

Customer Value Research and ServQual Surveys as Methods for Information Need Analysis

The Ubiquitous City Songdo as a Case Study

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Abstract

Introduction. This article introduces two methods of information need analysis to study the acceptance of so-called “ubiquitous services” (u-services) in a ubiquitous and “smart” city. Case study is New Songdo City in South Korea. Our research is motivated by questions like: (1) Do such cities really react to the information needs of people? and (2) How can one ascertain the success of a u-city in regard to the information needs?

Methods. To capture both questions we applied a ServQual-like survey as well as Customer Value Research as methods of information need analysis and interviewed residents in Songdo in early 2013.

Results. In regard to methodology, both methods proved to be very useful. The information needs of our residents are more or less satisfied with the offered u-services; the grade of irritation between developers and customers is rather low.

Discussion. Our research in Songdo provides first results in regard to the information need of the customers and the usefulness of the u-services in Songdo. For the future work it is important to continue and expand the research.

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1 Introduction

The fast growing information needs of the people are one of the main features of the 21st century. However, the task consists of the challenge to recognize, to identify and to satisfy the different information needs of the people. “Information need” (Case, 2007; Cole, 2012) includes all motives for information behavior (information search behavior as well as information presentation behavior) in order to satisfy human needs (Wilson, 1981: 8; Stock & Stock 2013: 469). The upcoming of ubiquitous cities and the implemented advanced information services enable information designers to consider every information need, instead of focusing only on the information search behavior (as in the past). Schumann and Stock (2014: 2) state, “[c]omplex information services satisfy complex human information needs.” The information need analysis should find out which information services in a u-city are desired, accepted or rejected. Developers all over the world accepted the challenge. They are designing and constructing so-called “ubiquitous” cities (u-cities) to satisfy the information needs of their citizens. In such u-cities information technology solutions (u-services) are present everywhere and every time by definition. U-services satisfy all basic information needs of the inhabitants of u-cities – that is what the developers tell us. U-services consist of “smart” locking systems, “smart” waste disposal, “smart” temperature and air quality control, “smart” meters, “smart” remote control of domestic appliances, “smart” light control, and free WiFi access to the Internet and its services. “Smart” mainly means the intelligent utilization of information technology and of the appropriate information content. A further aspect of “smart” technologies is the goal of “green” (e.g., low-carbon) and sustainable systems. If a city banks on smart systems and smart services, it is called a “smart city” (Dameri & Rosenthal-Sabroux, 2014). The idea of smart cities includes the reflection of a city that symbolizes a “sustainable and livable city” (Chourabi et al., 2012: 2289). Additionally, “the vision of ‘Smart Cities’ is the urban center of the future, made safe [and] secure environmentally green” (Hall et al., 2000: 1). For Caragliu, Del Bo and Nijkampf (2011: 70) a city is smart, “when investments in human and social capital and tradi-

tional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance.” According to Haubensak (2011: 34) “smart cities help to make urban systems clear, simple and responsive through modern technology.” It becomes apparent that information and communication technology (ICT) takes not only in ubiquitous cities but also in smart cities an important role to fulfill the aims. Often the ideas and implementations of smart and u-cities conflate with each other.

Particular one city in Asia attracts attention as ubiquitous and smart city: New Songdo City. Such u-city is appointed with ubiquitous infrastructure that contains services such as u-life services, whose aims are reflected in the realization of a more comfortable everyday life and workday. Are the services constructed to satisfy the information needs of the residents? It is important to find out if u-services even exist and, if the answer is yes, how they satisfy information needs.

In order to answer these questions, we use a questionnaire, which was constructed according to ServQual method (Parasuraman, Zeithaml, & Berry 1988). On the other side, derived from Customer Value Research (McKnight, 2006), the paper presents the assessment of the developers (Cisco & Gale International) relating to the satisfaction of their customers. The results should show if the two methods are suitable to answer our research questions: Do such cities really react to the information needs of people? and How can one ascertain the success of a u-city with regard to the information needs?

