also be better equipped with new planning tools to deal with the new situation.

5.1.1   Studies on Possible Impact of ICT on the Planning Area

The development of the information society and the role of ICT in this process is quite a new thing for many planners. Therefore a special study should be carried out in every planning process in order to get information about what could happen in the planning area and why.

These studies are also important because there is immense uncertainty about the understanding of the impact of ICT among planners. This is understandable because also many scientists (e.g. Moss, 2000; Dabinett, 2002) have argued that it is difficult to understand the impact of ICT on spatial development and often this impact is more complex than simplified examples show.

The opinions of Finnish planners about these questions, shown in Figure 9, indicate the uncertainty and also some firm opinions about the general impact of ICT.
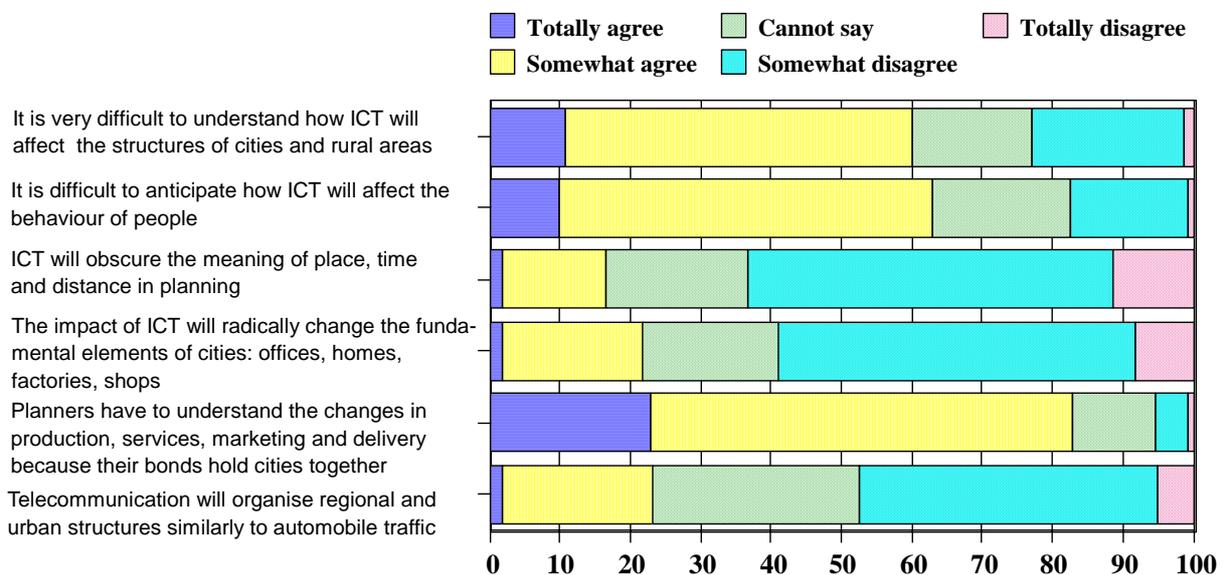
Figure 9. The opinions of Finnish planners on the statements of the understanding of the general impact of ICT on planning. (n= 305-306). Source: Talvitie, 2003.

Over 60 % of the opinions on the first two statements totally or somewhat agree the suggestions that there are difficulties in understanding the effects of ICT both on the structures of cities and rural areas as well as on the way how people apply this new technology. On the other hand the major-

ity of planners reject the suggestions that ICT would obscure the meaning of place, time and distance in planning and that ICT would radically change the fundamental elements of cities like e.g. Mitchell (1999) has suggested.

Finnish planners agree with another suggestion of Mitchell (1999) that there is a need to understand the changes in the operations of some basic elements of urban activities because their bonds hold cities together. Planners do not generally accept the proposal that telecommunication would have similar effects on regional and urban structures as the automobile traffic has had. One third considers this statement difficult to answer.

The opinions on these statements are someway conflicting. Despite difficulties to understand the impact of ICT on spatial development in general, planners do reject some proposed, fundamental consequences. This implies that the majority of planners are not anticipating big but small changes.

The content of the proposed study should be tailored according to the circumstances of the planning area by keeping in mind that the competitiveness of each area is facing new challenges. The leading general questions waiting for answers could simply be: what are the opportunities and threats our community or region could face in the emergence of information society and caused by the applications of ICT.

The main reasons which could affect the future of an area were discussed earlier. These findings can form a good background for the detailed programme of a study. ICT will affect the prerequisites of different activities to function in an area. This concerns different types of industries, housing, services, retailing, travelling, commuting and many other activities we may not even be aware of today.

