

STAKEHOLDERS' VIEWS ON ICT AND SUSTAINABLE DEVELOPMENT IN AN URBAN DEVELOPMENT PROJECT¹

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Abstract

ICT potentially plays an important part in achieving sustainable urban development. Subsequently, ICT could be expected to have a central role in the general discourse of urban development, and in specific development projects, both as a means in the planning process itself and as an end product, i.e. smart city solutions. By exploring a case study of a local urban development project (Urb@n) in Sweden, we explore different characteristics given to ICT and how they can be understood as different discourses of sustainable development. By studying how ICT is spoken of in the planning phase of urban development we can understand how different stakeholders interpret and incorporate (or not) the technology in the design and development of urban areas, and how they collaborate in order to achieve goals. Our findings show that there are discrepancies between how ICT is spoken of on a policy level and in practice. A conclusion is that technology is both taken for granted and black-boxed at the same time. This indicates rather naïve conceptions and understandings among stakeholders of what characterizes ICT and how it can be used for different purposes to support sustainable development.

Keywords: sustainable development, smart cities, economic sustainability, ecologic sustainability, social sustainability, urban development.

1 Introduction

It is well established that cities are growing rapidly and already in 2030 it is estimated that more than half of the world's population will live in cities (www.unfpa.org). Urbanization alongside with climate changes are global trends and draw global interest (e.g. UNCED, Earth Summit). However, it is just recently that cities have been acknowledged as having a pivotal role for sustainable development (Kievani, 2010; Holden et al., 2008). It is the cities that have to leverage the challenges that coincide with urbanization, e.g. overpopulation and overcrowded areas potentially leading to high levels of unemployment, poverty, inadequate access to water and sanitation, or traffic congestions resulting in increased Co2 emissions and, thus, also greater ecological footprints (cf. Rees, 1992). Of course issues regarding housing, traffic, and environment (both ecological and social) are of another dignity in mega cities than in other large cities in the world. But regardless of the contextual differences, these challenges put demands on future city management to take major actions in order to meet the needs of the citizens without compromising the needs of future generations (cf. Brundtland report, WCED, 1987). Moreover, it is well known that the resources are limited and as a consequence it has

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been established on a European policy level that governments need to “provide better public services with fewer resources” (European eGovernment action plan 2011-2015, p. 3). Yet another global trend is the increased digitalization in and of societies (Baskerville, 2012; Walsham, 2012). Information and communication technology (ICT) is portrayed to play an important role in overcoming some of the challenges cities are facing. Hence, the present situation described above implies that city management and urban development face challenges with limited resources and at the same time explore opportunities through the use of ICT. The world is dramatically changing and the information systems (IS) field needs to be flexible and proactive to offer solutions to these societal challenges that focus both ethical and critical aspects (Walsham, 2012).

Recently, the concept of smart cities has emerged as a new approach to make urban development more sustainable (Alawadhi et al., 2011). The concept denotes that cities through the use of ICT can become smarter in using resources and delivering and administrating services to citizens, and thus in a long run contributing to a better living and quality of life (Schaffers et al., 2012). Just like cities are portrayed as having a pivotal role for sustainable development, different types of ICT artefacts and applications can be seen as important instruments in achieving these goals. For example, the implementation and use of smart grids not only include implementing ICT infrastructure, but also the design and development of new ICT-based services. This also implies that there is a chain of activities that precedes the occurrence of new services and these activities often involve several stakeholders. Thus these kinds of development are complex as they not only involve many stakeholders with sometimes “competing objectives and values” (Chourabi et al., 2012, p. 2289), but also imply requirements of shared technical standards and interoperability (Perera et al., 2013). This has in recent years made the field of urban development, together with the use of information systems (IS) and information technology (IT) to achieve the above-mentioned goals, an interesting research topic for some IS researchers (Dedrick, 2010). However, the impact of IS/IT for environmental sustainability has so far gained much interest in practice, but as a research area it is still rather novel (Watson et al., 2010; Jenkin et al., 2011) and in a research agenda setting phase (Meville, 2010).

Altogether, this indicates an ideal picture of how ICT plays an important part in achieving sustainable urban development. Subsequently, ICT could be expected to have a central role in the general discourse of urban development, and in specific development projects, both as a means in the planning process itself and as an end product, i.e. smart city solutions. But how does this picture converge with reality? Is it as good as it sounds? This is what we intend to discuss in this article. We will apply a critical approach to how ICT is expressed in the urban development context by looking at how ICT is spoken of and interpreted in a real case. In this article we only study the planning phase of the project. By studying how ICT is spoken of in the planning phase of urban development we can understand how different stakeholders interpret and incorporate (or not) the technology in the design and development of urban areas, and how they collaborate in order to achieve goals. In turn, this could give insights to in what contexts ICT is contributing to a sustainable development and in what contexts it is left out. Hence, the purpose of this article is to critically analyze and characterize how ICT is spoken of (or not) by different stakeholders in an urban development project. By exploring a case study of a local urban development project (Urb@n) in Sweden, this article explores different characteristics given to ICT and how they can be understood as different discourses of sustainable development.

