NAVIGATING IN THE WORLD OF SERVICES – VISUALIZING A SYSTEM OF SYSTEMS

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ABSTRACT

Service design is a growing practice. Designers need new tools and frameworks for making sense of the intangible and tangible qualities of services. Customer journeys and service blueprints are among those tools. However, they typically address a specific service or a service package and lack of illustrating services as complex and relational systems. The challenge is to understand what kind of combinations services do and can create. This exploratory paper attempts to shed light on this challenge by first explaining the current frameworks, then introducing a case in which these combinations were studied and finally presenting a system experience map that attempts to visualize the combinations services create from the user point of view.

INTRODUCTION

Service design is often described as a holistic approach that is able to see the bigger picture of design problems (e.g. Mager, 2009b). However, the primary focus has so far been on singular services. The most common tools, such as the customer journey (Mager, 2009a; Koivisto, 2009), service blueprint (e.g. Shostack, 1984) and service ecology (e.g. Livework, 2008), are focused on analysing a single service or a service package. However, services create systems that function in parallel and are connected to each other. Manzini describes the situation as an "*existence of a horizontal system architecture where complex activities are accomplished in parallel by a high number of connected elements (technological artefacts and/or human beings)*" (2009, p. 48). In service science, these entities are called service systems that interact, create outcomes, and judge the value co-created by those interactions (Maglio et al., 2006). As it has been experienced in other contexts, designers are trained to envision systems from the perspective of the users (Miettinen, 2009) and that competence could be utilized also in the context of service systems. In the following we first briefly discuss the concept of service systems, visualization techniques and describe a 'system experience map' tool and a case in which the objective was to make sense of and visualize service systems from users' perspective.

SERVICE AND SERVICE SYSTEMS

There are multiple ways of defining service. The definition that is a base for service system thinking, and is utilized also in this paper is service being an act of utilizing one's competences for the benefit of another or the actor itself. The term 'service' stands for the whole process and idea of serving. Inside this process there can be different tangible and intangible goods that deliver the service to the user (Vargo and Lusch, 2004).

The service system definition in this paper follows the definition proposed by Maglio et al.(2006). A service system is a system of systems that are interwoven together forming complex adaptive social systems. These systems have internal and external structures meaning that as a service system consists of smaller service systems it also works together with other external service systems; actions on one end are reflected in the other end (see Figure 1). Service systems differ in scale but an example of a service system can be a university, municipality or a city centre. Service systems are value co-production configurations of people, organizations, shared information and technology. These all can be viewed as different types of resources. (Spohrer et al. 2008)

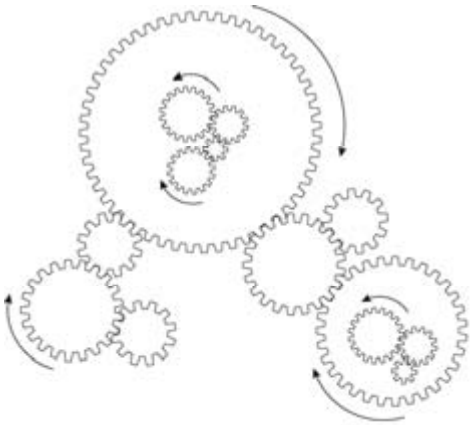

Figure 1 A service system with internal and external structures

As an example of a service system Spohrer et al. (2007) explain how a university builds up a service system. A university is a complex system of people and technologies working together. Instead of handling one co-production relationship, universities manage multiple relationships among different stakeholders. These include students and their peer experiences and government and its measurement systems. Universities have created processes and organizations to manage these various relationships. (Spohrer et al, 2007)

CASE STUDY

This paper is based on a project that focused on making sense of service systems and how they appear to the users. This was done through a case study conducted in a shopping centre in Espoo, Finland. The shopping centre was chosen as a context because of its way of combining both public and private services from health care and law services to entertainment and retail.

So far service systems have been discussed mostly from the organization management point of view. Through our study we wanted to explore how services are connected to each other from the user's perspective. The field study consisted of observing nine shopping centre visitors and documenting what kind of services they use during their visit. The participants were interviewed afterwards in order to get information on what kind of services they considered having used and experienced during the visit. Throughout the process visualizations were created and applied in different phases of the project to make sense and to communicate findings.