It should not be forgotten that ICT can be used also in achieving other types of goals. ICT can be a tool to promote sustainable development, more efficient functioning and operations of technical infrastructures etc. These items have not been discussed in this context, but should be taken into account when thinking the impact and possibilities of ICT in regional and urban development. Therefore within a planning process all the questions related to ICT should be considered and not only from the point of view of the authorities but also from the point of view of different organisations and habitants. The implementation of the study requires a close dialogue with all partners.

5.1.2 ICT-Infrastructure to be Included in Planning and Plans

For the future of all regions and communities including rural areas the most crucial thing is the kind of telecommunications infrastructure and service standard the area has. Most activities are nowadays dependent on these two factors. The development of traditional traffic networks has normally been a public responsibility. The telecommunications infrastructure and ICT services are in most cases built and offered by private companies. This dilemma has been widely discussed.

Like the traditional traffic networks also the telecommunications infrastructure offer the best services in big cities. Small communities and sparsely populated areas are not served as well. In every case it is important that planners clarify the situation in their planning areas and identify problem areas. Nowadays it is not enough to be able to use a mobile phone nearly everywhere or have low speed access to the Internet. Many services require a broadband connection to function smoothly. This is a critical point in many sparsely populated areas. In Finland you can get this service nearly everywhere, but outside the normal service areas of the operators the costs are higher. The development of wireless communications systems may provide new possibilities but their availability and costs will not be equal in all areas.

The reason that the responsibility to build ICT- infrastructure belongs to private companies is often seen as an obstacle to regional and local authorities to have real influence on the construction of the ICT- infrastructure. This can be the situation if authorities only deal with the building permissions companies require for the different elements of their infrastructure. In some cases authorities

only discuss the location of base stations on the basis of the environmental (visual) aspects. These types of reactions are very limited and do not allow for long-term solutions.

There are also examples when local and regional authorities have been involved in the development of the ICT- infrastructure (e.g. Moss, 1998). I think that this should always be the case. Therefore I would suggest that local and regional authorities should jointly decide on the minimum service standard of ICT they should have in their areas, and then work towards achieving these goals. The situation changes all the time because of the developments of ICT. The goal should be to safeguard at least the basic technical standard for the use of the generally offered services by ICT.

Local and regional authorities should negotiate with the operators about the implementation of desired objectives and also be willing to pay some of the costs. The authorities have also at their disposal many other tools like planning rights and construction permissions.

The ICT- infrastructure should be seen in regional and urban planning and in the content of plans as an equally important element as highways, streets, railways, airports and harbours. If planners are not aware of how a good ICT-infrastructure and service standard may affect the development of their planning area they can easily miss the opportunity to guide the development. Good infrastructure with good services is an opportunity and the lack of them a big threat for an area.

5.1.3   New Planning Principles and Opportunities for Gaining New Insights into Planning

As mentioned earlier the maintenance of the competitiveness of regions, cities and all communities in the changing circumstances is probably the most important common goal for all areas. The challenges caused by the change of the economic basis, restructuring of industries and services and development of new life styles etc. require global competitiveness and local attraction from places who like to compete in world class. Also communities having lower aspirations, competing at national, regional or local level, face changing circumstances which need to be addressed. Many authors (e.g. Mitchell, 1998 and 1999; Kotkin, 2000; Moss, 1998 and 2000; Graham and Marvin, 2000 and 2001; Kotkin and DeVol, 2001; Dabinett, 2002) have offered planners good advice on how to proceed.

The elements involved in the spatial development of the information age are diversified and not in all cases pointing to same direction. The common challenge planners are facing is, how to find and define the success factors for their own planning area. They are not similar in all places and regions because each area is its own special case. In some cases major problems are related to growth management while others face economic decline and outflow and decline of population. The results of the analyses proposed in the previous chapter can give a good starting point to considering how all development trends could be taken into account in a planning process.

The list of factors which will have an impact on planning because of the application of ICT is long. It includes the mix of home and work, teleworking, the development of new life styles, 24/7 phenomenon, greater freedom in the location of activities and the growing importance of the special quality of places, the virtual functions, special requirements for the locations of the businesses of the new economy, effects on the activities of companies of old economy etc. Also it should be kept in mind that the impact might be indirect. ICT gives opportunities to achieve goals which have not been possible before. It is thus easy to accept the proposals about the need to rethink and renew the old planning principles.

Our time gives planners more possibilities than one can list for new insights in order to benefit from the opportunities of their planning area, and as well as to overcome the threats they may face. This applies to all cases, not depending on the size, location, economic structure or any other feature of their planning area. All areas will have some kind of possibility, even a small good thing would be good enough for some. Planners should also note, as Barker (2001) has argued, that the

same innovation and technology can be applied to different places in different ways depending on the goals of the target area.

