TOOLS FOR OPEN SERVICE DESIGN
An Analysis into Existing and Future Methodologies

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Abstract. The growing importance of the service industry in today's information technology-oriented domain is indubitable. In contrast to the manufacturing industry, which has had time to develop, mature and standardise processes, there exists in the service industry a dearth of standardised design methodologies. In analysing an extent of relevant new literature, this illustrative case study examines three service design tools chosen on the basis of their applicability to open innovation. One tool is thus selected and applied to a currently existing, but hitherto under used, technology. The purpose of this illustrative case study is to expand the service design repertoire of service innovation managers in the field of open innovation.

Keywords: Open Service Design, Prototyping, Open Innovation, Service Innovation, Co-creation

1 Introduction

The importance of the service industry in the global context is a relatively new phenomenon; with a broad definition of services and its components still contested among academic communities. Services comprise more than 70% of aggregate gross domestic product and employment in the Organization for Economic Cooperation and Development countries [24]. Moreover, increased globalisation, in concurrence with the increased access to the internet [5], has accelerated competition and challenged companies to be more agile in light of increasingly complex consumer demands [26].

Open innovation is a concept that is gaining more traction within service design thinking and can help companies achieve the growth in service revenues they seek [10]. A firm achieves this by developing outward-looking strategic approaches to research and development in the attempt to leverage potential value from a broader environment [24]. However, the methodologies in regards to utilising this concept and resulting complexities are, until now, not yet widely investigated within the realm of service design. With the increasing popularity of open innovation, service innovation managers may have to learn how to effectively interact with the consumers for whom they create services.

This paper addresses the challenges and opportunities that service innovation managers may face when approaching open service design. This is achieved through an evaluation of the opportunities and limitations of a set of existing service design tools and recommending the best fitting tool with which service innovation managers can most effectively respond to this challenging environment. Thereafter this recommended design tool is applied to an emerging technology to demonstrate how the challenges and opportunities relating to service design could be minimised and leveraged respectively.

2   Research Methodology

The work that ensues has made use of an illustrative case study [35] to establish a conceptual discussion of prototyping within open service design. Initially, theory regarding select service design tools is examined in the context of open innovation. Following this the reader is exposed to possible use case studies in which prototyping has been applied. Lastly, future uses of prototyping is posited in the use of currently-available, however not widely used, technology.

3   Theoretical Background of Open Service Design

Until recently limited attention has been paid to developing systems that can address this changing situation, and specifically to the issue of new service development [26]. New internet technologies have not only increased the reach of information but also exposed hitherto non-internet users to a much wider "virtual" market [5]. Consequently consumer demand has evolved to reflect this increasing complexity. As Peter Drucker, in his interview with Chesbrough [10], states "What the customer buys and considers value is never a product. It is always utility – that is, what a product does for him." This trend towards consumer-centricity has pushed companies to engage in new forms of research development; looking at how to integrate external stakeholder knowledge into product and service development [24].

   One such approach is open innovation. This recognises and builds on the changes in the dynamics of the consumer's interaction with the company from simply a consumer of pre-determined services to that of value co-creation with the company. By engaging outside knowledge through open innovation, companies can achieve the growth in market share and in revenue that they seek [10]. However, it is often the case that activities performed by managers are inconsistent with the demands of the consumer they try to meet [39]. Consequently, a plethora of tools and methodologies have been developed under the broad umbrella of service design to better equip stakeholders, such as the company and consumer, in better visualising and articulating their specific needs and demands.

3.1   Tools available for Open Service Design

Service design is a useful framework for maintaining the perspective of the outside world of consumers as the leading element in selecting and elaborating ideas for potential innovation [13]. Service innovation managers have available a wide range of tools designed to engage various stakeholders in new service design. In the context of an open innovation approach to service design, companies attempt to engage 'outside in' innovation [10]; where outside stakeholders are actively brought into the design process [2].

