Introduction to a Service Prototyping Tool Box

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Abstract. Service prototyping is a relatively new discipline that requires s innovative ways for using current technologies, tools and approaches to offer rapid, accurate and cost-effective service prototyping solutions. These solutions should bear the capability to mitigate the risks connected with unforeseen problematic issues based on the service design specification, or aspects of it delivery. Thus, offering cost saving and effective service prototyping solutions with improved quality. One of key challenge in this quest relates to the selection of tools and established techniques that can provide fast iteration development process to service prototyping by enabling the integration of user comments and suggestions. For this reason, an innovative toolbox approach is taken for services prototyping where set of appropriate tools depending on the nature of service can be picked at different phases of service prototyping lifecycle. The paper presents the investigation conducted under the scientific project dimenSion, where initially service prototyping development matrix is created to support service provider to design and experience offered services as realistic as possible, thereby, laying the foundation to establish toolbox solution for service prototyping.

Keywords: Service Prototyping, Service Innovation, Service Design, Service Digitalization & Visualizations

1.1 Introduction

Service prototyping is a relatively new discipline that supports innovation, aiding designers in forming inventive concepts and ideas enabling the investigating and un-covering of related data about the target group. It also motivates communication, helping stakeholders to communicate the service idea throughout the organization enabling fast decision making. Correspondingly service prototyping permits early evaluation and testing, the evaluation can be done in various forms, including but not limited to usability testing and user feedback, surveys and interviews throughout the design process [1] [2]. The result of our qualitative survey [3] shown that there are three main reasons for which companies use service prototyping, first is to explore and find new ideas and solutions, largely for experimenting idea development or to find solutions, where quarter of the surveyed companies always used service proto-typing for the creation of a new service, the second reason is to get feedback from employees and customers, primarily to prove a concept, analyze feasibility, identify weaknesses, choosing alternatives, executing tests, and process scheduling to enable fast decision making , to which a third of the surveyed companies used service proto-types to evaluate their service or

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service idea, the third main reason is the cooperation between stakeholders for information exchanges, and learning process for employee training, principally used to make decisions, build competences, generate knowledge, involve the stakeholders, and create documentation, where almost half of the surveyed companies always used service prototyping for communicating a service idea. Service prototyping requires innovative use of current technologies, procedures, methods and tools in service design into creating a fast, accurate and affordable service prototype [4] [5]. Researchers differ on the definitions of service prototyping, and the definition of prototyping vary in different design domains [6]. Blomkvist [7] defines prototyping as the use of prototypes to explore, evaluate, or communicate in design, and describes prototype as physical manifestation of actual delivered service.

We considered all aspects and definitions to create our own definition, in which service prototyping is considered as an early or incomplete version of the real service and is allows the simulation of service experience. Therefore, permits the creation, evaluation and communication of service ideas at the same time supports conception and its visualization while the development phase. Another challenging aspect of service prototyping is the confidentiality of service prototyping solutions, where companies don't want to share information due to strong organizational opposition for having an edge on other competitors [8].

2 Service Prototyping Matrix

The service prototyping development matrix as shown in figure 1 consists of four design dimensions, each has a corresponding level of fidelity and resolution.

