

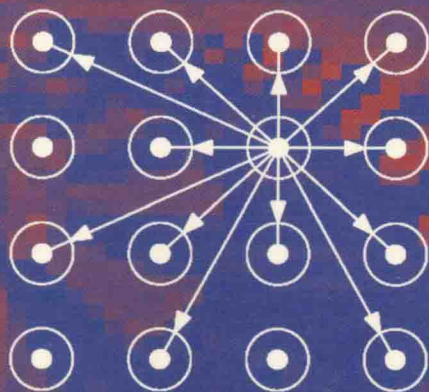
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Peter van den Besselaar
Satoshi Koizumi (Eds.)

Digital Cities III

Information Technologies for Social Capital:
Cross-cultural Perspectives



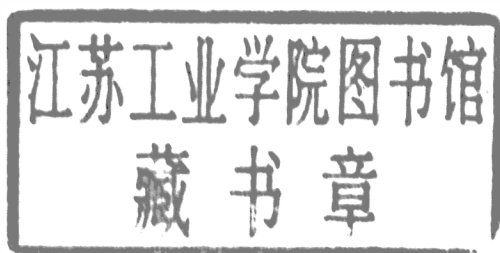
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Digital Cities III

Information Technologies for Social Capital:
Cross-cultural Perspectives

Third International Digital Cities Workshop
Amsterdam, The Netherlands, September 18-19, 2003
Revised Selected Papers



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Preface

Digital cities constitutes a multidisciplinary field of research and development, where researchers, designers and developers of communityware interact and collaborate with social scientists studying the use and effects of these kinds of infrastructures and systems in their local application context.

The field is rather young. After the diffusion of ICT in the world of organizations and companies, ICT entered everyday life. And this also influenced ICT research and development. The 1998 Workshop on Communityware and Social Interaction in Kyoto was an early meeting in which this emerging field was discussed. After that, two subsequent Digital Cities workshops were organized in Kyoto, and a third one in Amsterdam.

This book is the result of the 3rd Workshop on Digital Cities, which took place September 18–19, 2003 in Amsterdam, in conjunction with the 1st Communities and Technologies Conference. Most of the papers were presented at this workshop, and were revised thoroughly afterwards. Also the case studies of digital cities in Asia, the US, and Europe, included in Part I, were direct offsprings of the Digital Cities Workshops. Together the papers in this volume give an interesting state-of-the-art overview of the field.

In total 54 authors from the Americas, from Asia, and from Europe were contributed to this volume. The authors come from Brazil (two), the USA (eleven), China (three), Japan (fourteen), Finland (two), Germany (two), Italy (three), Portugal (two), the Netherlands (eight), and the UK (seven), indicating the international nature of the research field.

This volume is organized as follows: It starts with an introductory chapter which briefly describes the developments and challenges of digital cities research. The introduction also summarizes the papers included in this volume. The eight chapters in Part I present a series of in-depth case studies of digital cities and community networks, showing the commonalities and differences in experiments from all over the world. The last chapter in this part is an effort to compare the cases. Part II of the book consists of four chapters, each proposing a specific design of a platform for digital cities and virtual communities. Part III focuses on data and knowledge modeling approaches for community systems. In Part IV, issues of participation and design are discussed, as well as systems for monitoring the use of community systems. This part concludes with a chapter on the relations between real space and media space. Part V focuses on experiments with the use of information and communication technologies for improving local social capital in very different contexts. Four chapters discuss small and large experiments in different countries, urban as well as rural ones.

We are grateful to the members of the Program Committee, to the reviewers, and of course to the participants, who all contributed very much to the success of the workshop. Last but not least, we want to thank our sponsors who made the workshop possible, in particular the Social Sciences Department of NIWI, Royal Netherlands

Academy of Arts and Sciences, the Center of Excellence on the Knowledge Society at Kyoto University, and the Japan Science and Technology Corporation.