   In contrast to product design, where the end result is something tangible, a service is an intangible offering developed ultimately by a service innovation manager, an individual or a company [26]. This design process usually takes place behind closed doors, from service innovation managers working on their assessment of the consumers' requirements, traditionally informed by passive and reactive methods [18]. Increasingly, however, the lone ingenious designer, who could do everything by him/herself is rapidly becoming history [2] as it becomes more common for firms to search for knowledge existing beyond the boundaries of the company [24]. In line with increasingly complex customer demands, engaging with market-based partners such as

customers and suppliers can help to better specify market requirements for specific services and to spread the costs and risks of the innovation process [24].

The following section discusses three potentially relevant design tools that are frequently used in service design. These are: **Lead User Research, Crowdsourcing and Prototyping**.

These tools have been selected on basis of their potential applicability to open service design. Academic research on service design is to date limited [1], especially so in the context of open innovation. The following section will hence discuss the possibilities and limitations of each of the selected open service design tools. One tool will then be selected that appears to best suit the open innovation approach to service design.

Lead User Research applied to Open Service Design. A term first coined by Eric von Hippel [16], lead user research focuses on individuals who are experiencing needs that are yet to be known to the wider public. These individuals, through intense use of certain company value propositions, often adapt existing value propositions to enhance the benefit they obtain from them. They typically have a strong intrinsic incentive to innovate on their own account [13] and are not necessarily bound by profits, organisational structures and production capabilities [12].

As stated by [13], integrating lead users into service design can be highly profitable and, in turn, can be valuable to involve lead users in the exploration stages of the innovation processes. Von Hippel [16] identifies lead users as possessing the following characteristics: (i) they face needs that will be in a general marketplace – but face them months or years before the bulk of that marketplace encounters them and (ii) they are positioned to benefit significantly by obtaining a solution to those needs. This principle follows the line of "necessity is the mother of invention", whereby lead users will engage in necessary problem solving to ensure that their needs are met. Market research with normal consumers is constrained by the familiarity of the product, its attributes, and the real-world experience to which the consumer has already been exposed. Therefore market opportunities, if any, uncovered by market research, represent incremental improvements in a product with reference to company competition rather than a consumer focus. However, since lead users' needs are often very specific, perhaps niche, adopting lead user research still leads to uncertainty when applying the service to a larger market.

Expecting success based on advanced and innovative users of a product, which is what lead users typically are, does not necessarily foreshadow general market adoption. Using lead users for open service design needs to therefore be approached with caution. Applying the needs of the few to the general community could result in a service being too complex to be feasible; straining a company to provide resources that could go beyond the needs of the wider community. Additionally, the specific consumers who can be lead users can be especially difficult to find. They may exist outside of targeted markets, be consumers of rival products, or, due to their rapidly evolving needs, could have already moved on to the next innovation by the time they are identified [16].

Crowdsourcing applied to Open Service Design. Although only officially recognised in 2005, engaging crowds in the generation of new ideas has been a useful open innovative tool used throughout history. The ever increasing availability of internet access and reach, however, has accelerated the range and complexity of consumer demands; making it more difficult for companies to address them behind closed company doors [32]. Companies are responding by giving more attention to gaining knowledge and insights from crowds, potential and actual consumers for example, as opposed to only from competitors [21]. The transition to 'outside-in' knowledge [10]

goes against long-established approaches, in which companies typically considered their research and development efforts as the sole source of new technologies and products [12].

The utilisation of crowdsourcing within a company leverages economies of scale to solve problems that have been too resource-demanding to solve internally. Further, it is also used to generate ideas that will come closer to consumer expectations; creating, in turn, a lasting relationship between consumer and company as the opinions of consumers are listened to and acted upon. Companies engaging in crowdsourcing no longer see themselves only as resource providers, rather they are positioning themselves as community hubs - bringing together consumers and, for example, manufacturers and/or service providers [29].

