From knowledge gathering to knowledge management

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1. Introduction

The so called communicative turn in urban planning emphasized citizen participation and the roles of expert knowledge and layman knowledge in the process. In fact, it has been alleged that the issue of the interrelationship between expert and experiential knowledge has become crucial in communicative planning (Khakee, Barbanente & Borri 2000). According to communicative planning theories, in an ideal planning process the planners, residents and other stakeholders try to find the best solutions together, communicating with each other. This process could be a continuing knowledge creation process where planners and local stakeholders build up common understanding aiming for mutual learning (Friedmann 1973, Staffans 2004). The exchange of knowledge and the development of ideas through communication during a planning process is seen vital for its good outcome (Van Herzele 2004). Hence, communicative planning emphasizes future seeking, not future defining like the preceding rational planning theories (Healey 1993; Taylor 1998). Possible solutions for the future are thus communicated and negotiated during a planning process. This, however, requires that all the basic information concerning the planning issues at stake is available. In addition, many kinds of knowledge should be utilized in the process.

Today, urban planning is a complex process where the planners often play a mediating role between experts, decision makers, developers, citizen associations and other non-governmental organizations (NGOs) (Coburn 2003; Lapintie 2002). Knowledge and information concerning planning issues and development projects are produced by all these stakeholders. Consequently, the problem is not lack of knowledge – on the contrary, there are too much data, information and knowledge to handle. A lot of this information and knowledge is formal, technical or processed (e.g. real estate data, statistics, census data, registers, cadastres). It is based on the expertise of the planners and other professionals, and it is usually gathered, standardized and analysed by using professional methods (Fischer 2000; Coburn 2003). Geographical information systems (GIS) are widely utilized to collect, analyze and store this kind of “hard” information.

Besides formal or professional knowledge, knowledge produced by different local stakeholders like the residents and non-governmental organizations (NGOs) is needed. This local knowledge is often defined as personal and experiential place-based knowledge (Coburn 2003; Fischer 2000; Van Herzele 2004; Fischer 2000). Planning organizations and individual planners try to utilize local knowledge since they recognize its value. Numerous methods and techniques have been applied in order to gather local knowledge from the residents and other local actors. However, these methods seem often to be problematic. Public meetings and surveys produce so much information that it is hard and time-consuming to handle it. Opinions and statements of the residents are diverse and often contradictory. The practical problem is what to do with all this knowledge.
In addition to the great amount of data, there are procedural and organizational problems too. In a planning process, there are phases when opinions are asked, but then long periods with no interaction at all. Older knowledge related to the process is hard to find. There isn’t always a place in municipal databases for knowledge that comes from outside of the organization. Besides, the collected knowledge is not always in such a form so that it could be easily processed further by experts or decision makers. Thereby the dichotomy is necessarily not concerning only the definition of formal and informal knowledge as such, but the ways informal knowledge is handled in a planning process. Instead of just gathering knowledge, the organizations should develop feasible ways for managing this diverse planning-related knowledge. We should ask questions like when and by whom knowledge is distributed and published, with whom it is shared and how it is accessed.

In this paper I discuss the possibilities of using collaborative Internet-based applications to collect and manage local knowledge. Information and communications technologies have offered possibilities for distributing, representing and sharing knowledge during the process. Open source softwares like content management systems and Internet-based GIS (WebGIS) have opened up expert tools for laymen, too. GIS applications, discussion forums and map based applications constitute an efficient apparatus for local knowledge building. Urban planning is considered here as an interactive process where the expert organization (planners) and the public (residents, associations, laymen) create, share and process knowledge. I will discuss some definitions of local knowledge and examine participative GIS as a way to gather, analyze and utilize it. Knowledge management theories and applications are studied in relation to participative planning.

Two case studies are introduced. My Maunula Neighbourhood Map was a map application that was embedded into an existing city quarter’s web site in Helsinki, Finland. Development Forum of Espoon keskus is a local web portal of an urban sub-centre in Espoo, Finland. Both studies are realized in Helsinki University of Technology. The practical objective was to develop both new tools and new practices to gather and manage various kinds of local knowledge and bring it together with expert knowledge. In order to create a more comprehensive local knowledge base, links between informal and formal knowledge were built. The results of My Maunula Neighbourhood Map are presented shortly, mainly in order to discuss the types of gathered knowledge. The case of Development Forum is described more closely as it forms the base for a new model for planning related local knowledge gathering, management and governance in practice. How to organize the maintenance of these Internet-based systems? How is the data utilized in planning processes? What kind of questions raises concerning virtual communities – if such communities evolve? Encountered problems and questions are raised up for future discussion.

1. Mapping local knowledge

The growing need for utilizing local knowledge of the residents challenges both the planning institutions and NGOs to seek more efficient ways to gather, share and manage knowledge. In the following chapter I will discuss some definitions for local knowledge and examine the possibilities of participative GIS (PGIS) in gathering local knowledge.

About local knowledge in planning
A commonly used definition for *local knowledge* is that it is some kind of everyday knowledge of people who live in the area. The residents are mostly regarded first of all as laymen and non-professionals in contrast to professionals like the planners. The knowledge of the planners has described as expert knowledge (Fischer 2000) or processed knowledge (Friedmann 1973) as distinct from the laymen’s personal knowledge that is drawn directly from experiences. Local knowledge as contextual and social knowledge includes important understandings of the local meanings (Coburn 2003). Meanings, on the other hand, are linked to values and beliefs of the people. Meanings and identities of the living environment are shaped and constructed through communication among people who live, act and work in the environment (Healey 1993). Therefore local knowledge is not only something that “exists” as such but it is formulated and processed continuously by the members of the community.