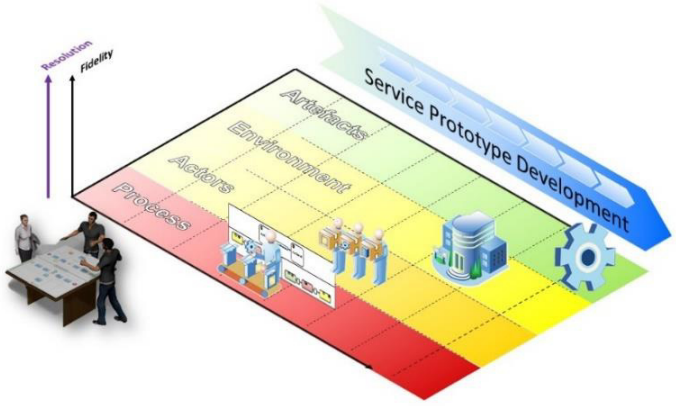

Fig. 1. Service Prototype Development Matrix

There is a direct correlation between the service prototyping development matrix and the service prototyping development key aspects in figure 2, which consists of the four key aspects: i) idea; ii) requirements; iii) design and iv) implementation, using a prototypical process of thinking where prototyping could be done at any time and as much as needed. Idea being the first key aspect, focuses on the idea-related activities like brainstorming, evaluation. In requirements aspect, the service prototyping requirements are gathered, separated, defragmented, and finally analyzed. In design aspect, the service concepts are created, developed and made ready for application. Lastly the implementation aspect where the service prototype concept is implemented before being introduced into the market.

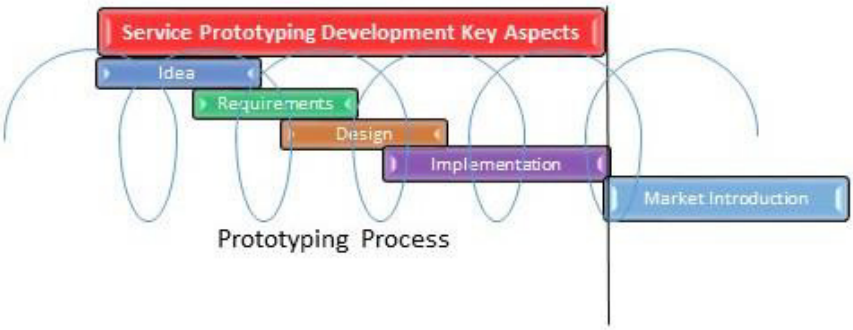

Fig. 2. Service Prototype Development Key Aspects

Research suggests that defining service prototyping and its design dimensions is a difficult process for designers [9] [10]. In this research, we have concluded that the best way to create the design dimensions of service prototyping is through describing the service prototype with four key dimensions, as show in Figure 1. Artefacts are the first dimension defined in the service prototyping matrix, artefacts are any physical objects, so as informational user interface like a homepage prototype and so as a tool or an object that helps in creating a prototype, the focus here is on how the objects will affect the service and its involvement. As the second design dimension is environment, where the setting of the service takes place, whether in an organization-al, industrial, or managerial setting or even in online or offline context, for example, customers contact oriented setting, where convince and comfort are key aspects for customers. The third design dimension of the matrix is actors, which are all the involved roles in service delivery, from internal like employees and external like customer. The fourth and final design dimension of the matrix is the process of service prototyping, in which all activities and interfaces in the process of service delivery like maintenance on customer's site or remote services.

2.1 Fidelity and Resolution in Service prototyping

The term fidelity refers to nearness to the final service design, Tullis [11] claims that the fidelity of a prototype is adjudicated by how it looks to the individual ob-serving it, and not by its similarity to the actual service. In other words, the degree to which the prototype accurately represents the appearance and interaction of the service is the determining factor in prototype fidelity, not the degree to which invisible attributes are precise [12]. Per Blomkvist [7] the degree of detail in a proto-type is the prototype's fidelity and can be thought of as how much of the final design the prototype represents. Fidelity is the level of improvement or degree of detail showed by a prototype while thoroughly assessing how the prototype resembles a finished service and how much of the information or interactivity it depicts [6]. To simplify we consider fidelity as the level of detail and functionality built into a prototype.

Although range of researchers believe that the degree of resemblance of the service prototype is not encompassed under the concept of fidelity but is another attribute which is called resolution. After careful research considerations on the definitions of both resolution and fidelity, some researchers consider fidelity and resolution as the same term, and per another set of researchers shown that having fidelity and resolution as one term can be problematic [6] [7]. Passera [1] argues that resolution assimilates fidelity, which demonstrated lack in representing the dimension of service prototypes, as the different attributes have different levels of functionality, which cannot be acquiescent under the mono-dimensional perception of fidelity. Houde & Hill [13] considered resolution as the "amount of detail" of a prototype" while Buxton [14] and Wong [15] agrees that resolution decides what kind of feed-back will be given back. Our research lead us to believe in that resolution is another design dimension to be measured other than fidelity, meaning that the resolution of a service prototype is defined by the degree of resemblance of the prototype and final design or final service.