Our time will also cause rapidly new reasons to rethink old practices. The case of 11.9.2001 is a good example. According to Kotkin (2002) these tragic events have affected the decisions in USA on the relocations of enterprises and people. I had the statement "11.9.2001 events will affect also planning principles" in my study. Non agreed the statement totally. Nearly 70 % somewhat or totally rejected the idea. The threat of terrorism depends on many things, which are difficult to foresee. But what is clear, the lesson of 11.9.2001 is for sure that, that all organisations have studied the vulnerability of their ICT-infrastructure. Not only terrorists, but also fire and digging machine can cause a lot of damages. These are questions which are rarely discussed publicly, but are concerns which will affect also practical planning solutions.

There is no unambiguous advice to be followed in planning. Possibilities are many and choices depend on the objectives of each city, municipality and region. The application of ICT gives ingredients both to the improvement of the functioning of existing communities as well as to the creation of new types of communities.

The easiest way to proceed is to expect that the possibilities of ICT will be taken into use in old structures and there is no need to react. This attitude can be dangerous. New types of development can take place and planners can only afterwards note what has happened. Also it is possible to try to forestall those aims which do not fit to the planning and construction principles in force. This possibility makes more room for competition between regions, cities and municipalities. The required conditions will be offered somewhere. Generally people and organisations will work for their own goals and try to implement them. So it is wise to address also the threats on a positive way.

The development of innovative milieus for industries of the new economy has been emphasised as a main success factor to safeguard the future of cities and regions. No doubt this is an important point. However it should be noted, that the use of ICT applications by ordinary people and companies of old economy and all others will also have a great impact on spatial development. The factory plants of automobiles have been of great importance in the economy and life of the cities and regions where they are located, but probably even greater impact as a whole is caused by the use of these products (automobiles) and this impact is spread nearly everywhere in society.

The opinions of Finnish planners about some proposed possibilities in planning are shown in Figure 10.
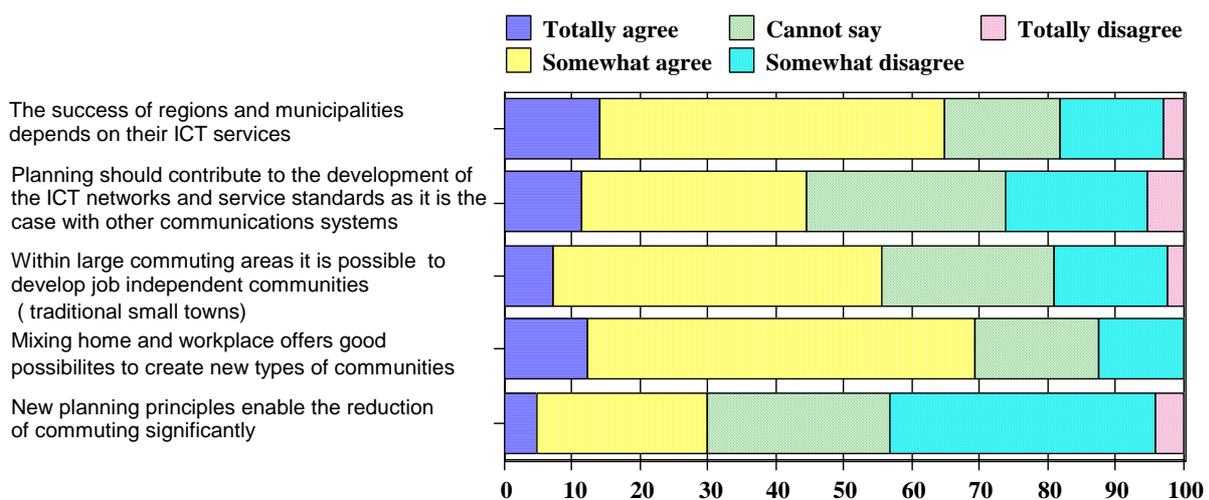

Figure 10. The opinions of Finnish planners on statements of some possible new planning principles. (n= 300-305). Source: Talvitie, 2003.