In a planning process, local knowledge of the residents is often considered as opinion or belief and thus dismissed, and the planning system relies mainly on expert knowledge and professional expertise (Fischer 2000, Puustinen 2006). As local knowledge is based on first-hand experiences, it lacks the verification and status of expert knowledge (Coburn 2003). The distinction is not, however, clear as also the planners have experiential knowledge of their own, and the laymen may hold many kinds of expertises and knowledge that are in many fields superior to that of the planners (Lapintie 2002). The concept of local knowledge is thus attached to not only to places (one’s living environment) but also to the roles and positions of the knowledge producers. The experts use their own personal experience as they make decisions concerning spatial problems. In the same way, the laymen use their own professional skills together their experiential knowledge as residents of the area as they assess local information. However, as the residents try to bring their own experience-based knowledge into planning process, they often notice that their knowledge is labelled as subjective and biased in contrast to the expert knowledge that is objective and “scientific”. Another problem is that even though the opinions of the residents are well-grounded and reasoned, they may be considered to represent only the viewpoint of a few residents.

When local knowledge is shared within a residential community, it evolves through interaction with other people who share the same local environment. Defined like this, local knowledge can be called community knowledge (Bradford 2005). Community knowledge can aim for changing the community: it can be theoretical models of what factors produce success or failure in certain areas (ibid.). It is needed in formulating profiles, strategies and policy outcomes concerning the community at issue (ibid.). This knowledge can be produced by both authorities and the communities itself. The case studies of this paper are both examples of community driven efforts for improving the area in general, and local knowledge is harnessed for development of the whole area.

**Participative GIS as a knowledge gathering tool**

Many kinds of methods and supporting techniques have been developed in order to promote participation and its outcome in a planning process. Since the 80’s, planning organizations have been utilizing geographical information systems (GIS) in gathering and managing various kinds of spatial data in a planning process. The conventional use of GIS has been quite top-down in the sense that GIS data are provided, managed and presented mostly by professionals (Talen 2000). The experts handle different kinds of census data and statistics concerning education, employment, income rate etc., produced by different authorities. The data can be usually brought into GIS for future analyses and evaluation together with hard technical data concerning for example infrastructure, real estates, zoning, and traffic flows. In
the 90’s, participative bottom-up –approaches in GIS were developed too (see e.g. Carver et al. 2001; Talen 2000; Rinner 2001). Experiences of many participative GIS projects have shown that GIS may legitimize local knowledge by giving it a technical form (Talen 2000). In other words, the previously vague local knowledge can be converted into spatially referenced data and utilized better since it can be handled in professional GIS together with other spatial data. However, as long as the use of participative GIS requires facilitators and technicians, communities will not benefit from it substantially.

The advent of the Internet and on-line communication tools has made it possible to open up GIS and spatial data to everyone. Today, Internet-based GIS applications reach large groups of people. The ease of producing and distributing information and reaching a large audience with one mouse click made the Internet a very tempting development platform in the end of the 90’s (see e.g. Staffans 2004, Weiner et al. 2002, Carver et al 2001, Rinner 2001). The alleged transparency and openness of the Internet seemed to promote new kind of participation and knowledge sharing, and in this way challenge the old ways of governing, decision making and planning. Not surprisingly, Internet is already seen as a central component of public participatory GIS delivery (Weiner et al. 2002).

Participative GIS projects promote the possibility for the residents to affect decision making by providing their experiential knowledge of their living environment (e.g. Carver et al. 2001, Elwood 2006). However, even though local knowledge of the residents is gathered and stored, it seems difficult to find a place for this “soft” informal knowledge in a planning institution (Carver et al. 2001, Staffans 2004). Furthermore, questions of governance and finance are also brought up. Who owns and controls the knowledge? There has also been not enough systematic long-term evaluation of the contribution of participative GIS projects to local decision making (Weiner et al. 2002).

The Internet and tools that utilize newest information and communication technology bring interesting possibilities for communities and its knowledge management. Yet, until recent years, Internet-based GIS applications have mostly been one-way, as the interface enabled the user to search information but not to produce it. The general development of WebGIS applications combined with the increasing use of open source software has enabled two-way interaction. Open source has made the costs so low that even NGOs can build up collaborative web sites with mapping features. Still, many WebGIS projects have been quite top-down as the applications are considered only as decision support systems for the authorities. The residents in the area could, however, benefit from participative GIS in many ways. Mapping applications could be embedded into local websites, using all the features provided by the rapidly evolving Internet technology. Combining open source content management systems to on-line GIS technologies makes it possible to widen the concept of WebGIS into a comprehensive local knowledge management tool. This, however, requires understanding of these tools and their function.

3. Knowledge management in urban planning

A great deal of the problems in participative planning processes seem to relate to knowledge management (Rubinstein-Montano 2000). From the beginning of the 90’s, knowledge management theories have been very popular among business organizations. In urban planning context, knowledge management has been related to strategic concepts like ‘creative
cities’ (Landry 2000) or ‘knowledge cities’ (Carrillo 2005). But how about knowledge management in urban planning process in practice?

Knowledge management can be defined as a process of knowledge creation, validation, presentation, distribution, and application (Bhatt 2000). It helps organizations to find, select, disseminate and transfer important information necessary for activities such as problem solving, learning, strategic planning and decision making (Gupta et. al. 2003). Knowledge management emphasizes the meaning of sharing both informal and formal knowledge. Pfeffer and Sutton (2000) define knowledge as value-added action and focused innovation: it can be accumulated expertise, relationships and alliances. In practice, knowledge is stored in the brains of individuals or encoded in organizational processes, documents, products, services, facilities and systems (ibid.) Knowledge management is related to many disciplines and technologies like cognitive science, organizational science, artificial intelligence, decision support systems, simulations, groupware and other collaborative systems (Gupta et al. 2003). Knowledge management promotes learning and innovation and includes both technological tools and organizational routines.

