

Cohen, Galit; van Geenhuizen, Marina; Nijkamp, Peter

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Tinbergen Institute Discussion Paper

Urban Planning and Information and Communication Technology

Galit Cohen¹

Marina van Geenhuizen²

Peter Nijkamp¹

¹ *Department of Spatial Economics, Faculty of Economics and Business Administration, Vrije Universiteit Amsterdam, and Tinbergen Institute,*

² *Faculty of Technology, Policy and Management, Delft University of Technology*

Tinbergen Institute

The Tinbergen Institute is the institute for economic research of the Erasmus Universiteit Rotterdam, Universiteit van Amsterdam and Vrije Universiteit Amsterdam.

Tinbergen Institute Amsterdam

Keizersgracht 482
1017 EG Amsterdam
The Netherlands
Tel.: +31.(0)20.5513500
Fax: +31.(0)20.5513555

Tinbergen Institute Rotterdam

Burg. Oudlaan 50
3062 PA Rotterdam
The Netherlands
Tel.: +31.(0)10.4088900
Fax: +31.(0)10.4089031

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Urban Planning and Information and Communication Technology: Ideas and Facts

*Galit Cohen*¹, Marina van Geenhuizen², Peter Nijkamp¹

¹ Department of Spatial Economics, Free University Amsterdam
De Boelelaan 1105, 1081 HV Amsterdam, NL.

² Faculty of Technology, Policy and Management, Delft University of Technology
P.O. Box 5015, 2600 GA Delft, NL.

Abstract

In our modern network world, ICT acts as a connecting and integrating mechanism. Information (data, knowledge) has become a core constellation in an open economy. The avalanche of information supply however, has not kept pace with the use of information by decision-making bodies. Especially in the public domain we observe often an insurmountable gap. The actual use of opportunities offered by the ICT sector to the public domain is disappointingly low. The paper sets out to explain the existence of impediments in information acceptance and use in urban policy making. Particular attention will be given to the perception of the information potential by planners, experts and decision-makers. In this respect various constraints exist in terms of lack of awareness of ICT policies, and lack of consensus about goals and means of ICT policies. The analysis will be illustrated by reference to a Dutch study on the role of the advanced information sector in modern urban planning and administration.

Key words : ICT policies, local authorities, decision-makers, perceptions

1. Towards a New Urban Scene

In her book “The Home of Man” (1976), author Barbara Ward makes a convincing and passionate plea for a reorientation of our views on the city: the city is the cradle of civilisation which must be protected, supported and recognised as the major carrier of socio-economic and cultural progress. The majority of the world population nowadays is living in urban areas, and this share is still increasing. And for the time being, there are no signs of change in the pattern of worldwide urbanisation. Modern cities however, are severely burdened by environmental costs (e.g. Los Angeles, Rome Athens), and it is precisely these factors, which will be decisive for the course a city will take in the future (see also Bertuglia et al., 1998; Verhoef and Nijkamp, 2001). The question is of course, whether in our ICT-age, cities will assume a different development trajectory.

Cities have always attracted urban “in-migrants”, in both the developed and the under-developed world. This has caused an increased stress both on the urban labour market and housing market and on the urban environment. However, the stress on the urban territory as a whole has simultaneously caused urban sprawl. Land prices and environmental factors in central areas of the cities have become impediments for new household and company locations, so that a massive outward shift has taken place. Essentially this shift only meant an expansion of the functional urban territory. Thus, a decline in urban environmental quality tends to create geographical relocation with a wider spatial coverage (the ‘ecological footprint’ of the city: see Rees and Wackernagel, 1994; Nijkamp and Fino, 2001). Altogether, modern cities tend to reveal drastic evolutionary changes, in which the human resource potential, composed of creativity, competence and communication, exerts a dominant influence. In this framework, technological innovation and new technology policies (in particular, ICT policies) are increasingly advocated as effective tools in urban and regional strategies for a balanced and sustainable development (see also Cohen et al., 2001).

A first condition for a general balanced and sustainable development in the urban economic system is the presence of seedbed conditions for technological innovation, the so-called incubator potential. There appear to be strong tendencies towards

agglomeration and geographical concentration of R&D centres based on ICT features. There are sound reasons for this agglomeration trend. The information-intensive nature of technological activities and the resulting need for face-to-face communication, favour places that offer (1) a high level of competence, (2) many fields of academic and cultural activity, (3) excellent possibilities for internal/external communications, (4) a widely shared perception among interest groups of particular, underused opportunities, and (5) a general business environment with many challenges facilitating a synergistic development (e.g., van Geenhuizen and Nijkamp, 1998). A second condition for promising urban opportunities is urban quality of life, not only in terms of pollution but also in terms of preservation of cultural heritage. In general, an attractive urban climate is a *sine que non* for a sound urban development, and in this respect the ICT sector is often believed to play a critical role.