The theoretically mass-directed approach that crowdsourcing permits does raise the question of product quality. Questions are also raised in response to its non-monetary incentive insofar that participants are less likely to commit for small, or no, financial incentive. Additionally, as the crowdsourcing participants are typically large in number, companies are required to engage resources (internal or outsourced) to direct, regulate and speak to participants, with a commensurate increase in management time and cost overheads [8]. While crowdsourcing may in principle work for new product development, services are intangible which involve processes and experiences that are difficult to define [18]. Although crowdsourcing is a useful tool for idea generation, its voluminous nature may complicate clear visualisations of services that provide value.

Prototyping applied to Open Service Design. Prototyping can be defined as the conceptualisation of abstract thoughts and specifications into tangible realisations. Where a prototype is the manifestation of ideas and the assumptions behind them, prototyping is an activity and a mindset [30] seeking to answer one or two questions at a time as opposed to the entire system [11]. Originally applied to manufacturing, prototyping in services faces intrinsic difficulties relating to a service's intangible nature. For this reason, prototyping in service design differs from its use in manufacturing in the sense of being a representation of a future situation [6].

Despite this apparent limitation, prototyping is a powerful service design tool that is able to identify current, future and perceived expectations of a service. Its nature is centred on participatory design and focuses largely on making ideas explicit by directly engaging stakeholders, particularly users of the service and others who will be impacted by the service, in the development of an effective design solution [17]. Engaging stakeholders in the development of services encourages multi-disciplinary input; removing the organisational barriers that can sometimes exist as remnants of the importance that corporate internal research and development once possessed [27]. The effect of prototyping is twofold: (i) from the management perspective companies gain inputs from divergent mindsets that would otherwise not have been discovered under traditional organisational structures (ii) by having participants demonstrate what a favourable service consists of they are breaking down the intangible complexities of a service. Such activities allow companies to address expectation gaps in turn minimising wastage of company resources. Giving permission to explore new behaviours - the tangible presence of a new thing, the prototype, itself encourages new behaviours, relieving individuals of the responsibility to consciously change what they do [11]. Hence the ideas generated are typically better representations of actual consumer demands and are better situated to address the improvement of a stakeholder experience.

While prototyping offers an empirical, user-centred, rapid solution, it is a practice still not easily understood nor applied in the service domain [30]. This is partly because services exist in stages with a multiplicity of touch points [37], thereby making it

difficult to visualise and imagine how a service may be of benefit. Therefore the result of prototyping is constrained by the participants' ability to visualise the complexities of a service. The risk in this regard is the time and resources used to create a prototype [33] which may not be a real representation of the needs and wants of the wider community.

Flexibility within prototyping allows for this consumer involvement. However it does require that a company maintains open channels of communication between all stakeholders. Such an investment into new service design thinking requires a company to focus less on passive and reactive forms of research, rather more so on engaging with, listening to, and acting on stakeholder comments.

Summary: Crowd Sourcing, Lead User Research, & Prototyping.

	Possibilities	Limitations
Lead User Research	- Ahead of the mainstream market - Belong to a niche of innovators - Insights that may foreshadow future market trends	- Ahead of the mainstream market; assumed adoption - Potential overly complexity - Time expenditure with identifying lead users
Crowd-sourcing	- Company as a hub; pooling ideas from a large resource base - Outside-in approach breaking down company walls - Scale of knowledge reached far greater than internally possible	- Crowd dictates direction of the idea – possible misdirection - Difficulty in articulation with respect to service visualisations - Extra staff needed to manage incoming information flow
Prototyping	- Accurate visualisations of services. Breaking down services to a series of processes - Multidisciplinary input - An activity and mindset that is embodied in the thought process	- Dependent on participants ability to visualise - Multiplicity of touch points in services – difficultly in thinking broadly - Limited practical research