Collaborative ICT based tools are seldom used as they are designed to be used. According to Nissen (2003), many contemporary “knowledge management tools” (groupware, Web portals, document databases, search engines etc.) are used in quite conventional ways, concentrating on transfer of information and data instead of enhancing the flow of knowledge. Information systems used for planning processes have usually been presented as decision support systems, thus defining planning first of all as a decision making process. Planners and politicians are seen as the main actors in this process (Laurini 1998). Especially GIS and its data management facilities play an important role in systems designed especially for supporting decision making in land use planning (Rinner 2001, Nedovic-Budic 2000). Bearing in mind the complexity of planning process and the amount of information in it, knowledge management systems in planning can be called urban knowledge systems. During planning process an urban knowledge system can function as a place for the decision makers and community members to share knowledge that will ultimately enable the plan to be accepted by the public and implemented (Rubinstein-Montano 2000). In this system local knowledge of the residents is related to cultural attributes and defined as something that the planners need to know to convince the public to accept the proposed plan (ibid.).

From the viewpoint of communicative planning theory, I find the model in which knowledge management is considered more a less as a tool for managers (planners and other authorities) problematic. The procedure of knowledge sharing in this institution-based urban knowledge system is aimed at convincing the public, not actually collaborating with them. Of course, urban planning as an institution is very different from the firms and corporations, where decisions are made in a much more straightforward way. The gamut of stakeholders in planning is wide and sometimes uncontrollable, and the outcome of the process is often unpredictable. Political and economical interests blend with questions of democracy and civil rights. Therefore the ways knowledge is managed for example during zoning and master planning should be sensitive to demands for transparency and public discussion. True alternatives should be offered instead of sticking to one plan or proposal.

Today special groupware technologies are widely used in organizations. Typically groupware is a software that is designed for organizations to support information access to several persons (e.g. Lotus Notes and other corporate intranets). When used regularly, it can effect the interactions between people by improving communications and problems solving (Laurini
Groupware technologies can be seen as a more structured and enclosed form of on-line environments for virtual communities. Rubinstein-Montano (2003) has studied informal virtual communities as role models for successful knowledge management in organizations because many of the features that have been identified as important for successful knowledge management are present in virtual communities. Virtual community is a group of people with a strong sense of community, and its main function is to share knowledge among its members who have common practices and interests (Rubinstein-Montano 2000; Wenger et. al 2005).

Virtual communities have often some kind of memberships with registrations and usernames. They consist of many kinds of people which are identified by their shared domain of interest and common practices (Wenger 1998). Could a group of residents and activists using a planning related on-line tool be considered as a virtual community in any level – or should it? I will discuss this question more extensively in chapter 5.

Despite some difficulties in applying knowledge management theories on planning as such, there are a lot of interesting examples of digital environments for knowledge management that can be used in urban planning processes, for example Participation-On-Line1, VEPS – Virtual Environmental Planning tools2 (Chen & Knapp 2006), Argumaps (Rinner 2001), SMURF system (Repetti et al. 2005). However, urban knowledge systems within planning institutions are still mostly designed for enclosed expert groups with a top-down management and control approach. They are often desk top systems without a possibility to download or upload local information online – which is recognized as a problem (e.g. Repetti et.al. 2005). Therefore the use of Internet-based tools seems to be essential for the present development of urban knowledge management systems (Laurini 1998.) Efficient use of these applications requires new collaborative practices, management approaches and testing of new tools.

4. Case studies: Maunula and Development Forum

In the following chapter I present two case studies. In My Maunula Neighbourhood Map the aim was to collect and analyze experiential knowledge. In Development Forum of Espoon keskus, the focus was in designing and implementing the application and then finding out suitable practices to manage knowledge in cooperation with a multi-sectorial maintenance team.

My Maunula Neighbourhood Map

My Maunula Neighbourhood Map3 was a simple Internet-based interactive map application, which was a integrated into a local web site of Maunula, a city quarter with 7500 inhabitants in Helsinki. The website is managed by a local maintenance team. The map was active from spring 2003 to spring 2006. In the map, the users could mark places with four different symbols: pleasant (green), unpleasant (yellow), unsafe (red with minus) and trafficly dangerous (red with exclamation mark). A comment could be attached to each symbol. After the session the users were asked about their age group, gender and whether they lived in Maunula or not. Based on these criteria, it was possible for the users to make simple thematic analyses and in this way evaluate the results themselves. The results could be viewed on the map as clusters of different symbols, or as lists of the comments in certain areas (see Figure 1). In the end, there were 876 symbols in the data base, and in half of these there was a

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1 www.entera-online.com/015_demo_english
2 www.veps3d.org/site/242.asp
3 www.kaupunginosat.net/maunula/kartta
comment included. Out of the comments, 36% was marked pleasant, 29% unpleasant, 19% unsafe, and 16% traﬃcally dangerous. The comments were classiﬁed roughly into ﬁve categories: Built environment (26%), Social context (26%), Action related (20%), Nature (10%), and Traffic (18%). Hundreds of symbols formed differently coloured ﬁelds on the map: it was easy to see, which were the most important and valuable places for the residents, and on the other hand, which places really needed improvement. In this way, speciﬁc “experiential knowledge layers” were produced. At the present stage of the study, I will not go deeper into the qualities and types of the given comments but present only some early remarks.