1.1 Case study: New Songdo City

New Songdo City (in short: Songdo) is part of the city of Incheon and about 40 miles away from South Korea’ capital city Seoul. Songdo is characterized as a reclaimed and backfill city with an area of 1,425 acres (Lee et al., 2008). Before the reclaiming began there were nothing than sea. According to Lee and Oh (2008) Songdo should offer an area for 65,000 residents and 300,000 workers. According to Segel (2005: 1) Songdo’s geographical position is suitable to be “the principal business hub in northeast Asia.” With its “strategic location, advanced infrastructure, and business-friendly environment” it offers a solid framework (Segel, 2005: 1). Two companies, the American developer Gale International and the Korean construction firm POSCO E&C, are responsible for the artificial structure of Songdo (Kim, 2010). According

to Kuecker (2013: 5) Gale International “planned an urban complex that was ambitious, futuristic, and utopian.” The American company Cisco is responsible for the information and communication infrastructure (Halpern et al., 2013). Songdo offers a lot of green places or rather parks. One of these green places is called Central Park (O’Connell, 2005). Facilities such as international schools, convention center, museum and a golf club are also represented in Songdo (Kim, 2010). Following Castells’ (1989) definition of informational cities (Stock, 2011), Songdo represents such a prototypical city of the knowledge society (Kim, 2013). According to Fietkiewicz and Stock (2015), smart and ubiquitous cities are the expressions of the digital infrastructure of an informational city. Songdo developers tried to make use of both aspects, smart and ubiquitous, with the aim to create on the one hand a green environmental-friendly city which would be fostered by ICT and on the other hand a city where the ubiquitous computing is everywhere and anytime available and supports action and decision. All over the world developers try to build eco-cities and some already exist (e.g., Masdar City in Abu Dhabi or Oulu in Finland) (Schumann, Rölike, & Stock, 2013). Songdo is chosen as a case study because it is one of few cities that are constructed from scratch on backfill land with the aim to develop a completely new ubiquitous and smart city. According to Shwayri (2013: 39 f.) “Songdo in South Korea [is] a self-declared ubiquitous eco-city or u-eco-city, as it strives to contribute to the making of a ‘Green Korea’.”

2 Methods

Two different methods were used to get not only quantitative but also qualitative results.

- The ServQual method represents the expectation and experience of a target with regard to specific aspects. To get the expectation and experience of the residents in Songdo, a questionnaire based on the ServQual method (Parasuraman, Zeithaml, & Berry 1988) was developed. The questionnaire includes 21 ServQual-like questions about u-city’s u-services with an evaluation criterion based on a seven-point-scale. One means the lowest and seven means highest agreement with the proposition. The questionnaires’ left-hand side represents the expectation and the right-hand side the

experience. The ServQual method provides three values (experience, expectation and difference value). The difference value arises by subtracting the experience from the expectation value. 21 residents were interviewed in their flats in March, 2013. From the 21 interview persons 14 are students. The variable N varies with regard to the questions. The students could not answer some questions, because they live in dormitories, where not all u-services exist. Nevertheless the number of participants is not sufficient to get general transferable results. Therefore a qualitative interview supported the questionnaire. The residents had the option to talk about their experience with the u-services.

- Customer Value Research is based on McKnight (2006) and leans on ServQual. Customer Value Research distinguishes from ServQual in regard to the participants. It focuses on customers *and* on developers. The aim of this method is to show, how well the developers know the needs and their satisfaction of their customers. The developers are asked to estimate the experience value of their customers (called modified expectation value). The difference value here represents “irritation.” To get the irritation value it is necessary, that the modified expectation value of the developers have to be subtracted from the experience value of the residents. The developers got the same ServQual questionnaire as the residents, but with the different, that they should have to ask themselves for each experience question “What do I expect that my customer said?” Here we are talking about the modified expectation value of the developers.