It is interesting to note that the majority of planners agree with the statement that the success of different areas depends on their ICT services, but not as many agree with the idea that planning should contribute to this development. In an other connection of the same study 73 % of planners, out of 295, agree with the statement that cities/municipalities and regions should support the activities to bring about ICT services to areas where they could not be economically profitable. Planners probably have considered the tools of planning modest in this sense, but that the authorities have other means than planning to work for this goal. In real life all means and tools should be used. The ideas for new types of community development are accepted by the majority

Opinions are divided and a major part of replies rejects the idea that new planning principles make it possible to reduce commuting essentially. Earlier in a statement, represented in Figure 7, the majority agreed with the statement that ICT makes possible to locate activities so that commuting will diminish. What would be possible in theory would not work in practice, could be an interpretation about these results. The other one could be, that a great number of planners see it difficult to change old planning principles. Reasons may vary. The use of this proposed new possibility may have negative consequences on the future of current working areas, public transport can lose passengers, the values of properties may change, neighbouring cities can benefit etc.

By simplification, new planning possibilities will probably not be applied by cities/municipalities who expect negative consequences on current situation. However, changes will be inevitable if the companies move to lower cost places and where also the commuting distance of employees will be shorter. This type of development is in principle similar with that what has happen in rural areas when they have lost some of their economic basis. New planning principles and development possibilities may thus cause problems and conflicts between cities, municipalities and regions who compete over enterprises and inhabitants. The competition will have new forms.

The different principal tasks of regional and local planning, depending on the planning legislation, affect the content of planning. Equally the nature of the planning area has a great impact on planning. Big metropolitan areas differ from small capital regions, big cities from small, and rural municipalities from urban areas etc.

In regional planning it would be important to clarify what actions are needed in safeguarding the competitiveness of current industries and what the possibilities are for new industries and under which conditions. The activities of some reference regions, preferably in foreign countries, would give also new ideas for our own work. Regional planning would be good also in searching for suitable areas for different lifestyles, promoting sustainable development by trying to reduce commuting etc. A difficult task in regional planning will be to try to solve the conflicts between cities and municipalities.

In many cases local authorities are more powerful than regional ones. Their jurisdiction is often larger than that of many regions and they have normally their own money because of their right to collect taxes. They have closer contacts than regional authorities with inhabitants and industries in their area. Local authorities are also in the frontline in identifying new development trends. This means that they can be the first to react to changes. However, as discussed earlier, many development trends can be seen only from a wider angle and also possible relocations do not respect the administrative borders. Therefore a good interplay with regional planning authorities is essential as well as a close co-operation with those units of local authorities which are responsible for industrial development, education, housing etc.

How Finnish planners experience some of the statements related to the development of spatial planning practices is shown in Figure 11. A large majority of planners agree that the success factors of regions and municipalities should be evaluated also from the point of view of ICT. Over 80 % consider that the possibilities and challenges of ICT should be taken into account when reviewing the plans. An interesting result is that a great majority of Finnish planners accept the statement that the need and role of spatial planning which covers a larger area than one municipality will grow. The opinions are split on the question whether this area should be a region or only a sub-region.
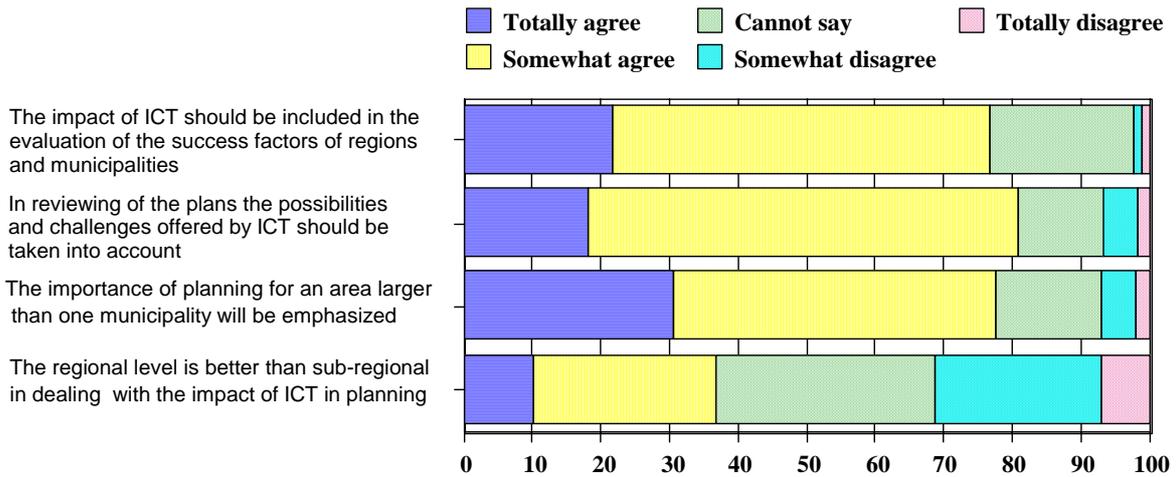
Figure 11. The opinions of Finnish planners on some statements regarding the development of planning practices. (n= 302-305). Source: Talvitie, 2003.