Figure 1. User interface of the My Maunula Neighbourhood Map

When analyzing and classifying the comments, the general notice was that especially the traﬃcally related comments were quite precise and provided concrete suggestions that could be utilized in traﬃc planning almost as such. The other comments were more diverse in both quality and content. Comments in category Built environment were mostly related to the physical environment like buildings, roads and parks, including qualitative remarks about their condition, functional purpose, tidiness, architecture etc. Social context was referring to perceived behaviour of the others in certain places (e.g. negative comments about antisocial groups and their behaviour, or on the other hand, positive feelings of belonging and memories related to certain places). Action related comments reﬂected physical environment as a scene of action, full of opportunities for play, exercise, or relax. The “geography of fear” was also present in the comments attached to places which were untidy, dark, or occupied by gangs. Comments related to nature were almost entirely positive, as the surrounding woods and ﬁelds offered experiences of gracefulness, peacefulness and relaxation. Majority of the positive comments were referring to possibilities for recreational exercise, or they were appreciative comments on certain commercial and municipal services on the area. On the other hand, the vast majority of the negative comments was related to social context. Also the built environment emerged in negative comments. In was noticeable that pleasant places were dispersed and dotted around the map, but unpleasant and unsafe places clustered on certain areas, showing the critical areas very clearly.
My Maunula Neighbourhood Map showed that the knowledge produced by the residents is in most cases very cross- and multi-sectorial. Except the traffic related comments, it is not so easy to take them into account as such since it would require close cooperation between the different administrative departments of the city – which is a problem. When there are dozens of comments of how people are afraid of walking on the streets in the night close to the mall because of the aggressive drunks pouring out of its numerous pubs, whose job it is to react? The police, social services, department of trade, public works department, planner? Maybe them all? And how to organize this cooperation? The study did not provide an answer to this question but it inspired us to work further on this field.

*Development Forum of Espoon keskus*

Development Forum of Espoon keskus⁴ is a local web site which functions as a shared platform and storage facility for all kind formal and informal local data. It is a part of a research project OPUS (*Urban planning and everyday life: a learning process*), in Helsinki University of Technology, Department of Architecture. Development Forum was opened in October 2006.

With its 35 000 inhabitants, Espoon keskus is one of the five sub-centres of the City of Espoo. It is the city’s administrative centre, and its population is growing rapidly. Numerous development projects have been launched in order to improve its physical, functional and social environment. The problem is that the knowledge about these projects – both formal and informal – is dispersed and hard to find. The official web site of the city provides the essential information, but it lacks the layer of experiential knowledge of the residents as well as a comprehensive place-based approach. On the other hand, the web sites of the local NGOs offer mostly quite static and non-interactive information. In sum, it is sometimes hard to find up-to-date local information of the area, and almost impossible to produce it for others to see.

The objective in Development Forum was to make it easier for all local stakeholders to find and produce information concerning their living environment, and also make planning and development issues more interesting by enlightening their contexts and backgrounds and in this way to contribute to the dissemination of knowledge. The site is designed, maintained and controlled by a multi-actor body of local stakeholders like residents associations, representatives of the City of Espoo, OPUS-researchers and people from various projects in the area. Easy-to-use-design and overall bottom-up approach is pursued in cooperation with the users. Tools for independent knowledge building and content management are offered. Anyone can add information, news, advertisements and comments. Knowledge produced by the users is thus shared in interaction, and in time we expect that the community of users gradually develop new local practices. The maintenance team meets face-to-face once in 6-8 weeks in order to discuss the practical and content related issues. Otherwise, the members of the team work independently using the tools offered by Development Forum, each according to their own skills and personal motivations. (See Figure 2)

In Development Forum, two open source softwares are combined: content management system Joomla⁶, and MapServer⁷, which is a development environment for building spatially-enabled internet applications. Components like discussion forums, news sections, picture

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⁴ www.espoonkeskus.fi
⁵ opus.tkk.fi
⁶ www.joomla.org
⁷ mapserver.gis.umn.edu
galleries, project trees and advertisement boards are used too. The city survey department of Espoo provided the basic cartographic material like GIS-formatted maps and data layers. Spatially referred data are linked to articles and discussion topics in the site. The front page of the site functions as a local portal with news topics and calendar of events as well.

Figure 2. The concept of Development Forum of Espoon keskus

There are two mapping applications on the site. In Local Knowledge Map local data are linked to places either as points, lines or areas. Administrators of the site can add new data into the system with an easy point and click system. Links to official information concerning a certain area can be combined with statements of the residents’ associations, news from local magazines or photographs. This information can be viewed on a map, in separate coloured layers and categories. Users can zoom into a map, select a category (for example ongoing, archived or future zoning; statements of the associations; historical information: pieces of art etc.) and submit a search. The application then shows the results both as points or areas on the map, and also as a list of titles. By clicking a certain title or area on a map, the system shows the articles that have been attached to it. In most cases, these articles include links to other sites, maintained by different stakeholders. The user can then decide which links to follow further.