Figure 1: Identified possibilities/limitations of chosen service design tools

The importance of service design within the context of an increasing reliance on technology is indubitable. The preceding investigation into possibilities and limitations of the selected design tools, and their applicability to open service design, favoured prototyping as the most suitable in the context of co-creation and open service design. Prototyping's unique adaptability stems from the unique characteristic of stakeholder interaction and involvement; achieving a level of subconscious and 'in-use' reactions that the other tools lack. This real-life experience improves the speed at which consumers respond to stimuli in addition to providing visualisations of the experience that are closer to, if not the actual, demands of the consumer. The effect of which mitigates effects of misdirection and the saving of company resources [6]. Through participatory design companies switch their focus from providing a service they deem to be of value, rather allowing the consumer to tailor their own perspective of value. As ancillary developments in technology become more advanced, the integration of prototyping in conjunction with augmented and virtual reality will allow for scale and reach to broader markets.

Consumer interaction is typically characterised by passive and reactive methods to experiences [18], utilising retrospective descriptions to gain insight into consumer behaviours. Through interaction and involvement, prototyping in open service design allows companies to see how value is perceived from an outside-in perspective [10], transcending the intangibility of services. Although crowdsourcing is directed at large

scale participatory involvement, it still exists within the context of passive and reactive interactions between company and customer. In this regard its capacity for participatory design are both the strength and weakness, in that it has the ability to engage scale, however only in a backdated capacity. Lead user research also encourages participation and involvement from consumers however lacks the scale of participants; assuming that the wider community will be receptive to a group of innovators.

The intangible characteristic of services contributes to the difficulty from which the visualising of services can occur. Prototyping engages stakeholders in intense visualisations, making ideas more tangible, complexity more readable and alternatives shareable [30]. Within service design it shows how different touchpoints, along with their associated actors and customer groups [37], fit together sequentially [30] making public services and hospitals, as examples, more accessible. Crowdsourcing lacks this ability to intensely visualise services as, due to its strength in scale, it can only exist in an online arena governed by moderators attempting to control the flow and direction of the innovative process. Consequently, and as Jonas et al. [18] argue, service industries are still lacking an open space for transparent, interactive value creation to include, on a large scale, customers, other potential future users, non-users and ordinary people. With lead user research, issues rise again regarding its adoptability from the general user community. As lead users' demands exist only within a select niche [13], it could be thought that integrating their ideas into open service design would serve to complicate services unnecessarily. Creating a service from such an advanced niche could create superfluousness, potentially straining company resources. In contrast prototyping in open service design is oriented around user-centred thinking. This implies that the walls between customer and company are, during prototyping in open service design, removed. The result of which is a collaboration of co-created effort leading to the realisation of a service that is both feasible and desired from the company and customer perspective respectively.

4 Executing Prototyping in Open Service Design

As services are experiences and a result of human-to-human interactions, service design is about communication [23]. In service innovation the challenge is to not only to identify the consumers' needs and wants they can express, but also to enable the consumers to tap into their subconscious desires [22] by instinctively interacting with their environment. Therefore, the role that the end-consumer plays is integral to prototyping within service design [22]. Dodgson [14] describes prototyping as the company's embodiment of open innovation and its direction towards the inclusion of an outside-in stream of knowledge. The following section will elaborate on the importance of prototyping and its methodologies to the service innovation manager [22]

4.1 How the Service Innovation Manager guides the process

Prototyping can be viewed as a tool that aligns the efforts of stakeholders such as companies or end-customers. Services are tested by having the users of the prototype interact in collaborative, explorative, iterative and open-ended ways. At the same time factors that could interfere with the service delivery and the user experience need to be taken into account as well [7]. Hence, service innovation managers can be seen as actors playing a key role as translators in the network of participating stakeholders. They ensure the user-centred design of the service by avoiding passive and reactive observations. Instead, they attempt to understand unrecognised needs of the customers and in turn propose relevant service solutions [4].