2. The City in the ICT age

Cities are by their very nature focal points of economic activity. Although information may be ubiquitously available and routine types of information processing farmed out to non-urban locations, the point is that the collecting and processing of information is an urban function par excellence. In a fascinating article on 'Are Cities Dying?' Glaeser (1998) concludes that - despite negative externalities - there is no reason to worry about the future of cities. Cities have been, and always will be, powerful vehicles for agglomeration benefits that far exceed the opportunities of any other geographic constellation.

In the context of debates on the future of the cities in the electronic age, three different scenarios may be distinguished. In the first one (see Cairncross, 1997) the footloose character of economic activities comes to the fore, resulting in electronic cottages and wired societies. In contrast to this view, the emergence of global meta-cities - called command centres - may be envisaged (see Graham and Marvin, 1996). Here the role of multinationals becomes dominant, controlling the world economy due to the pervasive role of ICT. And finally, a hybrid global development based on

interplay between global firms and urban centres may be considered. Here a blend of physical and virtual space offers the best platform for successful development strategies (see van Geenhuizen and Nijkamp, 2001; Mitchell, 1999).

In recent years we have witnessed the emergence of the E-city (electronic city) concept, an urban area governed and driven by the ICT sector. Such a city is a typical network city in which virtual communication and electronic connection form the guiding architecture, next to physical and face-to-face interactions. At the same time however, an important dilemma is coming to the fore: E-illiteracy among the population segments that have no ICT skills and are excluded from the benefits of the e-city. They have no access to tele-activities and do not enjoy the advantages of the club environment inherent in the e-city. Thus, the ICT age leads to a serious equity problem. This can only be dealt with by paying more attention to the adoption and organisation of ICT knowledge, through education and training. This is an important task for the public administration. In addition, we may identify some other important roles of ICT in the public sector. ICT may enhance the efficiency in the urban administration by combining economies of scale and of scope, but it may also contribute to the external profile of the city. Nowadays we are confronted by many buzzwords, such as the ICT city, the electronic city, the associative city, the information city etc., which offer an appealing image to the city concerned. However, if that image is not supported by dedicated efforts on the part of the city administration to reinforce such a profile, all urban policies will be in vain. It is therefore important to know to what extent urban ICT profiles are supported by the city administration.

3. Local ICT Policy-making: General Impressions

Policy-making in our western world is the comprehensive process of searching for and deciding on solutions for particular policy problems. It includes problem definition, identification of alternative solutions, and selecting between them; the implementation of solutions and monitoring of the outcomes and autonomous changes in the problem areas concerned (e.g. Patton and Sawicki, 1993). Usually, there is a strategic vision based on more general policy goals and development paths that

provide the frame for problem definitions and the selection of solutions (plans and projects). Policy problems do not exist by themselves, but are normally systematically forwarded and put on the policy agenda of authorities by so-called “problem owners”, i.e. private actors or public bodies who suffer from a particular problem or conversely, perceive opportunities to be exploited. Policy-making is often relatively complex, due to the involvement of different actors, with different attitudes and interests, and therefore, diverse perceptions of the policy problem. By different actors we mean different organisations and, within organisations, different departments.

Increasingly, ICT is becoming a part of the local policies. Yet for ICT, policy-making seems to be in an *early development* stage. There are fast-changing interests among companies and public bodies; there is a shortage of knowledge among them about opportunities and threats of the technologies in practice, and there is a shortage of coordination between initiatives and between initiatives and long-term strategic visions. This situation leads to a number of (related) constraints in policy-making, as pointed out in a large-scale survey in the United Kingdom and various case studies (van Geenhuizen, 2001; Gibbs and Tanner, 1996). These constraints include:

- A lack of attention of local governments for ICT as a relevant area in itself; ICT-policy is often seen as a derived (or secondary) area, not pushed by a “problem-owner”.
- A fragmentation of efforts and knowledge concerning ICT within the local government; ICT-initiatives are taken at different points within the organisation without clear coordination.
- An absence or weak development of strategic goals to be achieved through ICT, such as regional development goals; and related to that, a lack of priorities.
- Insufficient support for visions and priorities - if they do exist - among citizens, businesses and local authorities.
- Constraints of local governments in translating visions into concrete actions or plans, and in coordinating implementation.
- A lack of proactive behaviour of local governments, e.g. initiating, starting and steering of demonstration projects towards citizens and businesses.
- Insufficient ICT education in the business world, among citizens and policy-makers.

The above situation may lead to what might be called “ad-hoc policy making”. Accordingly, strategies may develop in a piecemeal fashion with initiatives as stand-alone events, sometimes without a clear notion about the goals that are supposed to be achieved (Gibbs and Tanner, 1996). The above constraints will serve as a framework for understanding the situation at the local level in The Netherlands, particularly the perceptions of policy-makers and the facts related to policy-making.