Commentary map offers a platform for spatial commentary. The users can put different kinds of symbols with comments into a map: negative and positive comments, and ideas. Some background information of the users is asked (age, sex, whether he/she lives in the area or not). Time-related spatial queries are enabled since every comment has a time label. Everyone can survey the comments by using these variables and in this way produce simple thematic maps. Each comment can be studied separately, too. If a comment or an idea on a map arouses arguments, it can be linked to the discussion forum. The comments and opinions are then commented by the others. All commentary data can be transferred into municipality’s GIS if needed, and a certain “local knowledge layer” can be formed on top of the so called formal data layer. A planner can view these layers on his/her own working environment and new in-depth analyses can be made with professional GIS tools. (See Figures 3 and 4).
In order to store some locally important long term processes a special process tree tool was designed. Process tree is in fact an ordinary web page with a table divided into two or three columns. The purpose is to present a planning process from many perspectives and as part of a larger evolution of the area. For example, the renewal plan of the administrative centre of Espoon keskus has its roots in architectural and strategic solutions made in the 70’s. But the history of the area goes way beyond, to the time when Espoon keskus was a little rural commune with a medieval church as a centre. In a process tree, the historical facts with pictures and maps are presented in the middle column. On the left there are the “formal facts” listed, for example links to news of decisions. On the right there is the “informal” story of the process with outside links to columns, news, statements of the associations and politicians etc., and also links to material produced in Development Forum: articles, comments on the map, discussions, pictures galleries. Some of the material was retrieved from active residents who had all the documents on their computer or desk drawer. Thus, the process with its diverse details is presented for everyone to see, not just for authorities and the few activists.

5. Summary of the case studies

I will present a summary of some focal notices made during the case studies in which I have been involved for years. The summary is based on personal experiences, one user survey realized in Maunula, and numerous discussions with the stakeholders. My Maunula Neighbourhood Map is handled as part of the local website. Its maintenance team is examined alongside with the one of Development Forum of Espoon keskus.

General notices

It is almost common knowledge that Internet-based tools seem to reach best young people and busy working people and who usually do not participate for example residential meetings in the evenings. The user survey confirmed the argument as the most active user group in My Maunula Map was the 30 -39 year old. In Espoon keskus the same phenomenon is likely. Even though older people are not so familiar with ICT, it is important to understand that internet-based tools are not exclusive but complementary tools for participation. Traditional media and practices should always use alongside with new technology (if the Internet can be called ”new technology” anymore).

8 www.maunula.net
The basic notice in Maunula case was that the versatile nature of the knowledge challenges municipal governance in many levels since a single comment in a map may come under many administrative sectors: landscape management, housing policy, health care, traffic planning, social services and zoning. New practices in knowledge management inside planning organisations are thus needed. Better cooperation is required between the municipal departments and between the city and other parties like police and church.

Both cases show that the mapping applications should be part of the local knowledge production entity, integrated into other tools. In this way they expand the local community’s repertoire of tools for knowledge production and sharing (Wenger et al. 2005). Discussions and local news production constitute the context through which the comments must be interpreted. In fact, in some of the mapped comments in Maunula the respondents referred to common knowledge as such; “I don’t have to explain my comment because everybody knows it anyway”. Consequently, the interpreter of the data must have at least some knowledge of the area in general.

*Interaction between residents and planners*

According to feedback, the users of the map application in Maunula appreciated the possibility to read the comments of others and make simple spatial queries and analyses themselves. But for them, the most important thing was that their actions would be of some importance. They expect feedback from the city. Two-way interaction motivates people to visit the site and makes the work of the maintenance team more meaningful. Like in any organization, people should be shown how their participation is benefiting the process (Rubinstein-Montano 2003).

However, in Maunula two-way interaction between the planners and the residents didn’t occur because the project funding ended before the results were handled properly (this was not done until 2007). Thereby the significance of the map for the residents was mainly to share local knowledge and get familiar with opinions of others. In Development Forum of Espoon keskus, some representatives of the city and members of the city council visit the discussion forum regularly and share their knowledge on local development plans – which is a very positive message for the users and managers of the site. They also offer many kinds of extra material to be published. However, neither the discussion forum or the commentary map is not integrated into the official feedback system of the city. In fact, we tried to suggest that the comments on the map could be automatically redirected to the official feedback system, but some representatives of the city feared that in this way the amount of feedback could be too much for them to handle. This, on the other hand, raises questions whether the current feedback system of the city is efficient enough, as the questions and complaints are handled and answered individually. It would be more effective if at least some of the feedback were answered on a public forum so that others could see them too. Since the planners are often tired of answering the same questions all over again, there is a need for locally targeted FAQ:s (frequently asked questions) to be published. In Development Forum we realized one FAQ page concerning an area in which there is a zoning process going on. This page proved to be quite popular, and it seemed to reduce the amount of direct contacts on the planners.

*Usability of the tools*
In the case studies, planning-related and other local knowledge is organized and examined in many ways: as news, mapped knowledge, cumulative process trees and discussions. For the planners, the process tree has proved to be the most feasible application as there is a lot of information about the case that can’t be found anywhere else. From a knowledge management point of view, it is surprisingly hard to find old information of non-active planning cases in the city’s own knowledge storages. A lot of information is, of course, in a planners own brain. But sometimes a planner is new in the organization and he/she has no personal knowledge of the planning area. A cumulative knowledge base is a handy tool for a planner in the early phase of planning, especially because planners can contribute to the data base him/herself too (the FAQ page could be an example of this). Process tree is designed in a way that it is easy to read and follow: it is visual and logic (newest data on the top, headlines offering sufficient insight of issues, links to more detailed information). It has already been used in official residents’ meetings by the planners to present the backgrounds and visuals of the plans at stake. (See Figure 5).

Figure 5. Process tree (on the left).