Service solutions offer value for the consumer in two ways: a customer evaluates a service (i) by its ability to fulfil a functional outcome and (ii) by its experiential offering [4]. As fulfilling functional targets is likely to lead to the consumer's satisfaction, providing an enjoyable experience during the process of a service may lead to a consumer's loyalty [4]. By prototyping the service experience, service innovation managers work towards meeting functional and experiential targets by proposing solutions and examining the results in a trial and error process; thereafter the result are refined in collaboration with the consumer. Buchenau & Fulton Suri [9] explain however that prototyping is not about using a toolkit or a set of techniques, rather about creating an attitude and language for communicating with the consumer in order to solve design problems.

4.2 Creating a Communication Tool Using Prototyping

The service design process is carried out in a number of phases [23]: Discovering, Concepting, Designing, Building and Implementing. Buchenau & Fulton Suri [9] write that prototyping is of value in understanding existing user experiences, exploring and evaluating design ideas, and communicating services to an audience. Participatory design, prototyping and co-creation are integral in the concepting, designing and building phases [23], and are ongoing activities throughout the design process [7]. Meanwhile, operating in the background, prototyping is functioning as a mechanism for knowledge transfer [23, 36]; hence breaking down the complexity of service systems into easier-to-visualise segments.

The consumer experiences a service as a journey in which interactions between consumer and service innovation manager are dynamic, complex, subjective, and go beyond concrete sensories [9]. Prototyping enables the identification and targeting of key touch points within this journey. Thus allowing both the service innovation manager and consumer to collaboratively break down a service experience into smaller segments. The cocreation thereafter is directed towards the improvement of smaller segments as opposed to the entire service system.

4.3 Leveraging Interaction and Involvement through Prototyping

Prototyping in service design provides the opportunity to describe, discuss and develop services efficiently. It achieves this, by (i) integrating customers as co-creators that can partake in creating services and (ii) contributing explicit and subconscious needs [18]. The different ways in which prototyping can be carried out are based on interactions between the users and emphasises giving voice to actors who may previously not have been involved in the innovation process. Through the process of doing and refining and by customer participation it is possible to create differentiated services [3].

4.4 Possible Caveats using Prototyping in Open Service Design

The inconsistent nature of services has implications on the prototype and the way people interact with it. The presentation of a technology-based prototype is the same each time, whereas a human-delivered prototype can vary even if the same people are involved [7]. This inconsistency could impact the validity of the produced prototype, hence risking the position of the service innovation manager, the collaborating consumers, and the relationship between them.

Awareness of fictitious scenarios could also influence the authenticity of the prototype. As people are privy to the role-playing scenario, there is a possibility that they behave differently in a real service situation. Additionally, it is possible that participants new to prototyping are unaware of relevant methodologies (e.g. theatre play, bodystorming, etc.). Hence resources of the service innovation manager may be required to train new participants and actively enourage open-minded participation in the service design process.

All the stakeholders of a service should ideally be present already at the prototyping stage in order to improve how similar test and implementation contexts are [7]. As the service experience is ultimately subjective, producing only one prototype would not be considered sufficient. Therefore, several prototypes would be necessary to validate the consistency and authenticity of the service design.

4.5 Open Service Design in Practice

(Open) service innovation as a research field is a relatively young topic that is receiving increasing traction. Meanwhile, an increasing number of 'service innovation labs' (c.f. Fraunhofer ServLab[1], JOSEPHS®: The Service Manufactory[2] or the Service Innovation Corner[3] among others) are interesting approaches where prototyping methodologies in the development of new service concepts are applied.

Service innovation labs equipped with sophisticated technology enable abstract ideas to transcend into a tangible reality. Positioned as an engagement platform between service innovation manager and consumer, they apply the principles of prototyping through active participation and collaboration. This in turn encourages and promotes cocreation of services from different stakeholders early in the innovation process.

The Service Innovation Corner – University of Lapland, Finland. The SINCO lab is described as a technology-aided prototyping environment for user experience in which tools and devices support the concretisation of ideas, testing and agile co-creation [33]. It is an ideal example of how prototyping as a service design tool can approach the aforementioned challenges of services. The focal point of this approach is to map the divergent touchpoints in a consumer's experience of a service. Technology is hence used as an aid to create a 'transferable model' of a service prototyping environment [23].