December 2004

Peter van den Besselaar
Satoshi Koizumi

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Local Information and Communication Infrastructures: An Introduction

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Abstract. The ICT revolution has had a considerable impact on the city: It has affected the urban economy, the global urban networks, various dimensions of urban life, and social divides within cities. In this introduction we discuss some of the effects of ICTs on the city, to put *Digital Cities* experiments into social context. Next, we describe the diversity of existing local ICT infrastructures, followed by a summary of this volume. The 26 chapters give a broad overview of some ten years of experimenting with and research on digital cities. We conclude with a few observations about the research field.

1 Information Technology and the City

The chapters in this book describe and analyze a large variety of digital city experiments that have been carried out during the last decade. This diversity reflects that technological systems are *socially shaped*: the technologies, methods and applications are all developed in local situations by specific actors with different aims [37]. In other words, local ICT infrastructures are socio-technical systems, and the development, use and effects are heavily influenced by *local* organizational and social factors [20, 21]. At the same time we are living in an increasingly *globalizing* world, and therefore share the same global environment. Before discussing the different perspectives on digital cities in the next section, we will first discuss some of these social developments, in order to put digital cities research and experiments into context.

Cities are depended on infrastructures: The larger the city, the stronger the dependence. Examples of this reliance include the water supply system, the sewer system, the electrical power system, and transport systems. The streetcar [42] and the automobile [32] have heavily influenced urban structures and processes. . Scholars have also recognized that information and communication are crucial in urban life, and some have conceptualized cities as information processing systems [9, 27]. Apart from transport, it is communication technologies that have enabled the growth of cities, and the differentiation of urban structure (the emergence of suburbs or functional zoning). More recently, the political and scholarly debates have extended from the quality and maintenance of existing urban infrastructures to the impacts of new ICTs on urban and regional change [11, 25, 47]. Five dimensions of the

relationship between ICTs and the city emerge from these debates: the geography of structural economic change; the changing meaning of distance; globalization and urban competition; the rise of local technology policies; and changes in social integration and inequality.

The geography of structural economic change. The economic crisis of the late 1970s and the early 1980s marked the transition of the industrial society to the information society. In terms of the neo-Schumpeterian *long waves theory* of economic development, the mature 'old' industries and technologies had lost much of their innovative capacity and therefore of their growth potential: e.g., car industry, chemical industry, electro-technical industry. New technologies, leading to new dynamic industries, were needed to get the economy in a new, extended 'upswing' [7]. The required structural changes in the economy did indeed occur around what was called in those days *micro-electronics* – a new set of technologies with pervasive effects throughout the economy and society. Since then, economic growth has been strongly related to the development of ICT. It has led to new economic activities, and at the same time it revolutionized existing industries. Companies producing or heavily using ICTs were indeed growing much faster than other companies [8]. Additionally, the geographical dimension of the changes in the economic structure were becoming an issue, as the new ICT producing industries were not always situated in the same region as the old ones [14].

The meaning of distance. An old theme in the discussion about the social effects of ICTs is the prediction of the end of geography. Modern telecommunication technologies with increasing bandwidth would enable us to work from any location, and at the same time would allow for other everyday activities such as e-shopping, e-learning, and e-healthcare. The role of proximity in physical space and face-to-face communication would decline and gradually be replaced by various forms of *telepresence* and *virtual organizations*. Dematerialization of production would reinforce this tendency. In the e-society, concentrations of resources and people in cities would lose its meaning, resulting in the dissolution of cities and the emergence of the global village. A further 'disurbanization' was expected to occur, deepening the already existing urban crisis.

This, however, did not happen. Around the mid 1980s, the negative spiral of the urban crisis reversed, and cities actually increased their roles as economic, cultural and knowledge centers. Since then, quite some observers have argued that face-to-face communication is indispensable for creativity and innovation, the main resources of the knowledge economy.

The geography of the Internet, and of telecommunication networks in general, point in the same direction. Network capacity is distributed very unequally on the global level, on the national level, and also on the level within cities [39, 47]. The new industries producing ICTs (for example, the content industry and the multimedia industry) are actually highly concentrated in specific metropolitan areas, and these areas have by far the highest density of advanced networks. The same holds for the heavy users of ICTs, such as the financial sector, and there is little indication that this trend is reversing in the network society [5]. Modern theory of network dynamics may explain why this concentration takes place [1, 3, 43]: Concentrations of companies, which heavily use network capacity, result in high investments in networks in

those areas, which in turn attracts even more companies that require this infrastructure.