The remaining part of the article is organized as follows. In the next section, we characterize sustainable development and ICT in the context of smart cities by exploring the literature. This will in turn be used to characterize how different stakeholders talk about ICT in a particular context. In the third section, we present the case study methodology, followed by the case presentation in the fourth section. The fifth section presents and discusses the main findings and the final section conveys conclusions and future research.

2 Sustainable Development and ICT in the Context of Smart Cities

In this section we start by outlining the context in which ICT is spoken of by different stakeholders, i.e. the context of smart cities and smart city initiatives (cf. Schaffers, et al, 2012; Alawadhi et al., 2011; Chourabi et al., 2012) as a particular approach in urban planning and development. Stakeholders refer in this context simply to those who affects or are affected by an urban development project, in line with Freeman's (1984) often cited definition. Hence, stakeholders could in our context range from citizens, politicians, civil servants and project leaders to private and/or public organizations which have a stake in the process or end product (e.g. construction firms or infrastructure providers). We then continue to discuss previous research about sustainable development from the ecologic, economic and social perspectives.

Due to the problems cities are facing today they are pressured to make management and resource use more efficient, and this has led to various so called smart city initiatives (Perera et al., 2013). Chourabi et al. (2012) mean that the smart city is an abstraction of a "sustainable and livable city" (ibid., p. 2289) and it has today become a "landmark in urban planning" (Kourtit and Nijkamp, 2012, p. 93). However, to this point, due to its emerging nature, there is still no clear definition of the concept per se. Instead, the literature reveals several working definitions (cf. Alawadhi et al., 2012; Caragliu et al., 2011; Nam and Pardo, 2011a; Nam and Pardo, 2011b). The literature reviewing the concept of smart cities mainly focuses on what to be interpreted as smart (cf. intelligent, digital, virtual, and ubiquitous). One dimension of what is meant with "smart" refers to different application layers of ICT. These layers range from hard infrastructure to integration layers, e.g. smart grids, sensor technology, and cloud services, to pure service applications, all of which are equally important to achieve smart solutions (Perera et al., 2013; Chourabi et al., 2012). Consequently, the smartness is dependent of all ICT layers to interoperate, where the hard infrastructure is a basic condition for delivering ICT-based services to citizens. Today, infrastructure development, e.g. broadband development, together with rapid development of mobile devices have contributed to a society where ICT has become pervasive in all sectors, in private and public organizations, as well as in people's personal lives (Baskerville, 2012; Hidding, 2012; Walsham, 2012). From an IS research point of view, it is important to study these expectations of what benefits ICT can give to the society from a critical view (Walsham, 2012). It is vital that ICT in sustainable development is not introduced in an over-optimistic way that has been the case in other public sector settings (Heeks and Bailur, 2007).

A second dimension of "smart" can be linked to management of resources. In this context smart can easily be associated to the concept of sustainable development (SD). Historically, SD goes back to the 1960s and was used in economic terms. Ten years later the concept started to appear in environmental management (Hansson, 2010; Mebratu, 1998; Partridge, 2005). The word "sustainable" means in general terms that something can be maintained or go on for a long time and

the word “development” denotes progress and growth. The concept of SD, however, became a significant concept with the Brundtland report in the World Commission on the Environment and Development in 1987 (Mebratu, 1998). According to the Brundtland report, SD is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 43). In this regard, SD could be interpreted as needs driven development (cf Mebratu, 1998); also taking into account the preservation of the environment. As such, SD can be linked to on-going economic growth and development. Further, literature on SD reveals two stances toward the concept. One which is in line with the quotation above, and according to this view it is possible to use natural resources as long as we pass on other solutions instead. The second view is more radical and strictly promotes preservation of resources, i.e. it cannot be substituted by anything else. These two views are also referred to as strong and weak views of sustainability (Hansson, 2010; Holden et al. 2008). The long term effects of urban developments, and planning and use of different resources, naturally put questions of sustainability on the agenda. Hence, the discourse of sustainable development could thus be expected to be central to city management and smart city initiatives, especially in the subfield of urban planning and development. However, as there are many stakeholders involved in this type of projects we also expect different interpretations of and perspectives on how ICT can be used in a sustainable way. Below, we continue to outline the different perspectives of SD that we have identified in the literature.