While the formal data often rely on the present situation in solving actual planning problems, locally produced on-line knowledge base could be a useful resource for the planners in understanding the area as a whole. Of course, the discussions or spots on the map don’t represent the final “truth”, but they can give some important signals and inside information that otherwise might be neglected. Monitoring the changes in the map can help planners and decision makers to recognize what is going on in the area. In addition, simple map visualizations may help the planners to present the plans to decision makers. As the comments often relate strongly to locally known social contexts, the planners have suggested that commentary maps could be used as a tool for social impact assessment. Commentary maps preserve all information, which makes it possible to monitor the changes in time. This kind of barometric map gives the user – resident, planner or decision maker – an interesting view into local development and progress (or recession). It is always useful to be able to go back in history, see the previous mind-sets and discussions in the past.

For the residents, the discussion forum is – perhaps alongside with current news in front page - the most important source of local information. In the discussion forum of Development Forum of Espoon keskus, the activity of certain key persons like project manager of the development project, a couple of
members of the city council and representatives of associations ensure that valid knowledge is shared. On the other hand, in the commentary map there are only about 70 comments so far. Even though commentary map offers a more sophisticated means to express an opinion, a traditional discussion forum has proved to be the most important interactive tool in both Maunula web site and Development Forum of Espoon keskus. The reason is simple: discussion forum offers a true two-way communication.

Local people as partners, managers and users

The experiences in the case studies have shown that when launching and implementing the projects, there are at least four kinds of groups of people that must be taken account in terms of communicating, organizing and interacting. Firstly, there is a group of representatives of the city, like planners, publicists and project managers. The active “municipal” group with whom the OPUS-researchers cooperated in Espoo has been quite small but enthusiastic and proactive – which has been a pleasant surprise. The presence of the publicists in the meetings has been important as they have disseminated knowledge of the Development Forum within the city organization through intranets and other media.

Secondly, there is the representatives of NGOs like residents’ associations and local projects. Even though cooperation with the NGOs in Espoon keskus started with good will and optimistic atmosphere, we encountered some problems concerning the ability to take over virtual media in general. The problem was not the lack of computer skills but the overall understanding of the essence of the Development Forum and its possibilities. Even though all the NGOs were invited to design the concept and define the practices of Development Forum, only a few attended the meetings, and those who came were not very active. This is – of course – mainly a problem of us researchers and our methods. In any case, we noticed that was very important to stress to the NGOs that the project was not owned and controlled by the city – even though the city was supporting it financially. For some NGO members this “independence” was the reason to participate in a first place.

The third group – maintenance team – is the core of the management system. The functionality of the maintenance team depends on successful interaction between the first two groups. As many kinds of actors bring their knowledge and skills to common use in the maintenance team of the site, this group may gradually form a new kind of community of practice (Wenger 1998). Overlapping expertises are a strong resource for community of practices: when different kinds of expertises come across, social bridges between actors and organizations are built up (Hakkarainen, Lonka & Lipponen 2001). In Espoon keskus, for many NGO members it has proved to be quite difficult to adopt new tools and role as managers, even though they are used to do voluntary work. Too long have the OPUS-researchers been responsible for the maintenance by themselves. In Maunula, the contribution of the local residents’ association and specially a couple of activists has been very innovative. They see that Internet is a complementary media and a useful - not competing or exclusionary - tool for them. Each of the four local resident’s associations in Espoon keskus have their own separate websites whose function is mainly to promote the association’s own agenda. Fortunately the webmasters of these sites have already seen the advantages of Development Forum as a collective portal with a larger geographical focus, as it picks up and links headlines of those separate websites, thus making it easier for ordinary non-organized residents to reach local information.
Which brings us to the fourth “group”, the residents of the area as users of the site. In Espoon keskus, most of the members of NGOs and some of the authorities and researchers are also local residents, thus presenting multiple roles. The success of Development Forum requires a lot of users. Individuals participate when they know that many others are participating too. But do the residents of a certain area form a virtual community when they use collaborative internet-based tools like Development Forum?

Users of local portals as members of virtual communities

Hampton and Wellmann (2003) showed in their Netville study that the use of local intranet enhanced the social relationships among the neighbourhood. Participation in virtual communities seems – at least in some cases - to increase interpersonal connectivity and organizational involvement (ibid.) Netville was, however, a dense residential area where people could easily meet each other outside of the “virtual sphere” just by stepping out of the door. In larger areas like small cities and city quarters with thousands of people this effect is not so likely to occur. Accordingly, do the users of the case studies qualify as virtual communities? If yes, how should this definition be taken into account in the future development?

According to Rubinstein-Montano (2003), in virtual communities people are usually registered members, communication is always two-way interaction, and technology is mainly a means of communication. Specific for virtual communities is that the knowledge sharing process is voluntary, self-regulating and on-line – people participate when they have time. The moderators of virtual community often represent some special expertise and share their expertise to the benefit of the community. (Rubinstein-Montano 2003). Discussion forums are the most common place for members of a virtual community to act. Jones (1997) has defined some minimum criteria for virtual communities in a case of discussion forums: (1) a minimum level of interactivity; (2) a variety of communicators; (3) a minimum level of sustained membership; and (4) a virtual common-public-space where a significant portion of interactive group communications occurs. There are even more precise definitions to be found: 80% of postings must have responses; minimum of 15 different members must post over a three-day period; a minimum of ten postings a day per during any random three-day period must be posted; at least 50% of the posters must post more than one time (Rubinstein-Montano 2003). There has to be natural need for discussion on certain topics: it can’t be forced.