Globalization and competition between cities. If concentration instead of dispersion is the dominant trend, advanced urban telecommunication infrastructure becomes of utmost importance. Through investing in a high-tech telecommunication infrastructure, municipalities had hoped to improve their position in the new economic landscape. The goal was to attract new and growing high-tech and creative industries, mainly in hardware and software, communication, media, business and financial services – all of which are highly depend on the new information technologies.

ICT did not result in the disappearance of geography, but it did contribute to the globalization of the economy. Modern ICTs are reshaping the global economy and its geographical dimension, resulting in a network society that functions as a space of flows [4, 5]. ICTs make companies more 'footloose', and enable them to move globally between cities and regions. The choice of settlement, while remaining dynamic, is based on differences between local conditions. Depending on the local opportunities for making profits, parts of the world are connected to or disconnected from this space of flows [4, 5, 11, 31]. The network society differs from the earlier industrial society, in that the centers of the international system are less fixed, but are flexibly determined from the perspective of the global system. However, as path dependency with its positive feedback mechanisms plays an important role [1], cities have to compete more than ever for their position in the global network.

Local technology policies. It is generally accepted that the availability of an advanced ICT infrastructure is a necessary condition for 'being connected'. In the early 1980s, cities and towns started to formulate their local technology policies, and concepts such as *teleport* and *telecity* became increasingly popular. A central metropolitan teleport was needed to connect the urban business districts, through a high capacity network and dish aerials, to satellite systems. Over the years, the idea of what counts as an appropriate communication network evolved from a centralized glass fiber telecommunication network between business districts via the introduction of the Internet, to an up-to-date glass fiber broadband network to every single office, house and apartment in the city. As return on investments in the existing networks is still below the initial expectations, private companies are not very eager to invest in an even newer generation of networks. Consequently, and despite the dominant market ideology, municipalities increasingly take a leading role in the development of the local broadband infrastructure.

However, it is not only the infrastructure itself that counts, but also the deployment of the network. Here the local e-government agenda becomes relevant, as this is considered a main instrument for integrating ICTs in urban life. By stimulating e-government, citizens (in their role as consumer) get used to electronic service delivery. This also reduces computer illiteracy, and contributes to the required critical mass for markets of e-services. E-government is also expected to improve service delivery to companies, citizens and tourists, enhancing the quality of the local environment. Finally, e-government is expected to contribute to new and more flexible forms of governance, and this makes government more responsive to the demands of modern volatile economy and society.

Of course, ICTs alone are not enough, as the knowledge economy also needs high level transport systems, first-rate institutions for research and education, the availability of a high skilled labor force, and a computer literate population. In addition, an excellent quality of living is needed to attract high skilled professionals for the advanced parts of the economy; ICTs, by the way, are increasingly applied to improve these urban qualities [46].

Social integration and urban inequality. Not only does global competition result into an increasing inequality between world cities and regions, it also influences inequality *within* cities and regions. Technological development and innovation result in more economic growth, but at the same time in less social equality. This tendency of increasing inequality is visible everywhere in the world, and manifests itself in old and new (digital) divides. For example, low-income groups in booming cities not only suffer from the increasing costs of living, but also from computer illiteracy [30].

A related issue is the decline of the traditional mechanisms of social integration. Changes in the urban economic and social structures have resulted in a lessening of community and of social integration at the neighborhood level, and have influenced the distribution of social capital [29]. Some argue that community and neighborhood structures are no longer the relevant framework as people nowadays are not members of a community, but of a multiplicity of social networks. Social interaction and social integration now have other forms, sometimes described as networked individualism [44]. The Internet seems to support the maintenance of these social networks [15, 16, 45]. Nevertheless, people do live in neighborhoods, with different social characteristics. Neighborhood oriented social experiments with ICTs have taken place in recent years; examples include networks and websites supporting local communities, privileged [15, 16] and underprivileged [33], and community computer literacy projects, helping people to acquire skills and social capital [26, 33]. However, as various chapters in this book will show, these experiments often are small scale and of short duration, and produce mixed results.