Ecologic sustainability refers in general terms to a viable usage of natural resources. Here it is a question of designing activities so they meet the needs of the people and at the same time preserve the environment. Areas of concern are water, energy and material supply; areas which directly concern urban development. ICT in this context often refers to technologies or systems that directly address environmental sustainability, also called Green IS/IT (Jenkin et al., 2011). According to Dedrick (2010) green IS refers to the use of information systems to achieve environmental objectives, while green IT emphasizes reducing the environmental impacts of IT production and use. In the latter case, IT in itself is part of the problem, i.e. producing and using IT has an increasing influence on the global energy consumption. Green IT is, thus, an approach to reduce technology’s negative impact on environmental issues. In this article’s context green IS is most emphasized, even though green IT also is an applicable concept in sustainable urban development. Green IS/IT can be regarded as an entrance for IS researchers to contribute to a sustainable environment. Dedrick (2010) suggests a green IS research agenda, where among other issues policy studies and empirical studies of ICT’s possibilities to improve societal sustainability are highlighted. This is in line with this article’s research ambitions. Watson et al. (2010) argue that the IS research community to a large extent has been ignorant to the challenge of SD so far. Therefore, they propose research questions that need to be explored by IS researchers; e.g. how information systems can be used to change social norms to increase energy efficiency. Jenkins et al. (2011) also acknowledge that green IS research on a societal level is, although very much needed, still sparse. They also present an agenda for green IT and IS research by developing a framework with four components; i.e. motivating forces, environmental initiatives (Green IT/IS strategies and Green IT/IS), environmental orientation, and environmental impacts. This framework focuses on the organizational level. These are all arguments that support our approach to study how ICT is spoken of in urban development projects.

Historically ecological movements emerged as a critique of a too narrow focus on economic growth (cf. Partridge, 2005). Urban areas are however characterized by increased levels of contact points

and interactions, concentration of power and culture, and as such, cities give more “opportunities for wealth creation, resource distribution and efficient use of scarce natural resources” (da Silva et al., 2012, p. 129). It can thus be argued that cities play a key role as generators of economic capital. Hence, economic sustainability has come to refer to a viable use of resources (monetary, human, natural); a question of using resources optimally to create a balance over time. New, wiser and smarter ways (involving ICT) of managing the city and its resources by for example offering/delivering new services to citizens could be expected to drive innovation (cf. Nam and Pardo, 2012b), and thus in the long run, contribute to a “sustainable economic growth and high quality of life” (Caragliu et al., 2011, p. 70). Chourabi et al. (2012) even go so far as meaning that creating “an environment for industrial development is pivotal to smart city” and the “economic outcomes of the smart city initiatives are business creation, job creation, workforce development” (ibid., p. 2293). These outcomes could be linked to questions regarding social welfare and social justice, which we will discuss further below.

According to Partridge (2005) the third of the three dimensions of SD, social sustainability, has received less attention than the other two. Social sustainability is according to her a more vague term, and therefore there is no concise definition of it. However, based on her review, Partridge (ibid.) presents five dimensions that she finds characterizes social sustainability; i.e. quality of life, equity, inclusion, access, a future’s focus and participatory processes. These dimensions could easily be linked to a smart city context. For instance, it is argued by Chourabi et al. (2012) that smart governance, which is designated as one important characteristic of a smart city, “is based on citizen participation” (ibid., p. 2292), which allows citizens to become active and participate in the “governance and management of the city” (ibid., p. 2293). This touches upon many of the dimensions that Partridge (2005) means social sustainability stands for. Giving access to the governance processes by letting citizens participate in them, something which conventionally has been ignored according to Chourabi et al. (2012), is also a way to create a sense of inclusion and let people and communities influence their quality of life. However, from a SD perspective it is argued by Partridge (2005) that a balance between the three dimensions – ecologic, economic, and social – is necessary.

To conclude this theoretical discussion of SD and ICT in the context of smart cities, we agree with Caragliu et al. (2011) who argue that social and environmental sustainability are “major strategic component[s] of smart cities” (ibid., p. 68) and together with a balanced economy they are pointed out to be the cornerstones of sustainable urban development. Therefore, as Meadowcroft (1997) claims, sustainable development norms, of which smart city initiatives could be seen as part, need to be integrated into “existing planning structures and processes” (ibid., p.450) . However, it is also clear that new governance structures are necessary in order to achieve desired results (Chourabi et al., 2012; Nam and Pardo, 2011b). Our article is, thus, in line with Meadowcroft’s (1997) call for a closer view of how SD norms and ICT are discussed and implemented by different stakeholders in the planning phase of an urban development project.