These and some previous opinions of Finnish planners can be interpreted so, that the spatial impact of ICT could be recognised better from a wider geographical angle of vision than one municipality can give. Also the roles of general and detailed planning are seen different. They emphasise the tasks of master and regional planning in dealing with the opportunities and threats caused by ICT.

5.2 Recommendations to the Support Organisations

The opinions of Finnish planners on the some wishes they have for the support organisations are presented in Figure 12.
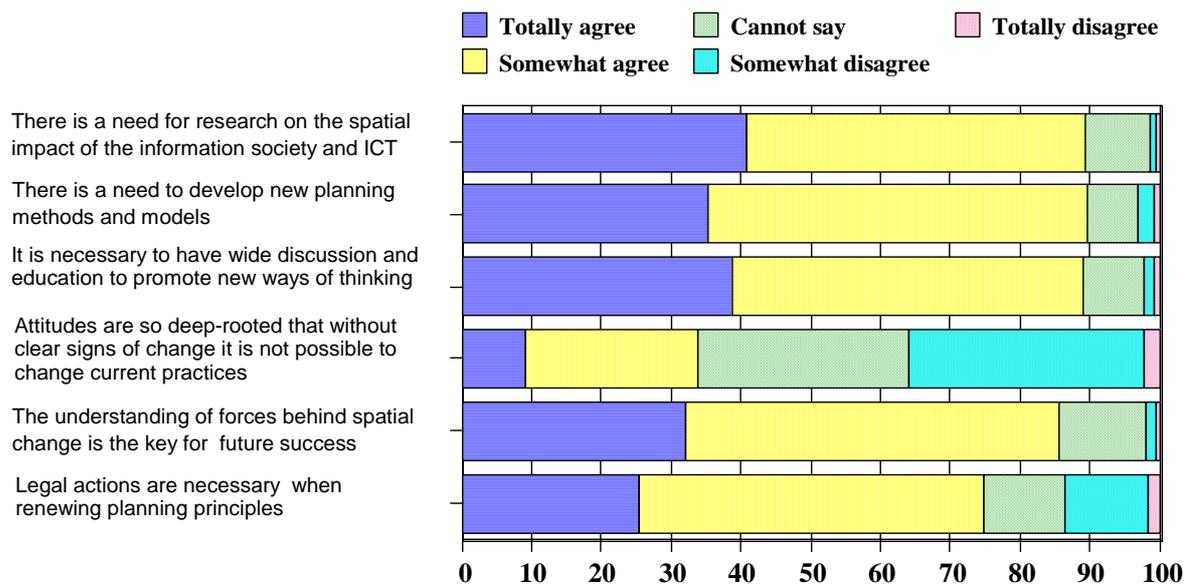

Figure 12. The opinions of Finnish planners on some statements about the needs of support in the development of planning practices. (n= 303-310). Source: Talvitie, 2003.

Planners are nearly unanimous about the need for research on the spatial impact of the information society and ICT, about the need for new planning methods and models and about the need for wide discussion and education to promote a new way of thinking. An interesting result is that the opinions are split on the idea that attitudes are so deep-rooted that without clear signs of change it is not possible to change current practices. The majority expect that the understanding of current spatial change is the key to success, as well as that legal actions are required in the renewing of planning principles. These opinions have an impact on the discussions below.

5.2.1 Challenges to the Universities and Training Institutes

Education has the key position in promoting the adoption of new practices in planning. Universities who provide education for planners should therefore assess the need to update their programmes so that they meet the requirements caused by the development of the information society and the applications of ICT. The same applies equally to all institutions who provide complementary and continuation education to planners.

It is important to note that the impact of ICT on spatial change can not be dealt with in isolation but as a part of the development of the information society and the forces behind it. Planners should be aware of the changes in industrial life, development of the new economy, and all important consequences affecting spatial change. Only this understanding will give a sound basis for the development of the new planning practices.

Institutions who provide further education for planners have a great challenge and opportunity in providing inspiring courses. Regional and local authorities should ensure that their planners also participate in this type of education. Consultants who offer planning services could have a powerful asset in marketing if their experts had a good understanding about these new trends in society and an ability to apply this knowledge into practical planning.

5.2.2   Interesting Tasks to the Research Institutions

Providing information and knowledge
There is an immense need in all countries for quality information and knowledge about the spatial consequences of the development of the information society and on the impact of ICT on this development. Local and regional authorities need both a good theoretical foundation for their own studies as well as a general overview about the spatial development trends in general and especially in their own country.