The wide range of possible interventions tends to lead to different ICT policies for cities. There are two types of public ICT policies. On the one hand, dedicated infrastructure development of a generic type (supply side) is necessary to enable ICT use. On the other hand, there are policies that induce the use and adoption of ICT both in households, companies and in the public sector itself (demand side). For instance, government adoption and the use of different types of ICT are important ways of supporting the development of information and telecommunication infrastructure, to stimulate demand and to provide incentives for additional investments in the ICT sector. Other strategies for adoption may be found in education and training programmes.

Along with *direct* ICT policies, in which the final policy goal relates to ICT such as expanding ICT infrastructure, regulating it or supplying services through it, we should also bear in mind other kinds of public activities that affect the actual public ICT policies: *indirect policies*. Indirect policies are defined as policies that are intended to achieve non-ICT goals *with* the use of ICT. Examples of this type of policy are the ways ICT is used to disseminate information to the public via the Internet and usage of ICT in the planning process. In this case, ICT is an instrument (in many cases, one of several) intended to accomplish pre-defined goals, in an indirect manner.

There are a few alternative factors or theories that may explain the differentiation in urban policies concerning ICT:

- Path dependency: previous policies determine subsequent policies, with minor alternations. Future policies are captured in the path that was directed by prior policies. Thus, to understand current policies, we have to explore previous ones.

- Constraints and exogenous forces: an alternative way to understand a policy is to examine what kind of constraints decision-makers are facing (e.g. budget, national policies, political commitments).
- Perceptions and attitudes of individual decision-makers: it is necessary to explore the way public decision-makers perceive the opportunities and challenges of their city as an explanation for their attitudes, behaviour and policies.

In this paper, we have chosen to focus on the third factor, namely the exploration of the way urban decision-makers perceive their city and its problems, and how ICT may affect their cities. Figure 1 presents a conceptual model of the process of ICT policy-making. It highlights the importance of the personal evaluation of ‘facts’ and ‘data’ (the decision-maker’s perception box). Perception forms “the portal between reality and knowledge” (Kellman and Arterberry, 1998). Schiffman (1996) defines perception as a result of psychological processes in which meaning, relationships, context, judgements, past experience and memory play a role. In other words, perception is the result of organisation and integration of sensations into awareness of object and environmental events. This can be translated into Vickers’ models of decision-making (1965). The Vickers model stresses the importance of understanding the way in which a decision-maker constructs *reality* (e.g. what is out there? What is the problem?). This model also emphasises the *values* (what values /norms are set? What ought to be?). The process of reality judgement and value judgement leads to action judgement or, in other words, to the idea about the policies that should or could be taken (Vickers 1965; Parsons 1995). Thus, assessment of policy alternatives (judgement) is based on the way decision-makers perceive both problems and opportunities (reality and values). Although Figure 1 describes a process, which ends with policy, we will focus in this paper just on the upper part of the model. Namely, the way decision-makers perceive the problems and opportunities of their cities, how ICT may affect these cities in the future and what kind of ICT policies seems to be relevant. Furthermore, information about the background of decision-makers themselves will be presented.

The Netherlands has developed an active ICT policy for quite some years. The question is of course whether this is also reflected in urban ICT policies. And is the

development of such policies generated by facts, dedicated decisions or by eclectic actions and policies based on beliefs and views on the potential of ICT?