3 Method and Case Study Introduction

This study has a qualitative and interpretative single case study approach (Walsham, 2006; Eisenhardt, 1989; Benbasat et al., 1987). As we are exploring how different stakeholders talk about and make meaning of ICT in an urban development project context, we also acknowledge different

views and interpretations thereof. In line with this reasoning, this study draws on a social constructionist approach (Burr, 1995) where emphasis lies on understanding the different versions of reality and how they are produced and reproduced by its members in the particular context. A social constructionist approach when analyzing how ICT is spoken of by different stakeholders in an urban development project could be expected to contribute to several understandings. First, discourse is in this context to be treated and understood as constructing the phenomena; i.e., ICT as a part of urban development and SD, rather than reflecting its essential properties or characteristics. From this perspective, rhetoric and narratives are important dimensions in understanding and interpreting the making of meaning of sustainable urban development and ICT. Second, discourse is to be understood as having both an epistemological dimension to it as well as a performative dimension, thus, contributing both to knowledge and actions within this particular area (cf. Potter, 1996). This allows us to explore epistemological agreements and/or disagreements among different stakeholders in how they operationalize ICT in the context of an urban development project and how this can be related to SD.

The case study has a longitudinal approach where we have followed and studied a particular local urban development project for 17 months. During this period the following phases were conducted in the project; competition, exhibition, planning process, exploitation, procurement, and local political decision (see figure 1). The selected project comprises a local urban development project in a city of Sweden. The particular project has high ambitions as it is not only aiming at building a new urban area, but also to organize a home and society construction expo in parallel. The project vision also reveals high ambitions when it comes to social and ecologic sustainability and for that reason it is well aligned with the purpose of this article. Hence, it provides a contemporary case for exploring how different stakeholders talk about and construct meaning of ICT in urban development and how this can be understood as different discourses of SD. Three main stakeholders have been identified; i.e. the municipality including the different municipal departments (being the project owner); the expo corporation (being the performer of the project), and the strategic partners (i.e. the local energy provider and the local university). Identified actors at the municipality are politicians and civil servants. Further, the project team consists of a project leader, who is also the CEO of the established expo corporation, and a communicator, who is also the marketing director of the project. Both partners have appointed internal project coordinators, and apart from these two actors, the assistant manager of the local energy company also has a salient role in the project.

For the data generation we used a triangulation of methods (Denzin, 1970): participatory observations of workshops and different project meetings, recordings of specific project meetings, and documents such as policy documents, project information material, and project web information. As focus lies on how different stakeholders talk about and construct meaning of ICT and SD in urban development, we thought it necessary to cover the planning process in large and in small, i.e. from policy level to practice. Accordingly, we have chosen to analyze three particular plan documents (A, B, and C in figure 1 below) which represent the visions and goals of the new urban area. The first, the vision document (A), is the project plan which is a document illustrating the municipal perspective of the direction of the project. In this document we analyze and characterize the municipal take and the project perspective on ICT and SD. The second, the competition program (B) for architects, is a vision document directing the architects in their work of designing the new area. This document is put together by a program committee consisting of not just municipal officials, but also experts in the field of urban development. The third, the winning design (read

“Urb@n plan” in figure 1 below), represents the architects’ perspective on the design of the new urban area and SD. This document also sets the direction of the continuing municipal planning work. In all three documents we have focused on what is stressed in the particular context, how ICT is spoken of and how this can be related to sustainability.

We have then chosen to compare these findings with observations made in practice through case interventions in different planning contexts in the project. Intervention 1, in figure 1 below, consists of participation in so called dialogue meetings arranged by the project team. These meetings were four in total and mainly attracted participants from the municipal departments. We attended all four of these meetings and notes were taken. Intervention 2, illustrated in the figure 1 below, consisted of six so called workshop cafés. These workshops were arranged by one of the main partners in the project (the university) and each workshop focused a specific interest. These workshops attracted researchers and targeted interest groups. We attended four of these workshops and notes were taken. The ideas gathered during these workshops were also documented in a database and we have had access to this application. Intervention 3, illustrated in figure 1 below, represents a specific development project within the project, i.e. a planning of a hackathon event. The aim of the hackathon was to come up with an idea for an ICT solution to support information and communication between energy consumers and energy providers, and then develop it. This particular project was managed by the local energy company and supported by researchers and other targeted interest groups. We have attended two of these planning meetings and they have been recorded and transcribed.