Country specific studies are important because the social conditions, industrial structures, economic life, spatial development trends etc. vary so much from country to country despite many common features. This type of research would also contribute to the development of national education and training programmes.

One special and ongoing task should be the follow up of spatial development to discover new applications of ICT which have impact on the functioning and formation of urban and regional systems. These studies are important because of the uncertainties we still have about these issues and because of the rapid development of ICT.

Creation of spatial and urban theories
The other important task the research institutions and universities have is the creation of new spatial and urban theories. Current development trends are so diversified and many-sided that it is not possible to get one consolidated picture for the basis of planning. Old theories do not give foundation

for the understanding of new development trends. What could help to overcome this problem is the development of new spatial and urban theories, which hopefully could combine and incorporate the new and developing spatial systems with the new features in urban and rural development due to the emergence of information society and the impact of ICT .

During the 1960s and 1970s the theories of the hierarchical arrangement of centres and areas (e.g. Christaller, 1933; Isard, 1956; Lösch, 1940) were applied e.g. in Finnish regional planning practices. Hall (1995) argues, that we need now a different taxonomy than the one represented in those old theories. He sees, that their principles are still relevant, but now we have a global environment. Hall distinguishes two levels of global hierarchy: global cities and national/regional cities.

Castells (1996/2002) has prepared the well- known new spatial theory called: "the social theory of space and the theory of the space of flows". The outcome of the application of this theory in the information age is the network society, as Castells calls it. As mentioned earlier, also Castells sees that the development will focus on global metropolises, large urban areas.

Global scale thinking is a good exercise also to urban and regional planners, but they really need a more grass roots oriented approach. Now they can observe that hierarchical structures are weakening and are often replaced with more diversified ICT-enabled networks. Castells´s theory can give a foundation for the rethinking of the principles underlying the formation of national and regional structures by also applying some principles from the old theories. One may try to incorporate the new form of traffic, telecommunication, and its diversified impact on these systems of old theories. By simplification, the outcome could be like the combination of space of places according to the old theories and of space of flows according to the Castells´s theory.

The network society would consist of network countries, network regions and network cities/municipalities with all possible inter-linked combinations. In every region and city it could be possible to apply the determinants of Castells´s theory to the local conditions and scale and to try to understand and clarify the impact of different networks on the development of physical structures and their functioning.

However, this exercise does not eliminate the need for well argued new spatial theory or theories for regional and urban planning. The creation of these theories is now a demanding challenge for universities and research institutions.

Urban development will according to the earlier discussion consist of very different development prospects. So there is an immense need for new urban theories as well. It is good to keep in mind that all big structures develop step by step through local actions. Therefore the interplay in the creation of urban theories with spatial theories is relevant and important.

Mitchell (1999) argues, that a result of the emergence of the digital revolution is that "familiar urban patterns have lost their inevitability", and suggests five points, oversimplified as he says, to the design principles for new urban patterns: dematerialization, demobilisation, mass customisation, intelligent operation and soft transformation. The ideas behind this thinking form one good basis for the development of a new urban theory or theories. Suggestions made by Mitchell are not in conflict with Castells´s theory but rather compliment each other. At the conclusion of his book "e-topia" Mitchell describes well the features of the future town. He emphasises both the roles of electronic connectivity and the power of place, with unique qualities, which will function interdependently and complementing each other.

When speaking of the development of new urban theories it is important to remember also the human dimension in this context. Kotkin and DeVol (2001) argue, that communities can only survive if they are more than "soulless zip codes of brick and glass, inter-connected by fiber-optic cables". They stress the need to foster the connectivity of human bonds by creating functioning connections between inhabitants, businesses and all organisations.

The research institutions and universities have to take the responsibility of these urban theory developments as well.

Development of planning methods and models

Hall (1975/2002) gives a good overview of the development of urban and regional planning principles and practices during the last 200 years. In the literature there are many principal ideas and proposals for the renewal of urban and regional planning practices in the information age. Some of them were discussed in the previous chapters.

New spatial and urban theories would form a reliable foundation to the development of new planning methods and models. With life becoming more complex, universal solutions will not work. Therefore there is a need for the creation of new planning methods and models for different types of planning tasks. They would offer a new way of dealing with the growth of big urban areas, the development of new types of communities, and the decline of some regions, cities or rural areas, just to mention a few examples.

Combinations of those five principles represented by Mitchell allow the formation of alternative solutions. They would be valuable because of the varied needs of regions and cities/municipalities with different development prospects.

It is possible to include the impact of ICT as a feature in at least some of the current planning methods. Instead it would be beneficial for new urban planning models to describe the functioning and spatial formation of new urbanism.