VISUALISATION TOOLS FOR SYSTEM APPROACH

The challenge in making sense, communicating and designing services and service systems is that they have little concreteness and visual evidence. Visualisation can *"make the ideas more tangible, complexity more readable and alternatives shareable, it applies quite well to support the communication between all actors involved, and the development of the process itself and its outcome"*. (Diana, Pacenti and Tassi, 2010, p.50.) Visual representation techniques should enable communication 1) in all the phases of a design process, 2) with all the actors involved in the process and 3) in different scales from the smallest details to overall view (Morelli and Tollestrup, 2007). Segelström (2010) sees visualizations as a bridge between user research and ideation. They are tools for communicating the collected information within the design team, with stakeholders, and for keeping the empathy towards the users in mind throughout the process.

Different tools for visualizing services from the system perspective have been in use and discussed before (e.g. Shostack, 1984; Morelli, 2002; Morelli and Tollestrup, 2007; Livework, 2008; Diana et al., 2010; and Segelström, 2010). In the following, some of the most common methods are briefly described.

Actors map [also called a service ecology (Livework, 2008), actor network mapping (Morelli and Tollestrup, 2007) and system map (Segelström, 2010)] is a graphical representation of the actors involved in service creation (see Figure 2). The map can be created by placing the service in the middle of the map and gathering the actors around it. The idea is to show roles and relations between the actors. (Morelli and Tollestrup, 2007.) However, when the amount of relationships grows the map's communicability and clearness suffer. It does not take the dimension of time into account either but presents the network of actors as a static statement even though different stakeholders affect services in different parts of the process.

Figure 2: An example of an actors map

A system map [also called a system platform (Morelli and Tollestrup, 2007)] describes the system organization using symbols, arrows and keywords (see Figure 4) focusing on the material, energy, information and money flows through the system. (Tassi, 2008.)

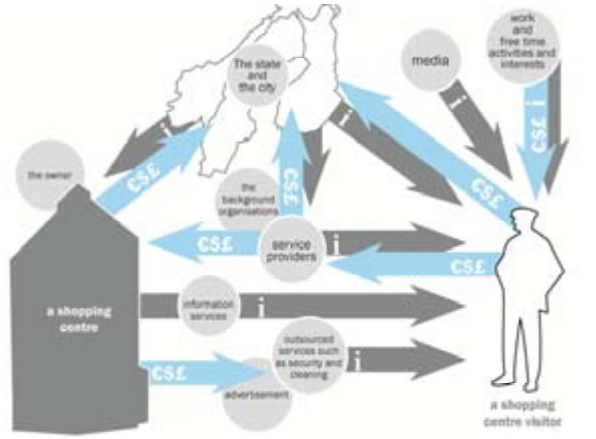

Figure 3: An example of a system map

Use cases, such as a service blueprint (Shostack, 1984; Morelli, 2002), give a detailed description of how a service works (see Figure 3). For instance, in the blueprint the actions visible to the user and the supportive actions happening in the backstage are described. (Morelli and Tollestrup, 2007.) However, when there are multiple operators responsible for the service experience a blueprint becomes difficult to manage. Wreiner et al. (2009) have experienced the challenge in presenting the several time lines and sequences between different actors.

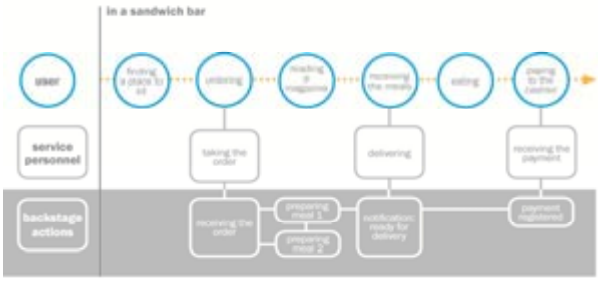

Figure 4: An example of a blueprint structure

A customer journey shows the service process from the user's perspective along a time axis (see Figure 5). The journey is a continuum of *service moments* that consist of *touch points* (Mager, 2009a). Service moments are like scenes in a television show. They have a beginning and an end containing smaller events. Every scene contributes to the overall storyline. This tool was the most influential in analysing the service system experiences in the case study.

Figure 5: An example of a customer journey

The existing methods see systems from a perspective of one service or a service package, not as a system of systems. In addition, there is not a particular tool that would combine the aspects of a service system and how people perceive them. The tools that have the capacity of showing multiple stakeholders, lack often means in describing the service as a process. The visualization tools that succeed in describing the process become unwieldy to compose and use with multiple stakeholders.