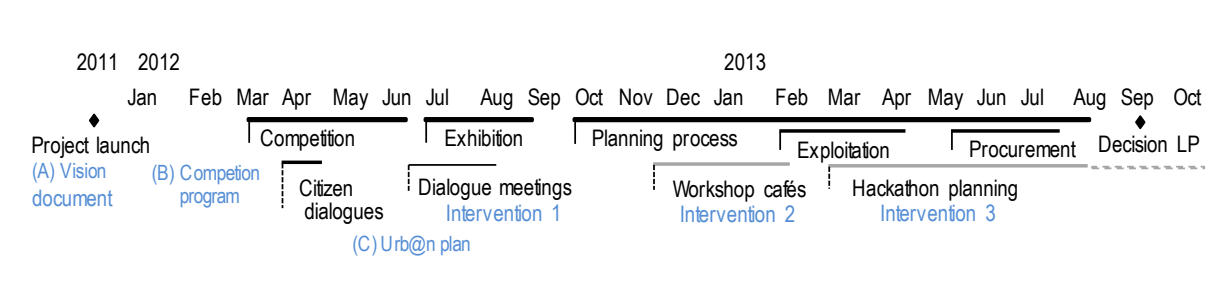


Figure 1: Project process and research interventions

Both the policy agenda and the prolongation of it in practice, i.e. actions taken to carry out the policy, contribute to what Potter (1996) refers to as epistemological and performative dimensions of different discourses. Hence, by critically analyzing what is said (or not said) about ICT and what actions are taken in practice, we are able to understand different stakeholders’ views of ICT and how they can be understood as different discourses of SD.

4 The Urb@n Case

The studied urban development project, here called “Urb@n”, was initiated and decided in the municipal executive board in 2011(see figure 1 above). Urb@n is a new area to be built from scratch within a larger city in Sweden. Short after the project launch a project team was formed and given the task of realizing aims with an open and transparent approach. Due to the particular location of the area, which is next to a university campus, and an outspoken ambition in the project to connect the city with the university, the university has become an important partner in the project. In

addition to this partner, the local energy company (publicly owned company) also has a central role in the project.

As mentioned above there are three documents that together can be seen as setting the frame and direction of the work and development of the area; the project vision document, the competition program, and the winning design proposal Urb@n (A, B and C in figure 1 above). The contents of these documents will be further described below. First, the project vision officially expresses the municipal's intentions of what is to direct the work in the development project and it is stated in the vision that the project is to be guided by the motto: "the human builds the city" (vision document, p 5). Further, three pillars are pointed out as essential to the project; i.e. knowledge, social sustainability and creativity. As a consequence, the planning and implementation process is explained to be characterized by "extended dialogues and development of new knowledge" (ibid.). The vision document also explicitly points out twelve foundation stones to the project and ICT constitutes one of these stones. Apart from being a foundation stone of its own, ICT is also mentioned when it comes to participation, here social media is remarked as a "particular important channel" to create "unexpected meetings and new exchanges of knowledge" (p. 18). ICT is also implicitly mentioned in the area of environment, energy and technical systems. Here it is spoken of in the context of new innovations within the area of environmental technology.

Second, the architecture competition program (B in figure 1 above) sets the direction for the architectural work and the design proposals. Architecture competitions (indicated as competition in figure 1 above) is nowadays often used in urban development projects. In this case, as in other similar cases, a competition program was set up by a special group of people (consisting of layout planners, project leader, civil servants from the municipality, and other people with special interest and expert competences). Thus, this document constructs their interpretation and intention of the urban development project. In this particular case four visions of the new urban area are highlighted in the program; i.e. 1) a miscellaneous area, 2) an area for meetings and participation, 3) an area in change, and 4) a climate smart area (competition program). In this document ICT is spoken of in two contexts. First, it is spoken of in terms of mobile technology for communication and brought up in the context of modern flexible ways of working. As a consequence, it is established that urban development needs to provide flexible solutions that give space for a "softer transition between work, recreation and social life" (an area for meetings and participation in the competition program, p. 11). Second, ICT is explicitly brought up as a part of the work and development of resource-efficient systems in the fields of energy, waste and transport (climate smart area). Here it is stressed that work needs to be done on both "information and IT solutions" (p. 12). Interesting to note is that it is only in the third vision (an area in change) that sustainability explicitly is brought up.