In Maunula, most of the definitions for virtual community are fulfilled as the discussion forum is quite vivid: there are about 14 000 visitors per month in the site⁹. There is no registration to the discussion forum, which in fact lowers the barrier for participating. In Espoon keskus, registration is required. Anonymity is, however, guaranteed as the user can choose whatever username he/she likes. At present there are about 60 members in the discussion forum, with a little less than 300 messages. Only about 15 of the members are active, and the forum is not active even daily. However, the messages are read by hundreds of users monthly. It is important to see that in dissemination of local knowledge also the readers – not only writers – play an important role (Nonnecke & Preece 2000).

In business world, increasing mobility and dispersion of work has made virtual space an important “place” for working. In a recent study on mobile and distributed work environments

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⁹ [http://www.kaupunginosat.net/raportit/raportti_maunula.html](http://www.kaupunginosat.net/raportit/raportti_maunula.html)
Hakonen et al. (2007) stress the importance of shared identity and find it difficult to build this identity only virtually. Face-to-face kick-off meetings and informal gatherings are necessary in order to create a shared understanding of the group members’ tasks and goals. Locality is still an important factor when people define their individual and group identities. (Hakonen et al. 2007). Especially for the maintenance teams it is important that the members of the group also meet also face-to-face. The meetings of the maintenance team of Development Forum of Espoon keskus are held in premises owned by the city, due to practical and technical reasons. These meetings enhance commitment and trust that can only be built on social relationships and face-to-face conversations.

In Maunula the importance of an existing virtual community – the users and managers of an established city quarter web site - was clear as without this existing web environment it would have been difficult to hype the map application, and far less comments would have been received. In Espoon keskus, there is still difficulties in marketing the site. The aim is that Development Forum would become a platform that enhances new collaborative practices as well as local knowledge building. After 10 months, it is still difficult to say if this has come true. The Development Forum has so far not established its role as a local portal since there are only 1500 – 2000 visitors per month. It takes time - perhaps a year or two – and a lot of marketing efforts before local actors embrace this new tool.

Hence, the website of Maunula and Development Forum of Espoon keskus seem to function as mixtures of physical and virtual communities. Locality – the fact that people share the same housing environments, services and nature resources - is considered as a binding factor. Is it enough? In my opinion the users of Development Forum do not necessarily form a virtual community as described earlier: the group (30 000 potential residents!) is too heterogeneous for that. However, it is typical for planning related processes, that at some point people are activated and motivated to take part in local discussion – either to have information on certain issues or influence by commenting. Therefore it is important that there is a established and low-barrier virtual place where this participation can easily happen and where people feel that they are automatically members of a local community – even if the community is a loose one.

6. Conclusions

Next I will make some conclusions that will constitute a basis for future development of a model for planning related local knowledge management system. The model is called Development Forum (DF) (See Figure 6). I will concentrate on four main elements of the model: 1) Design and accessibility, 2) Knowledge retrieval and distribution, 3) Maintenance and organizing, and 4) Technology and costs.

Design and Accessibility

In DF, knowledge must be found easily, otherwise the knowledge is not disseminated in the area. Marketing is important for accessibility because if nobody knows about DF it will not be used. Only a sufficient amount of users guarantees the continuing interaction and local knowledge dissemination. All kinds of media should be harnessed for marketing efforts: newspapers, websites, meetings, posters, ads, mouth-to-mouth. The target group for the advertising is not only the residents but the municipal organizations as well.
The design should be easy-to-use. It is important that when designing tools for knowledge management, both the future users and managers are involved in their development, defining the informational base of them. In this way the users get to know the reasons and backgrounds of the design, and the designer will better understand the practice of the users (Tuomi 1999).

As the main environment of DF is the internet, it is available from everywhere. The material on DF should be open to everyone without registrations. There can be, though, a possibility to register oneself as a member too. Anonymity is important since the ability to remain unknown lowers the barriers to participate. However, municipal workers often feel that it’s unfair that they have to use their own names as they answer to anonymously presented questions. Thus, it is important to decide about anonymity and registration in every case separately as sometimes recognition is preferred: it consolidates the feeling of trust.

**Knowledge retrieval and distribution**

In urban planning, knowledge constitutes a continuum of historical facts, political decisions, implementations and changes in plans etc. The knowledge management system should recognize this “informal” history and store discussions in the past. In process trees, long term planning and development processes are archived and followed from multiple viewpoints, and in this way the link between formal and informal knowledge is created.

The planning organizations should also think carefully what kind of knowledge is useful to share in which phases of the process. Besides the formal process there is the actual process in which people are acting and reacting. For example publishing early sketches and proposals and giving information of time tables and informal negations may build new kind of trust among the users of DF. Furthermore, knowledge shouldn’t be categorized only by administrative sectors but by time, location and quality. For example, it is quite natural to search information concerning a person’s own living environment. Therefore a map based “search engine” which arranges knowledge by its coordinates is reasonable.

In order to build up common understanding, knowledge must be shared. Certain key persons like the publicists in the city administration must be involved in knowledge sharing in order to ensure a proper flow of information. Besides the planners, the role of local decision makers and politicians is important too. It is a huge advantage if the key persons – including the researchers – happen to live in the area which brings in personal motivation.

Close cooperation with the city survey department is important as they provide the necessary cartographic material as GIS-formatted maps and data layers. The negotiations must be launched at the very early phase because not every municipality is ready to give up their spatial data for free. Basically, DF needs up-dated orthographic aerial pictures of the area, guide maps, and a few data layers like street names and real estate borders. Simple mapping applications make way to wider use of professional knowledge management tools and opening up municipal data banks for the public. However, commentary maps function properly only when the feedback system integrated into it. Transferring the comments to professional GIS environments should be tested too in order to have experiences of the usability of commentary data in spatial planning.