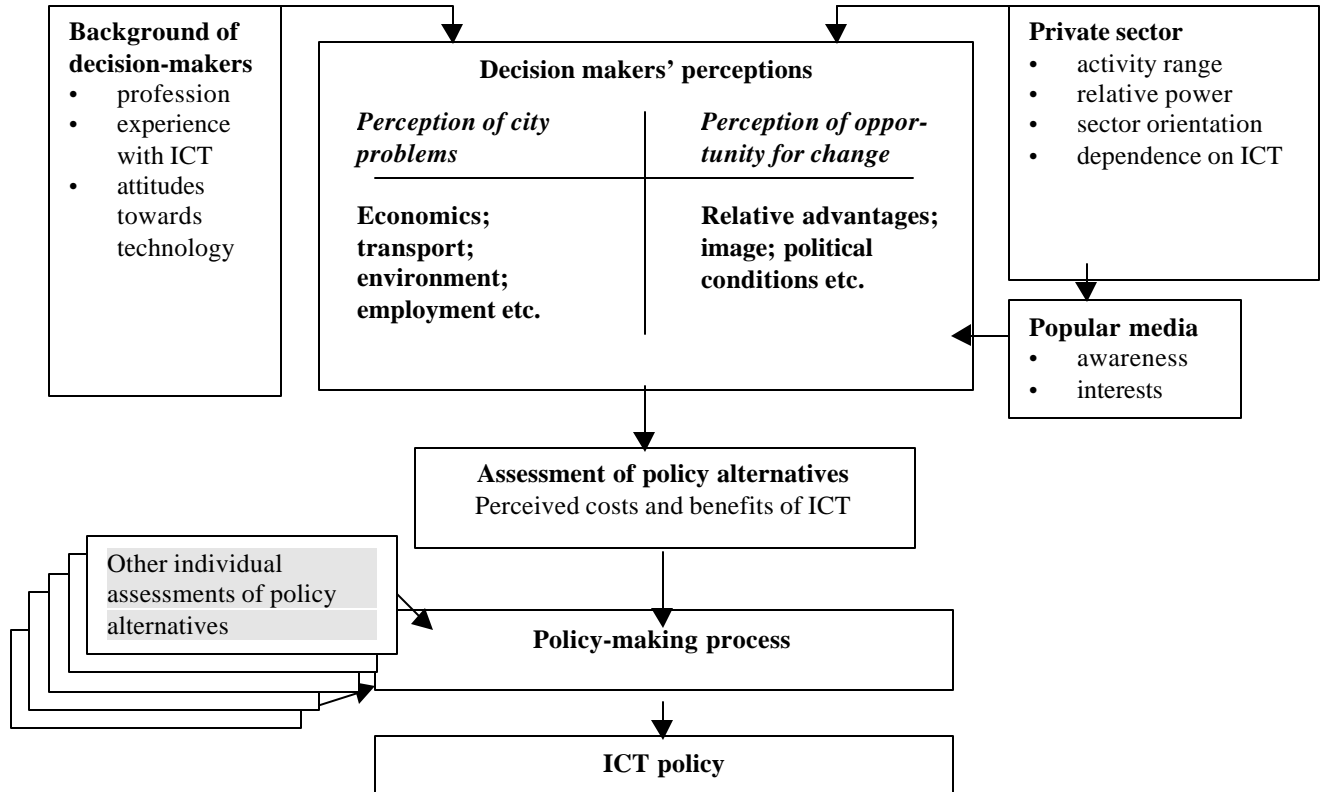


Figure 1. Factors and actors that affect the public decision-makers' ICT policy

Source: Cohen and Nijkamp, 2001

4. Urban Decision-making: Perceptions and Views

4.1. Methodological Aspects

In a survey, data were drawn from 27 Dutch cities, including all cities with more than 100,000 inhabitants (except Enschede) and also from two cities with less than 100,000 inhabitants. The four major cities in The Netherlands (Amsterdam, Rotterdam, Den Haag and Utrecht) are all located in the Randstad. The next six cities, in terms of size in national rank-order, are located outside the Randstad. Apart from Groningen and Nijmegen, each city had at least three respondents, which is the minimum agreed number of respondents required to analyse the answers at the city level. The survey aimed to include varied departments within the municipality. The variation is

important to explore the perceptions, knowledge and attitudes towards ICT from many actors in the urban government. Thus, we included not only respondents from ICT departments but also from planning and urban development, and from economic development. Elected officials were also included. All in all there were 130 respondents.

In the survey we used a written questionnaire including questions with pre-coded (closed) answers. In questions concerning perceptions and views a four-point scale was used, plus the option of “not known”. With such a scale, there is no middle option; thus it forces the respondent to take a clear choice, or to choose “I don’t know” when she or he can not take a clear statement.

4.2. Perceptions of the Role of ICT for the City

A central hypothesis in this research is that the decision-maker’s perception of the role of ICT may affect her or his awareness of ICT opportunities and the willingness to support or promote ICT policies and activities. In order to explore these perceptions, specific statements were included in the questionnaire, dealing with various aspects of ICT, the society and the city, and the respondents were asked to mark the level of agreement with these statements (Table 1).

With regard to the influence of ICT on the city administration, there is wide agreement among the respondents that indeed ICT will change the policy-making process. However, there is less consensus about the directions of those changes and the way in which they should take place. Although most of the respondents agree or strongly agree that the political decision-making will be more efficient thanks to ICT (45% and 16%, respectively), a substantial sector of the respondents does not agree with this statement (32%). Implementation of policies seems to be affected slightly more than decision-making itself. Further, ICT is likely to improve communications within the city administration and is even more likely to improve the administration’s ability to serve citizens and improve citizens’ access to useful information. Nevertheless, with regard to public participation in policies, there is less agreement about the contribution of ICT. 36% disagree or strongly disagree with the statement that ICT will lead administration to take greater account of public opinion in forming

policy. Almost 30% disagree or strongly disagree with the statement that ICT will increase citizen participation in policy processes. Further, most of the respondents do not think that ICT will improve equity. 67% of the respondents disagree (or strongly disagree) with the statement that ICT provides all population segments with equal access to education, employment and social services. Moreover, 46% agree (or strongly agree) that ICT will further increase the gaps between poor and rich. In that respect, it is obvious that most respondents do not believe that ICT is the answer to social segregation and inequity.