VISUALISATIONS IN THE CASE STUDY

During the case study, the system visualisations were used (1) for documenting the observations and interviews, (2) as a tool when interviewing the users, (3) for analysing the data and (4) in order to combine and communicate the findings, i.e. how people navigate in the service system. During these different stages it became clear that presenting a system of systems as a graph requires different elements from the tool than when presenting an individual service.

The first challenge is the contrast between the two main components; a system and experience. Describing a system requires taking a step backwards and getting an overall understanding, whereas, describing user perception calls for going close to the individual experiences that can be triggered from a very detailed part of a service system. The second challenge is the complexity of the time dimension. The events that take place in the present situation overlap and are affected by former events and future planning and expectations. Compared with other service representations, the service system representation has to have a capacity of handling multiple stakeholders, their relations and overlapping processes.

SYSTEM EXPERIENCE MAP

The system experience map in Figure 6 represents a collection of findings from the study and was created in order to communicate the user and system perspectives. It combines the dimensions of navigating in a shopping centre context and how users build connections between different services.

The horizontal axis shows the journey inside the shopping centre and the vertical shows how the services link together in a longer time frame as stories (see Figure 7). The difference to tools, such as the customer journey, is that the elements are not separate service moments but services connected to each other by users' associations. The order and existence of these story elements cannot be tracked down in a similar way as in customer journey or service blueprint. The customer journey on the horizontal axis ties the abstract mass of experiences into practice. The creator of a map is an editor who spots series of services from the stories that the users share. This map simplifies a big system into manageable collection of connected services that the users see as relevant and meaningful.