Our ServQual-like questionnaire is based on different preparatory work found in the literature. The original questions of Parasuraman et al. (1988) are not appropriate to analyze information needs. So it was our task to design a new questionnaire in order to study our research questions. The question *Should an apartment in a u-city have Audio/Video in every room for easier communication?* follows Sassen (2012) and O’Connell (2005). Sassen (2012) tells that not only every apartment but also offices and streets are equipped with video screens. Her statement is in line with O’Connell’s (2005) evidence that video conferencing should be an available option for residents. The special feature of such a video conferencing based on a system that works independently of a home computer. Manual handling for example in the domestic environment could be counteracted with a smartphone that acts in few clicks. According to Sassen (2012: 17; translated) “via smartphone [...] everything in the apartment can be controlled, from the room temperature to coffee machine.” Cisco Press Release (2012) discloses more the di-

versity of functions via smartphone. “With this solution, residents will be able to conveniently control lighting, air conditioning/heating systems [...] and all other home devices using touch-screen wall pads, mobile remote controllers and even smartphones” (Cisco Press Release, 2012: 1). Those aspects lead us the question *Should the technology in an apartment in a u-city be accessible via remote control (cell phone)?* We extended the questionnaire with two questions that also includes a handling, which is supported by a medium, here by a master panel (fig. 1). It bargains for the following two questions: *Should an apartment in a u-city have lighting control (Control via the ‘master panel’)?* and *Should an apartment in a u-city have temperature and air quality control? (Control via ‘master panel’)?* For John Kim, vice president for strategy at New Songdo City development, it is important to explain, that the smartcard (fig. 2) replaces the known house key. But the smartcard does not only open entry doors. “The same key can be used to get on the subway [...] and so on” (O’Connell, 2005). With regard to these information about smartcards it was important to ask the residents *Should a u-city have buildings with card access?*

With regard to Internet of Things (IoT) applications, an apartment in Songdo “includes [...] smart meters in each home to monitor electricity and water consumption” (Wildsmith & Smith, 2013: 272). The British Department of Energy & Climate Change (2014) describes such smart meters as follows: “smart meters will be offered [...] [and] an in-home display (IHD) lets them (the customers) see how much energy they are using [...]” In consideration of that information the question *Should an apartment in a u-city have smart meters?* was created. The question *Should a u-city have a central trash system which sorts the trash?* leans on Williamson (2013). Instead of the garbage collection trucks going around, all household waste is sucked directly from individual kitchens or corridors (fig. 3) through a vast underground network of tunnels to waste processing centers, where it is automatically sorted, deodorized and treated to be kinder to the environment. The questions *Should a u-city have (free) wireless Internet access?* and *Should an apartment in a u-city have (free) wireless Internet access?* follow Schumann, Rölike and Stock (2013).



Figure 1. Master panel



Figure 2. Door opening via smartcard



Figure 3. Trash disposal

3 Results

The results represent only a part of the 21 questions of the developed questionnaire. To represent every question would exceed the frame of this paper. The analysis of the first 6 questions (fig. 4) shows, that it does not exist a negative difference between the expectation and experience value of the residents. On the contrary, the residents often expect fewer from a ubiquitous city that it is offered in Songdo with regard to the first 6 aspect. Our research shows that the master panel allows for example to control the light in the apartment. The satisfaction value of lighting control is better than the residents would expect from u-city. The master panel offers different service. With your master panel you get the chance to see for example, what your children do at the playground or who is staying in front of your door. An in-

terviewed person showed us that you also get information about the usage of power by the master panel. You can also call someone or use it as a memo board. These master panels are installed in every apartment.

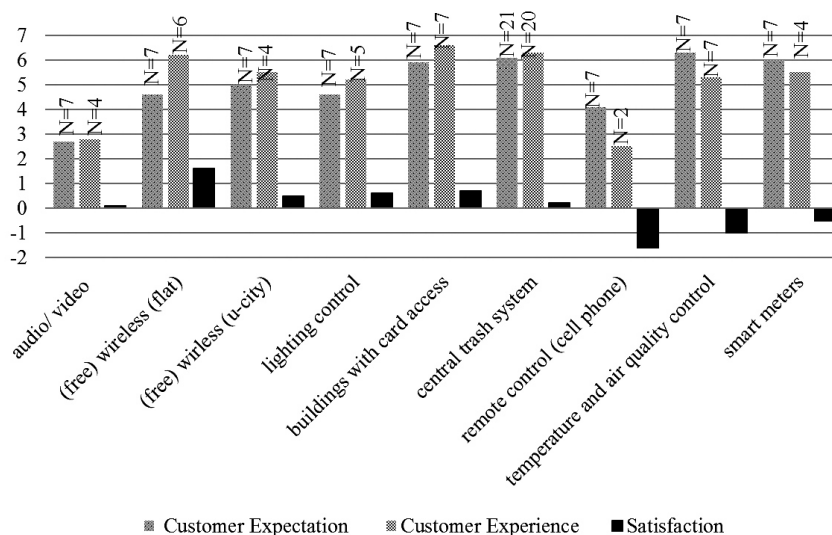


Figure 4. Songdo's u-services: The customers' view.