Third, the winning design proposal Urb@n (C in figure 1 above) articulates and constructs the architects' interpretation of the competition program and view of the area. Interestingly ICT is given a very minor role in this document. Here ICT is only spoken of in terms of smart grids in the context of energy infrastructure. It is stated that the area is to be developed with smart grids "which gives opportunities to both consume and supply electricity" (Urb@n plan, p. 4). In this urban design document the social dimension is mainly interpreted as an architecture concern, and implemented through the compact urban form which the winning architects mean creates natural meeting spaces in the daily life. The winning design proposal (Urb@n) has served as the foundation for the continuing detail planning process in the municipal administration.

| Project vision | Architecture competition | Urb@n plan |
|--|---|---|
| ICT as an explicit and exclusive dimension contributing to efficient use of natural resources, increased accessibility, service and social presence. | <p>ICT as an explicit dimension included in the context of participation and softer transition between work, recreation and social life.</p> <p>ICT as an explicit and exclusive dimension in the context of resource-efficient systems within transport, energy and waste.</p> | ICT exclusively mentioned in the context of smart grids, which makes it possible to consume and supply electricity. |

Table 1: Summary - characterization of ICT in the different policy documents

The project process follows a rather traditional approach to urban planning and development; i.e. set up of a project and a project team, launch of an architecture competition followed by an exhibition of the design proposals, and the municipal planning process resulting in a local plan (LP in figure 1), which eventually is decided by the municipal council. Parallel to these processes the work with exploitation and procurement are also performed. Due to the intentions of the project, where the planning process also was to be characterized by dialogue and participation, the project team initiated different activities in parallel with these traditional processes. For example, in parallel with the competition period (see figure 1) the project team worked with citizen dialogues to get further input to the architects in their work with the design proposals. In addition to this and in parallel with the public exhibition of the design proposals, so called dialogue meetings (see figure 1) were held by a consultant firm (procured by the municipal council). These meetings were focused around four to the area characterizing themes: 1) Urb@n as the learning area, 2) Urb@n as the creative area, 3) Urb@n as the social sustainable area, and 4) Urb@n as the resource-efficient area. The aim of these meetings was to come up with innovative ideas and the used methodology to achieve this was through creating advertisements. These meetings mainly draw interest from the different municipal departments (linked to each theme), the publicly owned companies, and the partners in the project. ICT was not explicitly in focus in these meetings, however, some of the ideas implicitly or explicitly built on the implementation and use of some ICT element. For example, when discussing social sustainability (theme 3) ideas of health-related and energy-related services (mobile applications) were discussed; when discussing the second theme creativity visualizations were brought up (also in the context of energy consumption); and when discussing resource-efficiency (fourth theme) ideas of consumption visualizations and development of an application indicating resource-efficient behavior was explicitly discussed.

In parallel with the municipal planning process of the development of the local plan, the university in its role as project partner initiated a workshop series (read workshop cafés in figure 1 above). These workshops gathered first and foremost researchers but also practitioners and were aimed to generate and process ideas. These workshops focused six different themes; 1) energy and buildings, 2) transports and mobility, 3) special session of buildings aimed at construction firms, 4) creativity, innovation and entrepreneurship, 5) education and learning, and 6) collaboration and daily life. The ideas were recorded in a web-based content management system during the sessions and thereafter processed by specially set up expert groups. These expert groups consisted of researchers and representatives from public and private companies with a special interest in the particular theme.

Focus in this work was to priorities, identify project owners, propose projects and support constructors in their work. ICT was not an explicit theme during these workshop cafés, however, it was established by the organizing group that ICT in one way or another imbued all other themes. For example, some of the ideas generated in the discussions concerned ICT-based services, often spoken of in terms of different “Apps”, e.g. a carpooling app, a kitchen-utensil pool app, and a hardware pool app. In the context of education and learning ideas supporting development of different apps for learning purposes were put forward. Further, in the context of energy and smart grids new services (apps) or visualizations of for example consumer behaviors/patterns were discussed. Other topics that were brought up were the use of metering systems and sensor technology to manage and control energy in homes and businesses. Also different automation systems were discussed, e.g. systems supporting different household machines to automatically start according to set parameters. It also became apparent in the discussions and in the proposals that the future residents (in the role of consumer and user) should be involved and engaged in the development process and that the development should be demand-driven.

It became apparent to the coordinator of the workshop cafés that ICT had emerged as a theme more or less permeating all the workshop cafés. As a consequence he initiated discussions with people with ICT competences or ICT connections. In these discussions the idea of a hackathon emerged (see figure 1 above). A hackathon (i.e. hacking marathon) is an event to innovate and develop prototypes, often very limited in time (Raatikainen et al., 2013). This idea was absorbed by the local energy company as this was an idea that fitted into their discussions and work on developing new communication and interaction models with their customers. A small group of people (with different backgrounds) was gathered by the energy company to discuss and plan a hackathon. The initial meeting focused on presenting previous work done in different contexts, i.e. an internal workshop at the energy company, the workshop cafés arranged by the university, and work done by the project team. It was pointed out by the energy company (being the basic energy provider in this city and in charge of the energy infrastructure) that their purpose for taking part in a similar event was to develop new models for communication with the end user, and the idea of some sort of “killer app” was initially introduced by them. They saw this development as a new strategic field in which they could develop new business models. The continuing discussions and meetings concerned different themes of what could be realized during a hackathon, e.g. energy management and control system, services/applications for error report, giving feedback on consumption patterns, an application for making sustainable decisions, etc. In this context it was discussed that the end user should be involved and that a need analysis should serve as an input to what should be the focus for the “hacking event”. Other issues raised in the meetings concerned what is necessary for arranging a hackathon; e.g. what kind of data that needs to be provided, in what format this data should be available, who the owner of the data is, and more practical questions concerning what kind of Internet connections, cables, etc. that are necessary in order to carry out a hackathon.