Cooperation with the universities and other academic institutions is desirable. Academic research and evaluation will benefit the dissemination and understanding of the DF in organizations. Researchers can function as “neutral convenors” for the stakeholders. It is also
important that the results and effects are evaluated and documented for the future. Neither of the voluntary NGO workers or municipal workers have time for that.

**Maintenance and organizing**

The maintenance team has the highest control over the DF. The work is distributed: administrators and managers with higher access levels control the contents, overall settings and user accounts. This control is, however, based on trust among all the stakeholders. Linking to city’s official pages is not a problem, but retrieving extra material, sketches or plain information from the planners and other authorities requires clear rules. There is sometimes a dilemma between the need of information and the status of a legal planning process. The question of responsibility needs to be worked out between the maintenance team and municipal actors. There are no ready solutions for that.

Different roles of the people involved must be recognized. Because the maintenance team works as a voluntary base the tasks should be split: those who are interested in photo galleries can maintain them; others will moderate the discussion forums etc. Also the planners and other authorities participate mostly on their own interest and time. It is unrealistic to expect them to use much time for example in writing news or taking part in discussions (which seems to be especially hard). Instead, more important is to create a functional relationship between the planners and the DF to ensure the fluent information change. The publicists of planning departments are key persons as they often actually do the email-sending and publishing, requested by the planners.

Universities and other academic institutes seem to be good - and first of all - neutral initiators of a cross-sectorial project like DF. In the course of time the initiative team – researchers – should gradually give up the maintaining work unless the roles of the researchers change. A researcher can, of course, act in a maintenance team for example as a member of a residents’ association. The initiators should if possible have strong experience-based knowledge of the area. In any case, local associations and projects must be involved in the process from the beginning. One should be aware of the local social and cultural conditions. Therefore the same organizational model is not valid everywhere. In some cases the local NGOs may be the driving force; in other cases it can be a member of the council, planner, developer or project manager. This will effect the ways maintenance team is working. However, it is important that as many kinds of stakeholders as possible is invited. Some are probably not very active. It may take a year or two for some people to “really get the idea”. It is, however, more dangerous to exclude than to include.

**Technology and costs**

The system should be cheap enough to build and maintain. Server costs are quite small in this kind of system. Technical assistance is another issue. Open source software is a reasonable alternative as it is flexible for changes and tailoring – which is always needed since most open source and also commercial systems do not fit for DF purposes as such. Making changes requires a lot of technical know-how and managing. Therefore tailoring and updating of software should be realized by municipal ICT departments with proper resources, in close cooperation with the maintenance team. This kind of “cross-border” task may be, however, difficult to enforce without proper organizational authorization and strategic decisions.
Introducing new ICT systems is often hard and expensive. Research projects (realized by universities, for example) can usually implement new technologies much more rapidly and with more flexible agendas than municipal organizations. Test beds like Maunula and Espoon keskus give valuable information both for the municipal organizations and local NGOs about new technologies, their use, success and encountered problems.

Figure 6. The model for Development Forum. A knowledge management architecture for a planning-related local knowledge base. (applying Gupta, Sharma & Shu, 2003)

In Espoon keskus, there were some plans to found a new multi-actor association to control the DF. A person could be paid for updating the site. This has proved to be hard to realize. It seems that a voluntary based, loose virtual-community-like system suits better for present situation. If someone gets paid, questions of control and bureaucracy will come up. Then again, there is perhaps not enough work for a paid worker, not even part time, as a lot of the
contents is produced by the users. In any case, the financial support of the municipality is essential for the DF, but other sources for financing are also possible. However, the private sector - local firms, housing companies and entrepreneurs – will be interested only when DF has established its status as a local portal.

7. Discussion

According to the experiences in these two case studies, the problems encountered in local knowledge managing and dissemination in a participative planning process are after all not technical but organizational and interrelational. Currently running Development Forum of Espoon keskus is a pilot case for a collaborative internet-based planning related knowledge management system. It offers a platform for all kinds of local actors to bring up issues that are considered important locally. It is sometimes hard to outline which tasks in participative practices should be governed by the public sector (municipalities/state), private sector, or the NGOs. Development Forum is somewhere in between, trying to establish a body of multi-sectorial actors to whom collaboration and locality itself are more important objectives than the question of who should or may be doing what. In any case, it seems that it is hard for the citizens to influence urban planning through the formal ways. Therefore new informal practices – not only techniques - need to be developed as well.

It is impossible to build up a “fit-for-all” –model for others to apply. The cultures and practices among local residential areas and NGO’s differ. Also the municipalities are surprisingly differently organized when it comes to their relationships to the NGO:s or the organizational culture in general. The neighbouring cities Espoo and Helsinki are a good example of this: the latter stresses that NGO:s should act independently when organizing local web sites, but in Espoo – or at least in Espoon keskus – the role of the city has been more active, and many planners and also decision makers have been producing ideas, news and many kinds of material to Development Forum.

Hence, a presented model presented here is a rough attempt to illustrate the complex interactions between several different organizations and actors. The important thing is that the model is not a hierarchical chart but a web of relationships and activities. Individuals can find themselves in many roles. The model requires rethinking of collaborative practices and organizational knowledge management structures in municipalities. Novel relationships and practices must be built up between the planning institutions and communities. However, the impact of local knowledge in urban planning and decision making is dependent on the willingness of the planners and decision makers to use many kinds of knowledge. Cooperation, open dialogue, readiness to accept various information and ability to change earlier assumptions and decisions are required. Thus, in order to achieve a more comprehensive knowledge base for planning, we should continue developing knowledge management practices that brake administrative boundaries and integrate experiential place-based knowledge into planning processes.

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