Table 1: Perceptions of ICT

Statement	Strongly agree	Agree	Disagree	Strongly disagree	I don't know
ICT will change the policy-making process in our municipality.	39.1%	50.8%	7.0%	-	3.1%
ICT will make political decision-making processes more efficient.	15.6%	45.3%	32.0%	1.6%	5.5%
The implementation of policies is more efficient with ICT.	12.5%	59.4%	18.0%	3.1%	7.0%
ICT improves communication within our city administration.	25.0%	56.3%	14.1%	-	4.7%
ICT improves the ability of our city administration to serve the citizens.	46.9%	49.2%	2.3%	0.8%	0.8%
ICT improves citizens' access to <i>useful</i> information.	58.6%	39.8%	0.8%	-	0.8%
ICT gives the administration better access to public opinion.	20.3%	60.9%	13.3%	2.3%	3.1%
ICT will lead the administration to take greater account of public opinion in forming policies.	6.3%	43.8%	33.6%	2.3%	14.1%
ICT will increase citizen participation in the policy process.	6.3%	53.9%	28.1%	1.6%	10.2%
ICT provides all segments of the population with equal access to education, employment and social services.	3.1%	23.2%	53.1%	14.1%	5.5%
ICT increases the gaps between poor and rich.	9.4%	36.7%	38.3%	7.8%	7.8%
ICT enables people to have better access to professional services without living in a city.	18.8%	70.3%	5.5%	3.1%	2.4%
ICT enables people to have better access to urban cultural life without living in a city.	10.9%	69.5%	14.1%	1.6%	3.9%
ICT will reduce the need for people to travel.	3.1%	11.7%	51.6%	29.7%	3.9%
ICT improves the quality of social relationships.	-	13.3%	59.4%	14.8%	12.5%
ICT will increase working at home in our city.	14.1%	69.5%	8.6%	0.8%	7.0%

With regard to specific urban services and culture, a vast majority of the respondents (more than 80%) believes that ICT enables people to get a better access to them without living in the city. Thus, they acknowledge the potential benefits from ICT for people who live in remote or non-urban areas. Regarding the substitution effect between ICT and travel, most of the respondents (more than 80%) do not believe in such substitution. On the other hand, most of the respondents suppose that ICT will increase teleworking (working at home). Apparently, teleworking will not reduce substantially the need to travel. As concerns the quality of social relations, most of the respondents do not think that ICT will have a positive influence. ICT appears to be seen more as a distancing factor between people than a connecting factor.

4.3. Perceived Problems and Future Trends of the City

As mentioned earlier, it is important to understand what kind of challenges and problems decision-makers perceive as relevant for their cities. Lack of land is a problem that 44% of the respondents perceive as serious (Table 2). Traffic congestion is the second problem considered as serious (38%). Traffic congestion and lack of land are perceived to be “very much” of a problem or “to some extent” a problem by approximately 80% of the respondents, and this is followed by housing shortage (73%). All reflect the typical situation of a densely populated area.

Another important factor that is expected to affect policies is the way the decision-maker perceives the future. To examine expectations for future developments, a list of different developments was offered and the respondents were asked whether there will be an increase or decrease in those trends.

Table 2 Perceived problems of the city

	Very much	To some extent	A little	Not at all	I don't know + no answer
Traffic congestion	37.5%	44.5%	17.2%	0.8%	
Housing shortage	24.2%	49.2%	22.7%	3.1%	0.8%
Lack of land reserve	43.8%	32.0%	12.5%	10.9%	0.8%
Unemployment	21.1%	25.8%	48.4%	3.9%	0.8%
Decline in the industrial sector	12.5%	33.6%	23.4%	21.9%	8.6%
Ageing population	21.9%	39.8%	30.5%	7.0%	0.8%
Sub-urbanisation/ urban sprawl	13.3%	32.8%	28.1%	19.5%	6.2%
Decline of the city centre	3.1%	25.0%	25.8%	43.8%	2.4%
Socio-spatial segregation	19.5%	41.4%	36.7%	2.3%	-
Problematic real estate market	15.6%	41.4%	30.5%	8.6%	3.9%
Lack of open (green) space	14.8%	23.4%	34.4%	25.8%	1.6%
Negative image of the city	10.2%	26.6%	35.2%	26.6%	1.8%
Pollution	2.3%	23.4%	57.0%	14.1%	3.1%
Budget deficit	7.8%	21.1%	32.8%	35.2%	3.1%
Problems in the education system	3.1%	32.0%	30.5%	24.2%	10.2%

The respondents do not expect many drastic changes, since in most of the cases they evaluated modest increase or no changes in the current situation (Table 3). However, in few cases the reader can identify anticipation for more dramatic changes. 30% of the respondents think that traffic flows will increase considerably (along with 24% concerning mobility of people in particular). Further, 24% anticipate a considerable increase in the importance of their city (along with 18% concerning large cities in particular). It is hard to judge whether these expectations are wishful thinking, a result of educated forecasts or perhaps an extrapolation of current trends. However, only 3% of the respondents suggested a decrease in the importance of their city. In this context, a very strong statement can be made about the future of the city, as perceived by the respondents: in contrary to some suggestions in the scientific literature (quoted in Glaeser, 1998), the city is NOT dying. Moreover, expectations are that the importance of the CBD (central business district) will increase (23% think it will increase considerably, 58% think that it will increase to some extent).