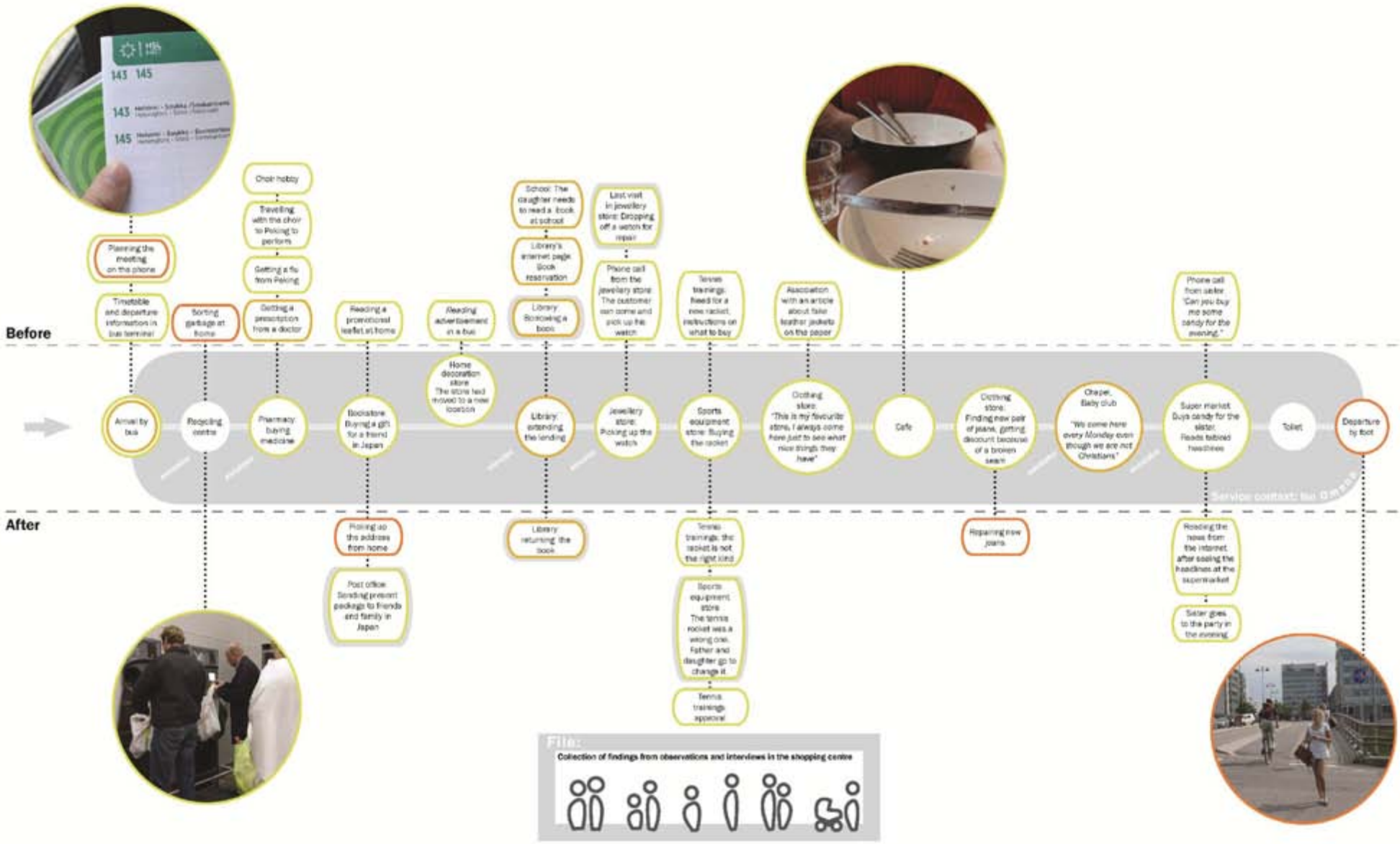

Figure 6: System experience map from the shopping centre case study. This map discribes how services in a shopping center (on the grey background) connect to other services in the users' lives (the vertical chains).

In order to maintain empathy and provide rich inspirational material quotations and pictures from observation and interview situations can be attached. A flow-type of representation technique was chosen to represent experiences even though the more realistic techniques, such as images and narratives, have traditionally been seen more effective in describing experience (Diana et al., 2010). This was because through maps and flows it is easier to show associations and relationships that people form between services through experiences in an economic way.

Figure 7: Services linking together as stories, a detail from Figure 6. From these two examples it is possible to see how a seemingly simple visit to a pharmacy or a bookstore in a shopping centre is actually intertwined with a use of multiple services. From these service chains it is possible to find service opportunities, partners for co-operation, as well as ways for understanding the users' processes also outside the service provider's service (in this case the shopping centre).

DISCUSSION

There is a need for visualisation tools that are suitable for representing systems. During the process the existing service design tools were explored, developed and in the end, a novel way of presenting service systems was introduced. This tool shows only one angle to the system and, as always, applying multiple tools provides a complete understanding about a system.

We have not yet tested the tool with service providers. However, we suggest that from an individual service provider's point of view the benefits of analysing a system deal with understanding how the service works as a part of a bigger whole. Who are "the others" in the same system and what kind of influence their actions can have in our service? Questions such as how the brand is positioned in relation with other services and how the service could be localised to fit the environment it is serving are addressed. Through these analyses it would be possible to find strategic partners and service networks. From a service system management perspective, it is important to understand that different services are not in conflict but support each other. By analysing system experiences one could better understand user needs and how successfully they are met.

One of the most challenging tasks for a researcher is to identify the boundaries of a service system. Maglio et al. (2006) have suggested that it can be done by identifying and interviewing stakeholders. This approach, however, has two problems, 1) often service systems grow that big that interviewing all the stakeholders is impossible or at least uneconomical and 2) identifying the stakeholders is one of the results of analysing the system, and they are not all known at the beginning of the process. In this study the topic of stakeholders was approached from the customer point of view by analysing what kind of combinations services create. The tool enabled seeing how services are connected to each other through stories. The stories are not formed only for the person to make sense of his world but they are also shared to others and communicated over the sphere of influence the service already has. The benefit in this approach is that also silent stakeholders can be found. By silent stakeholders it is meant different parties who are not part of the formal service system and do not hold a place in documents or organisation charts but still contribute or influence the service creation process. These silent stakeholders in the shopping centre case study were, for instance, a bus line passing for bringing customers, and a school program where all the students were required to bring a new book to school every month. Predefining the stakeholders has a danger that the silent stakeholders as well as opportunities for co-operation and finding new service ideas are not identified.

In the case study the system experience map helped in understanding how services affect each other from a distance and how also services outside of the shopping centre are present through the users. It provides new entrypoints to a service system and how it could be developed. By analysing, for example, individual, person to person services taking place in a service system there is potential in finding service opportunities

because through these actions the users fill in the gaps that the system might have. After identifying the most interesting actors in a system, other tools, such as blueprinting, can be utilized in a more detailed investigation.