SINCO identifies factors that need to be considered during prototyping. Thus the list below can be seen as a guideline for service innovation managers:

- Understanding challenges: users, environment and technologies involved,
- Creating empathy for and co-operating with the users,
- Including clients, other stakeholders and customers in the process,
- Prototyping, improving and visualising methods during the whole process and,
- Implementing, maintaining and continuous development at later stages.

The service labs extensive technological capabilities enable the creation of a 'Servicescape[4]', thus simulating the real service experience to help overcome authenticity and validity difficulties. Additionally, a skillful group leader and technical expert are necessary to include new participants and real consumers who are unfamiliar

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[1] Fraunhofer-IAO: http://www.servlab.eu/

[2] JOSEPHS® - The Service Manufactory: http://www.josephs-service-manufaktur.de/

[3] The Service Innovation Corner (SINCO), University of Lapland: http://sinco.fi/

[4] An artificial and physical environment of the place in which a service is provided (Bae & Leem, 2014)

with the concept and enable them to freely immerse themselves into a creative state that is required for prototyping [36]. Through the combination of new technology with prototyping in the SINCO lab, agile collaboration with users is easily achieved [22].

JOSEPHS® - The Service Manufactory. JOSEPHS® - The Service Manufactory, located in the heart of Nuremberg, Germany, is a non-profit innovation laboratory and an innovation ecosystem for the development and testing of novel service concepts and prototypes. The goal of the experimental initiative is to provide an intermediary platform for consumers and companies to actively engage in co-creative and collaborative innovations [34]. This is achieved by means of alternating exhibitions, or theme worlds, in which members of the public have a chance to view, interact with, and leave feedback for companies displaying their novel service or product prototypes. This offers users a rare glimpse into the thinking behind the company and thus allows users to play a (pivotal) part in the early stages of product or service development.

Opening up the prototyping process to the public means that companies operating through JOSEPHS® are able leverage participatory scale. Moreover, through the regular hosting of diverse events in the Denkfabrik (Thinking Factory), JOSEPHS® offers a platform for forward-thinking innovators as well as everyday consumers to collaborate with companies. Furthermore, companies have the chance to enact agile-like methods on their products and services based on the nature of feedback received. Hence the product or service remains in a dynamic state until the end of a company's three-month tenure at JOSEPHS®. This in turn allows for the development of a valid and authentic product or service before launching into broader environments.

5 Future Outlook: Prototyping in Virtual Reality

In the past, 'virtual worlds' or 'computer-simulated realities' were mainly used for public entertainment, cultural projects, virtual museums etc. [3]. Advances in computer hardware and gaming technology in the last decade have given rise to a new generation of virtual world applications running on desktop computers [19]. This new dimension adds another way in which service innovation managers and consumers can practice prototyping in open service design. Consequently, the application of collaborative virtual environments (CVEs) [38] in service-oriented fields is increasing and becoming more diverse. By means of high-immersion displays, haptic virtual environments, and other sensory-devices [28], virtual worlds are able to provide exceptional depth in a collaboration-driven prototyping experience. This is in contrast to simple online environments which often cannot provide the suitable relational depth of experiences and emotions needed for constructive co-creation [18].

5.1 Application and Relevance to Open Service Design

From a practical standpoint, virtual reality prototypes can, due to their novel use in the service industry, be more time consuming and costly compared to traditional prototyping tools. Additionally, users, just as with programmers designing service platforms, require new mindsets to become part of a structure in a virtual service organisation [15]. Therefore, the realistic presentation of a service scape and concept demands high effort and resources for scenery composition and programming from the service provider's side and an affinity for virtual worlds from the user's side [31]. Regardless, the hitherto status quo for gaining consumer knowledge is through market research, whereby statistical studies are regarded as being more scientific. Yet, it is known that asking the customer, particularly through structured questionnaires, only

reveals a superficial layer of attitudes and behaviour, rather than root motivations [15]. In contrast, virtual worlds are inherently interactive, allowing users to interact with simulated artefacts [20] as they would in real settings. Thus this process of interaction creates possibilities for service innovation managers to easily integrate users in the development process of a service [31].