As a whole universities and research institutions should also address these needs for new methods and models of spatial planning in the information age. International co-operation would be valuable. For instance "The Espon 2006 Programme", prepared in 2002 by the European Spatial Planning Observation Network, could offer one possibility under the chapter "Identification of spatially relevant aspects of the Information society" (http://www.espon.lu).

5.2.3 Need to Update Planning Legislation and Guidelines

As shown in Figure 12 the great majority of Finnish planners have the opinion that legal actions are needed in renewing planning principles. However the relatively new Finnish planning legislation, adopted in 1999, does not include any specific provisions to consider the possible impact of the development of information society and the impact of ICT. The same applies to Finland´s National Land Use Guidelines, which were adopted in 2000. The planning guidelines of central government deal only very little with these issues.

There are examples of governments taking into account in their national development plans the impact of information society and the possibilities of ICT in spatial planning (e.g. Ministry of Land, Infrastructure and Transport, Japan, 1998; Estonian Ministry of Environment, 2001). The spatial impact of ICT is also recognised in ESDP, the European Spatial Development Perspective, agreed by the European Ministers responsible for Spatial Planning (European Commission, 1999).

Despite differences in planning legislation and possible guidelines it would be important to consider in every country whether there is a need to update essential legal documents and governmental guidelines influencing spatial planning to include provisions for the impact of information society and ICT. These actions could help the incorporation of new planning principles into practice.

6 Conclusions

The findings and arguments represented and referred to above justify the conclusion that ICT, as the main driving force of the development of the information / knowledge / network society, should be taken into account in urban and regional planning as a new aspect. From the planning point of view the situation is also good because the spatial impact caused by ICT- applications in real life is still slight. People and organisations have not yet recognised all possible ways to benefit from new and continuously evolving opportunities.

Current spatial development trends are highlighted by the changing economic basis when knowledge and skilled people are becoming the most important factors in production, and by the new functional and organisational possibilities of activities. As a consequence the traditional ways of running businesses in industry, services and other organisations as well as activities in every day life will change. Also the prerequisites of locations of different activities will have new determinants. These developments form the basic driving forces on spatial change in the information age.

The expected spatial changes are diversified. The growth of big urban areas is seen as a consequence of the development of global metropolises. The development within these areas will disperse. There are also possibilities for new types of communities. The opinions on the future of small towns and rural areas vary. At least small scale developments could be possible. New life styles and special features of places will play an increasingly important role in decisions on locations of some activities.

If planners would like to influence new spatial development they should incorporate the impact of the development of the information society and ICT into regional and urban planning. There are indicators that this has not been common case until now. Reasons may be many. Human resistance against change is normal. Probably a more important factor is that planners are not aware about these new development possibilities, and they may expect that the impact of ICT could be applied in current urban and rural structures. This interpretation would be dangerous and planners would miss the possibility to influence the future formation of their cities and regions.

Competition, cheaper solutions, activities with improved functionability, possibilities to implement solutions which earlier have not been possible, are some of the arguments which may affect to the relocation of current activities or decisions on new locations and as a whole on demands of new types of community development. Therefore those who are responsible for spatial planning should actively work for the application of the impact of development of information society and ICT on spatial planning practices.

There is an immense need for further research on the spatial impact of the application of ICT in general and in specific planning areas and for the development of new planning theories, methods and models. Also the programmes of planning education and further training should be updated as well as the legal provisions for planning. The first thing to do is, that all planning authorities make a decision to incorporate ICT as a new element into planning and plans and decide on the actions which should be taken to promote the achievement of the adopted principle. The winners are those who will understand the emerging new spatial order.

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Appendix

Some Facts about Finland

Finland´s land area is 300 000 square kilometres, but it has only 5,2 million inhabitants. The population of the biggest city, Helsinki, is 0,5 million and that of the Helsinki region about 1 million. The population of the cities after Helsinki is about 0,2 million. As a whole the size of cities, municipalities and regions measured by population is small, but large by area.

The major part of the population is concentrated in the south and south-west Finland. In the country there are large, sparsely populated areas. Lapland, the most northern region, covers 100 000 square kilometres, but its population is only 200 000.

More information about Finland can be found at: http://virtual.finland.fi/

Municipal and Regional Administration

Finland is divided into 450 municipalities. About 100 of them are called cities. The Municipal Act regulates the activities of all municipalities. Municipalities play a central role in providing public services to citizens. They have their own income tax to cover most part of their expenses. State grants are the second important source of income.

Municipalities are also responsible for the land-use planning, the implementation of infrastructure and controlling the construction activities.