The system experience map is a result of an iterative process and was created for the purposes of this study. However, we believe that it could be used in other contexts as well. The utilization of the system experience map can open new ways of seeing a system and it helps one in putting himself into the position of different users. Visualizing systems with multiple actors and processes is challenging. The biggest challenge lies in the massive amount of information and what parts of this information should be included and what not. These questions remain to be studied in future research.

ACKNOWLEDGEMENTS

We are grateful to Tekes for funding the SBC project, to Aalto Service Factory and Risto Rajala for supporting this study.

REFERENCES

Diana, C., Pacenti, E., and Tassi, R. (2010). Visual Tools to Design, About the role of visualization techniques for Service Design. *Design Research Journal* , 49-55.

Koivisto, M. (2009). Frameworks for structuring services and customer experiences. In Miettinen S., and Koivisto M. (Eds.), *Designing Services with Innovative Methods* (pp. 136-149). Keuruu: Publication series of the University of Art and Design Helsinki, B93, and Savonia University of Applied Sciencies.

Livework. (2008). *servicedesign.org, service ecology*. Retrieved September 9, 2010, from servicedesign.org: http://www.servicedesign.org/glossary/service_ecology/

Mager, B. (2009a). *Introduction to service design*. Retrieved September 9, 2010, from http://share2solve.org/introtosd/start/Main.html

Mager, B. (2009b). Service design as an emerging field. In Miettinen S. and Koivisto M. (Eds.), *Designing Service with Innovative Methods* (pp. 28-43). Keuruu: Publication series of the University of Art and Design Helsinki, B93; and Savonia University of Applied Sciencies.

Maglio, P. P., Srinivasan, S., Kreulen, J. T., and Spohrer, J. (2006). Service Systems, Service Scientists, SSME, and Innovation. *Communications of the ACM* , 81-85.

Maglio, P. P., Vargo, S. L., Caswell, N., and Spohrer, J. (2009). The service system is the basic abstractation of service science. *Information Systems and E-Business Management, Volume 7, Number 4* , 395-406.

Manzini, E. (2009). Service design in the age of networks and sustainability. In Miettinen S., and Koivisto M. (Eds.), *Designing Services with Innovative Methods* (pp. 44-59). Keuruu: Publication series of the University of Art and Design Helsinki, B93; and Savonia University of Applied Sciencies.

Miettinen, S. (2009). Service Designers' Methods. In Miettinen S., and Koivisto M. (Eds.), *Designing Services with Innovative Methods* (pp. 60-77). Keuruu: Publication series of the University of Art and Design Helsinki, B93; and Savonia University of Applied Sciencies.

Morelli, N. (2002). Designing Product/Service Systems: Methodological Exploration. *Massachusetts Institute of Technology, Design Issua, Volume 18, Number 3* , 3-17.

Morelli, N., and Tollestrup, C. (2007). New Representation Techniques for Designing In a Systemic Perspective. Stockholm: Design Inquiries.

Segelström, F. (2010). *Visualisations in Service Design.* Lingköping: Lingköping Studies in Science and Technology, Thesis no.1450.

Shostack, L. (1984). Design Services that Deliver. *Harvard business Review* , 133-139.

Spohrer, J., Anderson, L. C., Pass, N. J., Ager, T., and Gruhl, D. (2008). Service Science. *Journal of Grid Computing, volume 6, number 3* , 313-324.

Spohrer, J., Maglio, P.P., Bailey, J., and Gruhl, D. (2007). Steps Towards a Science of Service Systems. *The IEEE Computer Society* , 71-77.

Tassi, R. (2008, October). *Service Design Tools, Communication Methods Supporting Design Processes*. Retrieved October 15, 2010, from Service Design Tools, Communication Methods Supporting Design Processes: http://servicedesigntools.org/

Vargo, S., and Lusch, R. (2004). Evolving to the new Dominant Logic for Marketing. *Journal of Marketing vol. 68* , 1-17.

Wreiner, T., Mårtensson, I., Arnell, O., Gonzales, N., Holmlid, S. and Segelström, F. (2009). Exploring Service Blueprints for Multiple Actors: A Case Study of Car Parking Services. Oslo: First Nordic Conference on Service Design and Service Innovation