Understanding the target group aids in defining the resolution and fidelity of a service prototype. The low resolution and fidelity of the prototypes are important not only for effectively sharing the insights of this abstract method with other designers and the client but also to communicate and persuade the audience [7] [12] [16].

Service Prototyping tools, procedures and methods also have a big impact on the creation and developing of service prototypes. Service prototyping tools can be identified with coherence with the service prototyping development matrix, which was also created within this research project, using the four design dimensions, actors, process, environment and artefacts, to position the prototypes in the matrix, with regards to both to fidelity and resolution. An upgrade of the matrix is currently under research and will be presented in the future work.

3 Service Prototyping Toolbox

The service prototyping tool box consists of procedures, methods, and tools. Procedures are the sequence of actions or directions to be followed in resolving an issue or

accomplishing a task create, methods are a way of arranging or doing a service prototype, particularly with a methodical order of thought and action. Tools are any item that can be used to achieve an objective, especially if the item is not consumed in the process. The term item refers that it can be a physical, informational and data management item, or a simple online device. The snippet of the suggested toolbox for service prototyping is presented (See Fig. 3, 4 and 5). The creation of this proposed service prototyping's toolbox is guided by the questions:

- Which procedure, method or tool should be used?
- When to use it?
- How to use it?
- what is expected from it at the end?

Tool Box	Type	Description	Content
Service Blueprint	Tool	Delivered through different channels: creating service scenarios and customer trips that define how different customers will use a service	Strategy Development
Personas	Method	Fictive persons who present typical users of a target group. They highlight important characteristics of the target groups and help with design decisions in the development phase	Design Decision Making
Story Telling	Method	Supports the research of the service idea. Through the use of simple words, the narrator will illustrate the solution as if it were a story	Troubleshooting
Customer-Journey Scorecard	Tool	From touchpoints to journeys: Seeing the world as customers, episodes, end-to-end experiences, language, channels, duration, repetition	Customer Service
Cross Channel Views	Method	To map customer interaction for all phases of the lifecycle across all channels allows us to design a 'channel neutral' experience and then define specific channel requirements	Tables & Diagrams
Customer Journey Map	Tool	Visualization of the touch points of the user with the service	Diagrams
Hotspot view	Method	Identify areas with potential for the customer and the business-> Determine the intervention points from where we imagine a service concept or design a service	Tables
Voice-of-Customer Analysis	Method	Method, with which explicit and unspoken customer wishes are determined and transformed into quantified, structured and evaluated customer requirements	Ideas Brainstorming
Virtual Simulation	Tool	Service environment exploration	VR-Simulation
System Map	Procedure	Visual description of the service organization: the various actors, have their common connections and the flows of materials, energy, information and money through the system are included	Map & Images Connections
Offering Map	Tool	Describes what the service provides in words, pictures or graphs. Can be used during development, implementation or communication to the end user	Graphs, words, pictures
Context mapping	Method	Everyday experiences of the users with services / products, in order to adapt their future requirements	Diagrams
Lego Serious Play	Method	For example, generation of new business strategies - develop and optimize team collaboration or analyse crisis situations and work out solution concepts for this	Moderated, professional Lego block exercises
Video Prototyping	Method	Visualization of ideas and concepts	Video
Short Clips	Tool	Short visual representation of the service or part of the service	Short, compact video
Design Fiction	Method	Design Fiction uses report elements to present and explain possibilities for the design	Idea & Prototype in a video