How can one interpret the single evaluations? For example the analysis of the question about a trash system (fig. 3) shows that residents expect an automatic trash system with a value of 6.1. With regard to Songdo itself and the experience about the trash system in Songdo with an experience value of 6.3, they are a little more satisfied than they expect (+0.2). One of the last three aspects shows that the experience was inferior to expectation. The satisfaction value of the aspect of remote control (-1.6) is in this analysis worst. That could be because the system controlling the procedures via smart phone (for example to open the door) works very slow.

Figure 5 presents an insight of the results of the Customer Value Research method. The evaluation shows that sometimes the developers expect better satisfaction values of their customer than it is actually. With regard to the second aspect 'lighting control', Gale International estimates the satisfaction of the customers nearly correct (irritation of +0.2). In contrast Cisco estimates that their customers are more satisfied than they are actually. This leads to an irritation value of -1.8. With regard to the question about "smart

card” both companies estimate the satisfaction of their customer better than it is. Both are sure that their customers are to 100% satisfied. In reality the customers are not far away of a 100% satisfaction (6.6 out of 7 points). The irritation values of both companies amount -0.4.

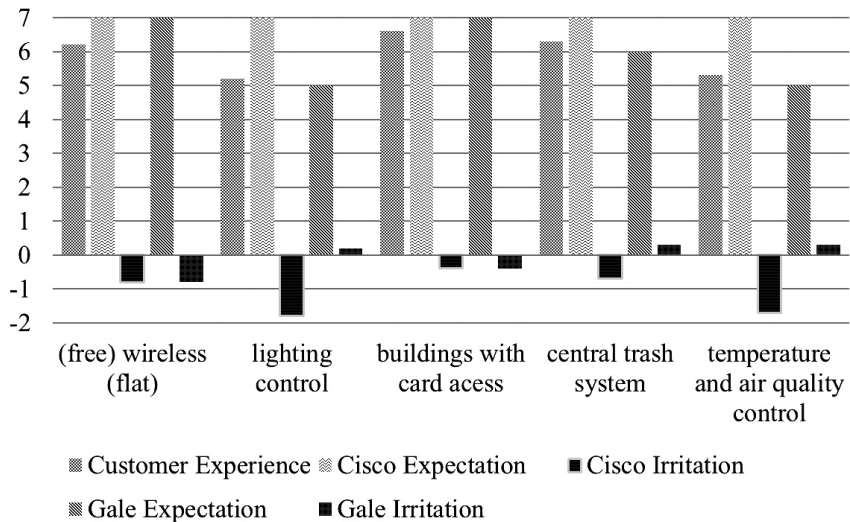


Figure 5. Songdo’s u-services: The developers’ view.

4 Discussion

According to a blogger called Nikola (2013) “Songdo is not an ordinary new city of South Korea at all. Everything, what a city needs, is there. But everything could have been executed a little bit better.” However, one of our participants answered: “Smart cities like Songdo are the answer to the high demand on new living and working facilities in Asia.” Our research in Songdo provides first results about the satisfied information need of the residents with regard to u-services and the usefulness of the u-services in Songdo. The two used methods of consumer research (ServQual and Customer Value Analysis) enable the chance to get evaluation about the usefulness of u-services and an evaluation about the satisfied information needs. The main advantage of both methods is the analysis of gaps between the expectation of

a service and the experience with the service. While ServQual only reflects the views of the consumers, Customer Value Research additionally includes the views of the service developers. After applying ServQual and Customer Value Research in our case study, we want to emphasize the appropriateness of both methods for information need analyses. For the future work it is important to continue and expand the research. In 2018 (presumably) the development of Songdo will be finished. One aspect could apply the check-up of the state of plans of the developers. Are the mentioned u-services implemented? Or does the city undergo a decline in relation to u-services and postmodern architecture?

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