| Dialogue meetings | Workshop cafés | Hackathon planning |
|--|---|--|
| <p>ICT mainly implicitly mentioned, and when explicitly discussed often spoken of in terms of visualizations or services in the field of energy.</p> <p>Focus on marketing of the project and the coming expo.</p> | <p>ICT mainly implicitly mentioned, and when explicitly discussed often spoken of in terms of visualizations and apps for changed behavior, new services in form of new apps, smart grids, etc.</p> | <p>Explicit focus on a particular ICT development of a new service; i.e. a “killer app”.</p> <p>Focus on business development.</p> |

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| | Focus on sustainable development. | |
|--|-----------------------------------|--|

Table 2: Summary - characterization of ICT in the different planning events

5 Discussion

In this article, we are studying what is said and not said about ICT in relation to the three sustainability perspectives by stakeholders in the case. We explore who talks and who initiates the discussions from a certain perspective. In the previous section, it is obvious that ICT has had different roles and been attributed different sustainability characteristics in the different phases of the planning process. First, in what we here label as the policy perspective, i.e. the agenda and direction of the particular urban development project, it is clear that ICT only is spoken of in terms of social and ecologic sustainability. As the three plan documents build on each other it is not a surprise that they follow a specific logic on how the different stakeholders have treated the sustainability dimensions. On the contrary, the different stakeholders have acted as would be expected of them. Local politicians, plan architects and civil servants have in their role as municipal representatives included sustainability dimensions in the project vision which are in line with general discourse of SD (cf. WCED, Brundtland report, Partridge, 2005; Hansson, 2010). For example, the focus on social sustainability could be seen as a response to previous lack of attention (cf. Partridge, 2005). The recent development of e-government/e-governance within the public sector could also explain why ICT is spoken of in term of participation and accessibility of services. Pointing out different ICT-based technologies, like for example social media, as important channels for idea gathering and communication with citizens in the project does, however, convey a rather naïve picture of how this stakeholder group perceives ICT use in the context of social sustainability. Presence in social media does not necessarily trigger involvement or engagement from the part of the citizens. Unless the medium is used in a strategic way there is an obvious risk that the anticipated communication fails. Thus, this kind of endeavors not only calls for an understanding of technology use, but also allocated resources to work with it, something which not has been apparent in this case. Nor is it a surprise that ICT is brought up in the context of resource-efficiency, which can be directly related to ecological sustainability (Dedrick, 2010). This fits well with the general SD (WCED, Brundtland report) and green IS (Dedrick, 2010; Jenkin et al., 2011) discourses. Notable is that in both these cases ICT, even though explicitly mentioned, is still more or less black-boxed. This could either be an indication of lack of ICT knowledge or a way of keeping it open for other stakeholders to interpret.

The second plan document, the architecture competition program, could be seen as an extension of the project vision and, thus, follows the same logic. The main difference between these two plan documents is that the first targets the end product (the urban area) and the second targets both the process and the end product. Thus, the social dimension is in the competition program more linked to dimensions of quality of life (cf. Partridge, 2005) and people and communities (cf. Chourabi et al., 2012) than to governance dimensions. Perhaps, this is not so surprising either as this kind of document is constructed to convey a picture to the architects of what kind of community and people this area is supposed to attract. The specific area is in this context marketed as ‘climate smart’, which reinforces the ideal picture of how ICT can be used to sustain the environment (Caragliu et al., 2011). The third plan document, the winning proposal, differs from the other two plan documents in the way that it presents the architects’ interpretation of the urban area to be developed. In their expert role as architects it is interesting to note that the social dimension is solely interpreted as created by

the physical space. Thus, according to their view it is the urban form (design) that generates a sense of inclusion and equity (cf. Partridge, 2005). ICT is by this stakeholder group only interpreted as an ecologic concern, and even in this context it is vaguely used in terms of smart grids. In sum, our analysis of the plan documents indicates a tendency that ICT is an explicit dimension in the project vision, contributing mainly to social and ecological dimensions of sustainability. However, further down the chain the role of ICT is reduced to only be a part of an ecologic dimension of SD.