Virtual worlds are powerful platforms for designing novel collaborative design environments [20] and have been used frequently in architecture and organisational and interior design spaces [25]. Furthermore, virtual worlds uniquely allow users the embodiment of another character through avatars. The added persona enables users to be more than just viewers of a virtual space. Rather, through their observable motions and actions they are able to express both verbal and non-verbal forms of communication and awareness. According to Koutsabasis [20], "the avatars' position and orientation communicate where they are and what are they looking at; their appearance can usually be modified to express the user's personality, or even to denote the role of the user in a collaborating team; their animated bodies communicate their current activity; in some virtual worlds the avatars may also use facial expressions and gestures as an additional means of communication. All these abilities are important for the quality of the remote communication and coordination of a design team." Thus, virtual worlds provide an interactive platform for service innovation managers and users in which prototyping can be iteratively practiced producing a refined service innovation.

5.2   Adaptability of Virtual Worlds to Subjective Service Experiences

Virtual worlds enforce the characteristics of prototyping without having to rely on a user's physical presence. Therefore, by eliminating mitigating factors such as presence, weather, or proximity, a whole new service design paradigm could be conceptualised from the comfort of one's own home. As service innovation managers would be able to record and analyse more than just traditional and retrospective market research, they would be confronting and overcoming the intangible and experience-driven characteristics of a service.

Moreover, virtual worlds offer their own scripting language to be used for extending the real world's functionality and defining specific object behaviour. This makes them customisable and allows developers to design and implement application-specific tools whilst taking advantage of the existing visualisation, interaction and communication infrastructure of the virtual worlds [20]. Therefore programmers and service innovation managers with the suitable skill set can deconstruct, reuse, and rebuild platforms based on the size of their existing graphic and source code libraries. In addition to providing numerous cost efficiencies, this would be particularly useful for a service innovation manager working across a number of industries.

6   Conclusion and Postulations for Future Research Directions

The importance of service design in a service-dominant economy is undeniable. With the rapid developments of, and reliance on, information technology, the service innovation manager is faced with a difficult role in catering for increasingly complex demands of consumers.

Open service design is an open innovation technique that encourages non-traditional involvement from outside stakeholders. Through the analysis of three different service design tools it was suggested that prototyping was not only the most appropriate tool in the service designer's arsenal, but matched open service design as an ideology.

Given the intangible and complex nature of services, prototyping still faces challenges of validity and authenticity, particularly with unfamiliar participants. Institutions such as SINCO and JOSEPHS® are approaching these challenges by encouraging and fostering an outside-in stream of knowledge. Both institutions display interesting and innovative methods in which service innovation managers can test the validity and authenticity of a service idea.

Integrating prototyping into future technologies such as virtual worlds have the potential to alter methodologies in service design; potentially reaching a larger audience from which to apply prototyping iteratively. The inclusion of novel technology has been designed to provide a real world scenario where participants can actively participate without having to leave the comfort of their own homes. Looking to virtual worlds may therefore answer the question as to how services, with their characteristic multiplicity of touch points, can be fully visualised.

In lieu of the wide-scale availability of virtual worlds, it could be suggested that more documentation and research is needed into the processes of prototyping in open service design. Namely, at which particular stage of open service design is the prototyping process most vulnerable to inauthenticity and lack of validity? Or, what contextual factors are companies and consumers most subject to in order to collaboratively prototype a service that can benefit both parties? Literature in this direction would develop further the field of research in service innovation, prototyping and open innovation. Additionally, it would ultimately help service innovation managers engage and collaborate more effectively with their consumers.

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