Table 3 Expectations on urban development in 10 years from now

	Increase considerably	Increase to some extent	Not change	Decrease	I don't know + no answer
The importance of our city will	24.2%	64.1%	8.6%	3.1%	-
In general, the importance of small cities will	2.3%	37.5%	29.7%	21.1%	9.3%
In general, the importance of large cities will	18.0%	59.4%	16.4%	3.1%	3.1%
Competition between our and other cities will	10.2%	58.6%	21.1%	6.3%	3.9%
Co-operation between our and other cities will	16.4%	67.2%	14.1%	1.6%	0.8%
The potential of our city to attract service companies will	19.5%	61.7%	11.7%	3.9%	3.1%
The potential of our city to attract industrial enterprises will	3.9%	19.5%	42.2%	31.3%	3.1%
The potential of our city to attract new residents will	13.3%	49.2%	25.0%	8.6%	3.9%
In general, the importance of the CBD in our city will	22.7%	57.8%	13.3%	2.3%	3.9%
Suburbanisation will	1.6%	32.8%	49.2%	7.0%	9.4%
Socio-spatial segregation in our city will	3.9%	34.4%	39.1%	21.1%	1.6%
Traffic in our city will	29.7%	60.9%	6.3%	3.1%	-
The flow of goods will	11.7%	73.4%	10.9%	1.6%	2.4%
The flow of people (mobility) will	24.2%	60.2%	7.8%	6.3%	1.6%
The effectiveness of environmental protection in our city will	2.3%	46.9%	35.2%	7.0%	8.6%

The respondents assessed that both competition and co-operation between cities will increase to some extent (59% and 67% respectively). This seems contradictory, but different areas may be concerned. As the Dutch planning system is decentralising, it may require more co-operation among neighbouring cities. On the other hand, the efforts to attract business may increase competition.

A vast majority of the respondents believe that the potential of their city to attract service companies will increase considerably or to some extent (20% and 62% respectively). A possible reason for the importance of ICT could either be that firms can afford relocation due to ICT substitution, or that ICT initiatives could attract firms to the city. The situation is different with respect to the attraction of industrial enterprises. Here, the most frequent answer was that the potential to attract industry would not change (42%). Almost one third of the respondents even think that it will

decrease. With regard to attracting new residents, most of the respondents expect an increase to some extent or no change (49% and 25% respectively). In addition, almost half of the respondents believe that suburbanisation processes will not change.

The respondents are not very optimistic about the social segregation process. 21% believe that segregation processes will decrease, whereas 34% think of an increase to some extent. However, they are optimistic about the effectiveness of environmental protection policies. 47% believe that it will increase to some extent.

4.4. Decision-maker's Background: Usage and Attitude towards ICT

One factor that affects the decision-maker's perceptions is the personal background in general, and her or his attitude to and familiarity with ICT applications specifically (Figure 1). It is reasonable to assume that usage and familiarity with ICT applications influences the perceived benefits of ICT and the relevance of ICT tools for the city.

Computer availability within the administration seems very high. More than 60% of the respondents estimated that 100% of the employees have a computer. Moreover, 91% of the respondents use a computer at work every day. The most frequent applications used by them at work are e-mail and word processing. ICT applications are generally perceived as helpful or very helpful (Table 4). In all cases the applications are more useful at work than at home, but even in daily life there is a high appreciation. However, among all applications, the positive reception to cellular phones is lowest, and most people do not use them either at work or for daily use.

Table 4 Support from ICT applications

Application	Very helpful	Helpful	Not helpful	Nuisance	I don't use it	No answer
Office package – work	68.0%	15.6%	0.8%	3.1%	9.4%	3.1%
Office package – daily life	42.2%	33.6%	5.5%	3.9%	8.6%	6.3%
Email- work	83.6%	12.5%	-	-	2.3%	1.6%
Email – daily life	59.4%	31.3%	2.3%	0.8%	3.9%	2.3%
Internet – work	57.8%	32.0%	3.9%	0.8%	3.9%	1.6%
Internet – daily life	50.0%	39.8%	1.6%	0.8%	4.7%	3.1%
Cellular phone – work	45.3%	22.7%	9.4%	0.8%	21.1%	0.8%
Cellular phone – daily life	40.6%	29.7%	9.4%	2.3%	16.4%	1.6%

5. Perceived Urban ICT Policies

5.1. Goals of ICT Policies

No wide agreement was reached about the goals of ICT policies, or about the tools for implementing such policies. Table 5 presents the perceived goals of ICT policies (previously indicated as indirect policies). Table 6 presents the relevant policy tools (goals more related directly to ICT). As Table 5 illustrates, most of the respondents attached importance to all of the goals that were offered in the questionnaire. However, the level of agreement differs from goal to goal. While many respondents strongly agreed with economic development (33%), transparency of the political/administrative process gained less agreement (29% disagreed). It seems that although ICT policies aim at economic development, not all respondents agreed that attracting new enterprises to the city would help achieve this (22% disagreed).