Fig. 3. Snippet of the Tool Box with description & content

Tool Box	Category			Key Aspects				Effort			Fidelity			Resolution		
	Create	Evaluation	Commun-ication	1	2	3	4	Low	Medium	High	Low	Medium	High	Low	Medium	High
Service Blueprint	x	x	x			x			x			x		x	x	
Personas		x	x	x	x	x			x		x				x	x
Story Telling			x	x	x				x		x				x	
Customer-Journey Scorecard	x	x	x	x	x	x	x		x			x		x		
Cross Channel Views	x	x	x	x	x	x	x		x		x				x	
Customer Journey Map	x	x	x	x	x	x	x		x			x			x	
Hotspot view	x	x	x	x	x	x	x		x		x			x		
Voice-of-Customer Analysis	x	x	x	x	x	x	x		x			x			x	
Virtual Simulation	x	x	x			x	x			x			x			x
System Map		x	x	x	x	x	x		x			x				x
Offering Map		x	x	x	x	x	x	x			x			x		
Context mapping		x	x	x	x	x	x			x	x				x	x
Lego Serious Play	x		x	x	x	x			x		x				x	
Video Prototyping	x	x	x	x	x	x			x			x			x	
Short Clips	x	x	x	x	x	x			x			x				x
Design Fiction	x	x	x	x	x	x		x			x				x	
Wizard of Oz	x	x	x			x				x			x			x
Gamification	x		x	x	x	x	x			x		x	x			x
Workshop	x	x	x	x	x	x	x		x		x				x	
Moderation Workshop	x	x	x	x	x	x	x		x		x					x
Design Workshop	x	x	x			x		x			x			x		
Imagine Workshop	x	x	x	x					x		x	x			x	x
Understand Workshop	x	x	x	x	x	x	x	x	x		x				x	
Experience Prototype	x	x	x			x	x			x			x			x

Fig. 4. Snippet of the Tool Box with Category, SPD Key Aspects, Effort, Fidelity & Resolution

When we asked companies about if these service prototyping tools, methods, and procedures are known in their respective companies, and if they are recognized within the organization, if they are being currently used by the company to create or enable the creation of a service prototype. Some of the tools that were relatively known and implemented are live prototyping and service sketching, while others like Mock-ups, paper prototyping, walkthrough simulations, and storyboard were moderately know and less implemented that the previous ones, on the other hand tools like roleplay, blue-printing, Wizard of Oz, and design fiction are unknown and not widely used in compa-nies.

Tool Box	Rolle in SP Matrix			
	Actors	Artefacts	Process	Environment
Service Blueprint	x		x	
Personas	x			
Story Telling	x		x	x
Customer-Journey Scorecard	x	x	x	x
Cross Channel Views		x		
Customer Journey Map	x	x	x	x
Hotspot view		x		
Voice-of-Customer Analysis			x	
Virtual Simulation	x	x	x	x
System Map	x	x		x
Offering Map		x		
Context mapping		x		
Lego Serious Play	x	x	x	x
Video Prototyping	x	x	x	x
Short Clips	x	x	x	x
Design Fiction	x	x	x	x
Wizard of Oz		x		
Gamification	x	x	x	x
Workshop	x	x	x	x
Moderation Workshop	x			
Design Workshop	x			x
Imagine Workshop	x			x
Understand Workshop	x			
Experience Prototype	x	x	x	x

Fig. 5. Snippet of the Tool Box with Category, SPD Key Aspects, Effort, Fidelity & Resolution

4 Conclusion and Future Work

The paper concludes by presenting a service prototyping matrix along with the service prototyping development key aspect which may pave the way for service prototype developer to focus primarily on the service being offered rather unnecessarily getting under the burden of how in optimal way realize the service prototyping idea into an actual running service prototyping. The investigation also has presented in tabular format available list of possible tools, procedures to select from. This list is not exhausted and due to the space limited few snippets of are shown here.

The research is still in the ongoing process and the future work will emphasis on the overall improvement of the service prototype tool box and the service prototyping development matrix. The tool box will be applied on several case studies where different techniques including new technologies like Virtual Reality, Augmented Reality, and Mixed Reality will be used in either the service prototyping process or as a service prototype itself. We drive also to investigate the degree of fulfilment of the service prototyping requirements and expectations, whilst evaluating and assessing the service prototyping tool box. The aspect of effort will be revisited and explained in a broader concept. The representation of the service prototyping matrix will be reengineered to have the best dimensional representation possible.

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