Finland has no universal regional level administration, but has several sector oriented actors. Regional councils, 19 together, are intermunicipal joint authorities, with a legal status and they are the responsible authorities for regional development planning and for regional land use planning. The Åland Island has a special status in Finnish administration and has its own planning systems in the region.

More information about municipalities at: http://kunnat.net

More information about regional councils at: http://reg.fi/

Urban and Regional Planning Legislation

Finland has strict legislation on urban and regional planning and construction. Detailed land use plans (zoning) are compulsory and should be adopted by the city/municipal council. Municipalities normally prepare also master plans, which are policy oriented and give guidelines for detailed planning. Building permission is required and will be given by municipalities.

Regional councils are responsible for regional development and regional land use planning, which both are compulsory. Regional development plans are policy oriented and regional land-use plans are more specific, dealing with issues of regional relevance. These plans guide municipal planning and also the activities of some state authorities. These plans are adopted by the assemblies of regional councils. Regional land-use plans are approved by the Ministry of Environment.

Regional councils prepare also special regional policy plans, which are interconnected to the planning required by the European union as part of the implementation of the regional policy actions of the EU. Most of these plans are prepared in co-operation with some other regional councils and some state regional authorities.

More information about the planning and building legislation can be found at: http://www.ymparisto.fi/eng/landuse/

More information about the regional development activities related to the European union programmes can be found at: http://www.intermin.fi/en

Finnish Urban and Regional Planners

In Finland there is no general education for planners. Therefore urban and regional planning is carried out by people who have a different educational background. There are about 800 planners. The majority are architects. Most of them have graduated from universities, having the degree of Master of Science in Architecture. The second largest group consists of surveyors. They have graduated from the Department of Surveying, at the Helsinki University of Technology and have the degree of Master of Science in Technology. The rest have different educational backgrounds. There are civil engineers, social scientists, like geographers and also those whose education is less than a masters degree.

Cities/municipalities and regional councils have their own planning staff. Only municipalities whose population is under 6000 do not have a legal obligation to have a professional planner at their service.

There are also consultants who provide planning services. They are used nearly by all municipalities and regional councils.

Development of the Information Society in Finland

The opinions of Finnish planners about the impact of ICT and spatial development and planning might be interesting because Finland is considered to be a highly connected country with a high rate of e-literacy. 92 % of the planners who replied to the questionnaire said that they use the Internet for obtaining information. 85 % told that the homepage of their employer contains information about the actual planning. 76 % said that citizens can send their opinions on the planning proposals via the Internet.

Information about the development of information society in Finland can be found at: http://www.e.finland.fi/

Some Statistics about Planners Who Replied to the Questionnaire

There were 310 planners who participated in the study, 39 % of 794. 50 % were architects, 20 % surveyors and the rest, 30 %, represented planners with a different educational background. This relative division complies well the expected reality.

The division according to the planning tasks was as follows: detailed land-use planners 34 %, master planners 11 %, doing both of these plans 31 % and regional planners 14 %. 10 % did not specify their job.

At the service of municipalities were 64 %, of regional councils 14 %, and of consultants 14 %. 8 % did not inform their employer.

29 % were females were, 71 % males. The age structure correlated the reality. The share of 50-year-olds and over was 52 %, 41-50- year-olds 31 %, 30-40- year-olds 14 % and under 30- year-olds only 3 %.

The absolute number of planners under 30, who replied to the query, was so low that it was not possible to make any statistical analyses about their opinions compared to the opinions of the age group older than 50. The opinions of planners under 41 did not generally differ from the opinions of older ones. Only in few cases were the differences statistically significant (p=< 0,05). This was also the case regarding the opinions of male and female respondents.

About the Author

Juha TALVITIE, born in 1935, in Lapua, Finland. He got his M.Sc.(Tech.) in1960, Lic.Sc.(Tech.) in 1969 and D.Sc.(Tech.) in 2003, all at the Department of Surveying, Helsinki University of Technology.

During the 1960s he worked as a planning engineer in a state rural development organisation and as the managing director of two regional planning organisation, in Lapland and Southern Ostro-Bothnia. In 1967-1993 he served as the managing director of the Association of Finnish Regional Councils. After the amalgamation of the national associations of Finnish local and regional authorities he served as the director of Structural Policy and EU-Affairs within the new Association of Finnish Local and Regional Authorities between 1993-1998.

He retired in1998 and established Talvitie Consulting for a free lance activity and hobby.

During his career he has devoted much interest into international affairs, like working actively within the International Federation of Surveyors, FIG , and participating in the activities of the European level intergovernmental and voluntary organisations of local and regional authorities.

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