Noteworthy is also the implicit mentioning of economic development in the plan documents, i.e. often mentioned in terms of innovation. Even though not explicitly mentioned as a dimension in the project, a motive for urban development is to contribute to economic growth. ICT is, however, not in this context spoken of in terms of driving this development (cf. Chourabi et al., 2012; da Silva et al., 2012).

When it comes to practice, i.e. implementation of the visions in the actual planning process, ICT has depending on the context either been an implicit dimension in the discussions or, as during the hackathon planning, totally in focus. In practice discourses concerning or relating to ICT can mainly be understood as part of ecologic and economic SD (cf. Caragliu et al., 2011). We also note a difference in how prominent ICT is in the different discourses depending on the aim of the activities. For example, ICT appears to have a more prominent role in activities and discussions regarding resource-efficiency than in contexts of social sustainability. In addition, we have noted a variation in how different stakeholders initiate and drive certain SD perspectives. Similar to the plan perspective everyone is in practice contributing according to what can be expected of their role. For example, in the role as project leader also lays an expectation to involve and engage different stakeholders in the planning process as a way of fulfilling the aim of social sustainability (cf. Partridge, 2005). Hence, the dialogue meetings could be seen as an answer to that expectation. However, the longer into the planning process it is also obvious that these participatory processes went from citizens and layman focus to target experts, officials and other stakeholders. Hence, there is a potential risk that the future residents' perspective is overlooked. Also the university representatives can be seen to act in accordance with what is expected of them in their role as partners. Participating researchers could be seen to have an expert and advising role, at the same time as they have a personal stake in specific topics.

When it comes to the contents of these meetings (both dialogue meetings and workshop cafés) ICT appears to have a less salient role. Interestingly though, independently of each other, ICT was in both of these idea generating contexts mainly taken for granted, when discussing other types of development, like new services, especially in the energy area. Further, it is no surprise that ICT is an explicit dimension in the discussion and planning of the hackathon (cf. Raatikainen et al., 2013). However, there are two observations to be made. First, even though there is an explicit focus on a particular ICT development event, the technology is both black-boxed and taken for granted at the same time. Second, even though focus in the planning meetings revolves around the development of a product, the "killer app", the energy company makes clear that to them this is a strategic business concept development. Hence, in this case economic development (cf. da Silva et al., 2012) could be seen to drive ecologic development, something which can be compared to what Chourabi et al. (2012) refer to as an industrial development.

6 Conclusions

The purpose of this article has been to critically analyze and characterize how ICT is spoken of (or not) by different stakeholders in an urban development project. Our findings show that there are discrepancies between how ICT is spoken of on a policy level and in practice. On a policy level, ICT is mainly spoken of in terms of social and ecologic sustainability, meanwhile in practice it is economic and ecologic sustainable development that are in focus. Conclusions to be made from this are twofold; first, this indicates that ICT is attributed different roles in different contexts, and second, this indicates that there exist separate discourses.

Another finding is that the technology is both taken for granted and black-boxed at the same time. This indicates rather naïve conceptions and understandings among stakeholders of what characterizes ICT and how it can be used for different purposes to support sustainable development. We see a clear tendency that business concept development (involving ICT) overrides user perspectives and user needs. This implies that there is a potential risk that smart city initiatives, like the development of a “killer app”, only becomes an economic concern without contributing to sustainable development. Moreover, the almost total lack of critical stance towards the use of technology in different contexts might also turn out to be counterproductive from the point of view of sustainable development.

The critical concerns raised above, evoke yet another issue connected to smart city initiatives and that is the discussion on resilience. Therefore, an important insight from analyzing this empirical case is that it is important to not only take the three perspectives of sustainable development into consideration in agenda and policy setting, but also to make them explicit dimensions in the actual planning activities. This conclusion fits well with previous normative discussions on smart city initiatives and sustainable development. We also see a need for a more explicit discussion on ICT and how, where and when it can and should make a contribution to sustainable urban development. Hence, it is important to critically study both advantages and disadvantages of smart city initiatives in the context of sustainable development. Here IS researchers obviously have an important role to play, which is in line with previous findings from, e.g., Watson et al. (2010), Walsham (2012), and Meville (2010).

In this article we have studied the planning phases of a local urban development project. In order to fully understand how ICT are viewed by different stakeholders we need to conduct further studies. We must analyze several urban development cases, but also explore other phases within urban development processes. In order to reach comprehensive understanding of sustainable development of smart cities, we need to study also other components besides ICT. There are of course a lot of topics that influence sustainable development (energy solutions, construction material, education, values and culture to mention a few very different but important topics). However, in this article we have taken the first steps towards increased understanding of ICT's role in sustainable development. We are now going to conduct further studies along this line.

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