Table 5 Goals of ICT policies

	Strongly agree	agree	disagree	Strongly disagree	Don't know + No answer
Economic development is a very important area for the deployment of ICT.	32.8%	60.9%	3.1%	1.6%	1.6%
Attracting new enterprises is a very important area for the deployment of ICT	21.1%	53.1%	21.1%	0.8%	3.9%
The application of ICT is intended to render the political/administrative process more transparent for citizens.	12.5%	48.4%	28.9%	3.1%	7.0%
ICT can make our municipality more competitive vis-à-vis other cities.	18.0%	50.0%	20.3%	2.3%	9.4%
Improving citizen-municipality relations is a very important rationale for the municipality's deployment of ICT.	16.4%	60.9%	18.0%	3.9%	0.8%
ICT is deployed in urban planning to improve planner-citizen communications.	6.3%	66.4%	20.3%	3.9%	3.1%
ICT enables better networking with other cities.	17.2%	75.0%	4.7%	0.8%	2.3%

The general goals that are suggested in Table 5 can be divided roughly into two groups, i.e. those aimed at developing the city and its opportunities, and more internal goals aimed at relationships between the urban administration and its citizens. In

general, we can see that the first group was given more importance. Thus, although most of the goals that were mentioned seem relevant, more weight is attached to development goals than to city/citizen related goals.

Table 6 Direct goals of ICT policies

	Very much	To some extent	A little	Not at all	Don't know +NA
1. Improving telecommunication infrastructure	35.9%	40.6%	11.7%	4.7%	7.0%
2. Promoting or supporting computer availability in public places	21.1%	41.4%	25.0%	3.9%	8.6%
3. Promoting research about ICT .	10.9%	21.1%	24.2%	18.8	22.7%
4. Promoting or supporting ICT training	13.3%	40.6%	0.8%	7.0%	15.0%
5. Supplying municipality information via telecommunications	48.4%	39.8%	9.4%	1.6%	0.8%
6. Promoting municipality services via telecommunication	32.8%	48.4%	14.1%	3.1%	1.6%
7. Promoting ICT use in the planning process	30.5%	43.0%	13.3%	2.3%	11.0%
8. Using ICT in transport planning	16.5%	38.6%	23.6%	5.5%	15.8%
9. Promoting or supporting teleworking programs	6.3%	26.6%	38.3%	22.7 %	6.3%
10. Promoting or supporting tele-medicine	1.6%	10.9%	24.2%	28.9 %	34.2%
11. Promoting or supporting tele-education	5.5%	17.2%	25.0%	31.3 %	21.1%

The most relevant direct goal in Dutch cities is supplying municipality information via telecommunications networks (Internet, teletext, telephone and others) (90% of the respondents) (Table 6). Providing services is also very relevant, although to a less degree. Improvement of telecommunications infrastructure is a relevant goal, as well as promoting the use of ICT in the planning process. A less relevant goal is the promotion of computers in public places (schools, community centres, etc.). Some direct goals are hardly relevant: promotion of teleworking, tele-medicine or tele-education programs. Here too, one can identify distinct groups of goals (Table 6). The first group aims at ICT infrastructure: network, PC availability and human capital (goals number 1 to 4). The second group is aimed at promoting services and usage of

ICT within the administration (goals number 5 to 8) and the third group encourages different tele-activities (9 to 11).

Clearly, according to the Dutch respondents, the first two groups seem to be more relevant than the third one. Apparently, most of the respondents evaluate the promotion of services as the most relevant goals because urban administration has more influence on these kinds of activities. Since most of the cities already have websites (mostly with information only, since services via the net are still less frequent) and ICT usage in the administration is high, continuing to develop these trends may appear plausible and suitable for urban policies.

5.2. Evaluation of Actual ICT Policy in the City

The respondents were asked about policies, strategies and activities that are related to ICT. The majority of respondents either do not know about ICT strategies or declare that there are no such plans for the city (Table 7). The relatively high percentage of “don’t know” answers to both questions reflects the ambiguity of ICT policy status for many urban decision-makers¹. Moreover, there were many cities where contradicting answers to both questions were evident, thus it was difficult to determine whether a city has or does not have ICT strategic plans. The vagueness of the conclusions, built upon the questionnaires, is the result of using “closed” questions without allowing the respondents to answer in their own words. Clearly, to get more insight about ICT activities within the municipality a more in-depth investigation is required. We can also conclude that the awareness among city administration and politicians to any ICT plan is fairly low. It may be due to relatively new activities (that the respondents are still not familiar with), or a relatively low profile of orchestrated ICT activities.