2 A Variety of Digital Cities

The term digital city was first conceived in 1993 when the *De Digitale Stad* (DDS)¹ was founded. Using a city metaphor, the DDS combined characteristics of a community network, a local WWW, and a platform for virtual communities [40, 41]. The combination of these models may have been the strength, but also the weakness of the system. Since then, the term Digital City is used for a much wider set of local information and communication *infrastructures, systems, and projects*, all related to the issues described in the previous section. We distinguish several types of digital cities: grassroots community and civic networks, municipal information and communication networks, city oriented commercial websites, virtual communities, and social ICT experiments in neighborhoods. In practice, digital cities may combine characteristics of the different types.

¹ Dutch for The Digital City

1. The oldest examples of local community networks or civic networks are the *community memory systems* and *freenets* that began in the mid-1970s in the USA and Canada, and spread over the world [35, 36, 6]. They aim at empowering the local community and generally offer free access, in order to enable community members to improve mutual communication, to access relevant local information and other resources, and to participate in local deliberation on important social, political and cultural issues (a virtual public sphere). Finally, they create an environment that facilitates learning how ICTs can be used for these aims, and increasingly are socio-technical test beds.

Community networks are grassroots initiatives. Generally, they are run by volunteers, and are dependent on subsidies to maintain their operations. University based researchers often play a crucial role in the sustainability of the systems, and sometimes linkages exist with public (libraries, municipality) and private (telecom operators, media, IT companies) organizations.

2. The second model shows the digital city as a municipal project [2]. Here a wide variety of initiatives can be discerned, ranging from a municipal website and local information systems, to urban programs for advanced networks, and e-government programs. An example is the EU *TeleCities* network, which consists of some 120 cities and towns in 20 countries, promoting the use of ICTs for improving the quality of local public services, and for economic and social development [10]. The focus is on the use of ICTs by the public sector itself (e-government). Although social inclusion is emphasized as a guiding principle, the TeleCities network mainly focuses on improving the efficiency of the administrative operations, improving the quality of services for citizens and companies through municipal information systems and through 'one-stop government', and promoting the city as an excellent location for economic activities. Citizens are perceived as *customers* and e-government seems mainly to consist of the application of e-commerce technologies within the public sector. In many cases, large-scale municipal digital cities experiments take the form of public-private collaborations.

3. The third use of the term digital city is for commercial websites with information about a city or town, such as the digital cities operated by America Online [18]. This type of system offers information about hotels, restaurants and retail stores, useful addresses, current weather, information about cinemas, theatres, concerts and other leisure activities. The intended audiences for these digital cities are local consumers and tourists.

4. The next type of digital city consists of virtual environments for virtual communities, often using a spatial metaphor in the design and the interface. These environments are used by geographically dispersed communities of interest, related to work, leisure, or other shared interests, such as specific diseases. In the network society, people take part in many social networks, which are to a large extent not local. In other words, virtual communities may have similar aims and effects as local community networks do, that is creating social capital, mutual support and empowerment. Incidentally, geographically dispersed communities of interest are not a very new phenomenon. For example, scientific communities ('invisible colleges' [28]) can be seen as virtual communities *avant la lettre*. Of course, the new media may affect the way they function [16a].

5. Since the 1980s, social experiments with ICTs have been carried out. Typical goals include improving social cohesion, learning computer skills, and increasing social capital of specific social groups, often in less privileged neighborhoods. Computer clubhouses, neighborhood email lists, and community memory systems for cultural minorities are examples. In some cases, these social experiments are part of governmental programs that support the social use of ICTs. More often these experiments are grassroots initiatives, and the work is generally done in collaboration with the researchers driving the project. Funding then comes from a research project or from other grants – and in both cases, this sets limits on the sustainability of the project.

3 Overview of This Volume

The 26 chapters in this volume are organized into five parts: case studies of digital cities and community networks, technical platforms for community networks and digital cities, information and knowledge modeling, participation and design, and social capital. Together, they provide an overview of the various dimensions of research and application in the field of local information and communication infrastructures. Most chapters are thoroughly revised versions of papers that were presented at the 3rd Digital Cities Workshop. We have also included a few in depth case studies, which examine several of the major experiments with digital cities in different continents.

3.1 Digital Cities Around the World: Case Studies

Without claiming that the first chapters provide a representative or even complete overview of digital cities, the selection does illustrate a variety of experiments from all over the world. They differ in terms of size and available resources, orientation (civic, governmental, or primary commercial experiments), focus (social experiments with ICTs versus high tech development projects), and age, but variation is also clear in terms of the types of participants and stakeholders, organizational forms, and social contexts. Two of the case studies are North American, three are European, and the other two are Asian digital cities.

Douglas Schuler describes and analyses Seattle Community Network (SCN). The project emerged from collaboration between computer professionals, local community groups and civic organizations. He discusses how SCN has functioned as a community resource, and how successful it has been in strengthening community relations. The main focus of the analysis is, however, the question of what actually counts as ‘success’. Success should not be understood mainly in terms of the (individual) use of the system. According to Schuler, a community network is successful if it provokes discussions about community development, and about social inequality and exclusion, and when it contributes to social movements addressing these issues (including the international community networks movement). Based on this view, issues such as sustainability of community networks are addressed, and

Schuler emphasizes the importance of relations with local actors, mainly universities and the public library.

Blacksburg Electronic Village (BEV) was founded by very different actors than were present with SCN: BEV consisted of the regional telecom operator, the city council, and the local university – all of which held different goals. Although BEV emphasized community aspects, in the beginning the technical and economic aspects were dominant. Only after the initial core actors left the project, the community became involved, and the model behind BEV changed considerably. The community network was no longer seen as a local Internet, but rather as collaboration between researchers and local community organizations in social ICT projects. A variety of projects were carried out, such as the local school project described in this chapter. The intimate relationship between a community network and university based researchers is one of mutual interests, as researchers often bring with them resources for the community network, whereas the latter creates research opportunities for the researchers. Carroll emphasizes that BEV has been a very successful research environment.

In early 1994, the Amsterdam Digital City (DDS) started as an experiment conducted by media activists and computer hackers to improve communication between citizens and politicians, but soon it also became a portal for local (and other) information, a place for experimentation with the Internet, and a platform for supporting a variety of communities. Peter van den Besselaar and Dennis Beckers studied the DDS from its launch in 1994 as a ‘local WorldWideWeb’, through the golden years as a not-for-profit platform for communities of interests, to its halt as a commercial Internet provider in 2001. At least two lessons can be learned from this case. Firstly, local information and communication infrastructures face an inevitable fragmentation – as did the WWW and the Internet at large. Second, the lack of local and civic ownership of the DDS seems to be the crucial factor behind its ultimate failure.

Digital Bristol was highly inspired by the Amsterdam DDS model, but at the same time, it developed within a completely different context. Alessandro Aurigi analyzes the history of Digital Bristol using a ‘science and technology studies’ perspective. This leads to interesting insights about the social shaping of local ICT infrastructures within an arena of various actors with diverging needs and interests. According to Aurigi, the resulting system reflected the lowest common denominator of the various stakeholders: a lean portal for local information. At the same time, any local social group felt ownership of the system, which explains the rather modest use of Digital Bristol.

A completely different example is Virtual Helsinki. It aimed at stimulating the adoption and use of broadband by the local community, and looked at aspects such as technological advancement (GIS, VR, integrating of real and virtual space), social relevance (participation and social cohesion), and profitability (the economic point of view). Risto Linturi and Timo Simula argue that these three interests are not contradictory, as the transition to the knowledge society in their view presupposes a good local infrastructure and social equality. At the same time, they do stress that one needs to convince potential customers that adopting the new technology is important for themselves, and for society in general. Therefore, the project tried to develop use models for local content provision. As the authors argue, Virtual Helsinki was a high profile effort to advance the *memetical* spreading of the idea of the Digital City.