Table 7 ICT strategy in the city

	Yes	no	Don't know + no answer
Is there a formal strategy plan/program on ICT	39.8%	39.8%	20.3%

¹ A possible explanation for such contradicting evidences is likely a different interpretation of the concept of ‘strategic plan’.

on your city?

Are ICT issues are integrated in any way onto the urban master/development plan?	34.4%	39.8%	25.8%
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We devoted a few questions to explore ICT projects in the city. In contrast to strategic plans or ICT measures that are incorporated in the master plan, projects are more specific initiatives. Usually, such projects are focused in more operative goals, and tend to be less general than strategic plans or master plans.

Most of the respondents indicated that there is, was, or would be a project (or more) that is related to ICT (Table 8). However, a significant share of the respondents stated they did not know about such projects (34%). This is again, another indicator for the relatively low profile of ICT activities in the city and low awareness to such activities.

Table 8 ICT projects

Any project on ICT?	
Yes	44.5%
No, but we had projects in the past	6.3%
No, but there are plans for the future	7.8%
No, never	7.8%
I don't know + no answer	33.6%

Further, the respondents were asked to evaluate the importance of influence of different actors with regard to application of ICT in their city. Obviously, the most important actor is the private ICT sector (71% of the respondents). Less influence is attached to the municipality (42%). The latter observation is somewhat contradictory with the identification of many important impacts of ICT in urban policy-making and administration (particularly information supply), and access to urban services.

The contradicting and vague conclusions that can be drawn about ICT policies and activities in the city point out a general problem with regard to ICT policies. There is no clear address in the municipality for such information. In some cities, where a strategic plan does exist, we may find a person or department which accumulates knowledge about ICT-related information. In other cities the knowledge is spread and thus it is difficult to form a complete or transparent picture. Unlike the case of transport or education policies, where there is a clear address to explore the city activities in those fields, ICT activities are not yet exclusively related to one specific department or field or to a specific plan or strategy. The relatively low awareness to

ICT activities and plans may reflect the fragmented knowledge as well as the low importance of such activities in the city.

6. Discussion

We can summarise the results of the survey as follows. Decision-makers in The Netherlands perceived an important role for ICT in changing urban policy-making, but there was less agreement on the directions of change. Agreement existed on improved services to citizens, internal and external communication of the administration, and a better access of urban life to non-urban areas. Disagreement could be observed concerning an improved efficiency in policy-making, a stronger influence of citizens in policy-making, decreasing social inequality, improved social relations, and reducing traffic of persons. The latter despite the fact that traffic congestion is seen as a serious urban problem. It can be concluded that the role of ICT in improving communication and electronic access is widely accepted but that no further role of ICT is perceived in improving structural problems.

The results of the survey indicated a rather complicated picture. Decision-makers assign different importance to the role of ICT in different aspects of urban life and activities. But, anticipating future changes does not necessarily mean a belief that the municipality should intervene in the process by initiating ICT policies. Even when a decision-maker believes that ICT will have overwhelming effects on the city and its society, it is not clear whether this belief is accompanied by a clear view about suitable ICT policies. Thus, the question as to whether urban decision-makers attach importance to ICT is divorced from the question whether these decision-makers believe there is a need for municipal ICT policies.

The results also showed a low awareness on ICT strategies and projects. Low awareness could reflect a relative unimportance of ICT policies and initiatives when compared to other policy fields. Naturally, activities and issues that are considered as important are better known and get more attention than other issues. In that case, although positive attitudes towards ICT and anticipation for positive effects of ICT

developments are evident, it is not fully reflected in policies and the interests of the respondents in such policies.

Further, little correlation could be observed between city problems and ICT policies and measures. An exception seemed the agreement about economic development as an ICT-policy goal, which conformed with the generally accepted view of an increased importance of the city in question. But most of the respondents, who had information about ICT strategic plans, or the incorporation of ICT measures in other plans, could hardly relate them to the specific problems of the city. One explanation could be the lack of information about the plans and activities, which made it impossible for the respondents to supply us with detailed information. An alternative explanation is related to an interesting feature of ICT policies. It seems that at least part of these policies are taken without the aim to solve a specific problem, but are based on the general uncritical assumption that such a policy is beneficial. In other words, the reason for the existence or implementation of ICT policies is (in many cases) not to be a latecomer. Thus, it is not surprising to find that ICT plans are not always related to a specific problem or to a specific desired goal. Indeed, our results illustrate that urban ICT policy-making is in an early development stage.

This paper presented the first step toward modelling the process of ICT policy-making. It illustrates the way the city and its characteristics are observed differently by decision-makers, thus having different input to their policy-making process. Moreover, the relevance of various policies and tools seems to differ across the respondents, reflecting both different views of the city and different opinions and attitudes toward ICT. The next step is to measure and model the effects of these factors on the assessment of the relevance of ICT tools for the city.

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