A Framework for Smart Servicescape: A Case of Smart Home Service Experience

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Abstract

The rapid development of IoT technology has accelerated the growth of smart services. Despite the proliferation of smart services, academic research is still in its early stage particularly in terms of service experience and service design. Concerning a service experience viewpoint, it is essential to consider the context and environment of smart services, namely "smart servicescape," as this can influence users' entire experience. Moreover, the smart servicescape will have different characteristics due to the convergence of online and offline connected environments. With this background, this study aimed to propose a framework for the smart servicescape by identifying new dimensions that reflect the characteristics of smart services.

Accordingly, an initial analytic framework of service experience blueprint was established on the basis of the conventional servicescape and service blueprinting. Twenty movie clips on smart home services officially produced by ICT corporations were collected, were analyzed through grounded theory, and were classified according to the analytic framework. Through a series of qualitative analysis, the framework structure was improved to make it more suitable for the smart servicescape. Finally, this study proposed a framework for the smart servicescape derived from the smart home service experience blueprint. The values of this framework can be identified in two aspects: (1) by identifying new dimensions to reflect the characteristics of smart services such as *Smart device, Datascape,* and *Connected scape*; and (2) by suggesting the structure of the service experience blueprint infused with the perspective of service experience, which consists of service encounters and the servicescape.

Keywords: Smart Servicescape, Service Experience Blueprint, Smart Home, Smart Device, Datascape, Connected Scape

Rapid innovation and development of information and communication technology (ICT) has accelerated the growth of smart services based on ubiquitous computing and the Internet of Things (IoT). In B2C industries, in particular, various smart services are emerging and expanding their boundaries such as the smart home, smart health, smart media, smart learning, smart car, and so on. Accordingly, more people are paying attention to the adoption and application of smart services and how to use them effectively and naturally in their daily lives. Compared to this proliferation of smart services, academic research is still in its early stage (Wuenderlich et al., 2015). Due to its technology-intensive characteristics, previous research has primarily focused on the development and application of smart service technologies in the engineering field (Wang & Song, 2017). Moreover, the acceptance and usage intention of smart services have been researched in the service management field (Canhoto & Arp, 2017). However, there has been little research on smart services from the perspective of service experience and service design.

In the service management field, research from a service experience viewpoint has emphasized the context and environment in which service interactions take place as well as the service provision itself (Akaka & Vargo, 2015). Service is usually delivered through direct or indirect interactions between customers and firms—namely, service encounters. Focusing on the service provision itself has underscored these service encounters, as each customer can experience different encounters according to their past experiences, preferences, or diverse service providers (Bitner, 1990). Meanwhile, the physical and social environment in which these encounters occur—that is, the servicescape (Bitner, 1992; Rosenbaum & Massiah, 2011)—can also influence how customers experience the service differently. Therefore, focusing on service experience could require the perspectives on phenomenology and social structures that influence the whole experience (Akaka et al., 2015). In that sense, Akaka and Vargo (2015) asserted that the service context in which service experiences are generated consists of service encounters and the servicescape.

Similarly, for smart services from the perspective of service experience, it would be essential to consider the context and environment of smart services—namely the “smart servicescape.” Yet, the smart servicescape would have a different nature and characteristics from the conventional servicescape due to the convergence of online and offline in connected environments. This is also because advanced network technology has enabled real-time data collection and continuous communication of intelligent objects and environments with users (Allmendinger & Lombreglia, 2005). Nevertheless, research on the environmental dimensions of smart services—namely, the smart servicescape—is scarce. Hence, this study aims to propose a framework for the smart servicescape by identifying new sub- dimensions that reflect the characteristics of smart service.

According to this research aim, the article begins with a literature review on the conventional servicescape to which smart servicescape can refer about concept and dimensions. Moreover, due to the lack of smart servicescape literature, the process of identifying new dimensions requires a grounded theory approach that observes users’ service experiences. Thus, the literature review also focuses on service blueprinting to be adopted as an analytic framework for service experiences. Next, the research method illustrates the process of establishing a

framework, focusing on the case of smart home service. The outcome of smart servicescape framework is described in a discussion section, followed by a conclusion.

Literature Review

Servicescape: the environmental perspective of service context

As previously introduced, the servicescape is a manmade physical and social environment in which service encounters are framed (Bitner, 1992). Bitner (1992) extended the service context from the firm-customer interaction to the environment-user relationship and emphasized the influence of physical surroundings. She categorized the physical environment into three dimensions: (1) ambient conditions (background characteristics of the environment such as temperature, lighting, noise, music, and scent); (2) spatial layout (the ways of arrangement/size and shape of machinery, equipment, and furnishings; and the spatial relationships among them) and functionality (the ability of the same items to facilitate performance and the accomplishment of goals); and (3) signs, symbols, and artifacts (explicit communicators displayed on the exterior and interior of a structure).

Table 1. Literature on the dimensions of physical servicescape and social servicescape

	Authors	Servicescape dimensions	Service sector
Physical servicescape	Bitner (1992); Rosenbaum and Massiah (2011)	• Ambient conditions (temperature, air quality, noise, music, odor) • Space and function (layout, equipment, furnishing) • Sign, symbols, and artifacts (signage, personal artifact, style, and decor)	Service organization (conceptual); Literature review (conceptual)
	Wakefield and Blodgett (1996)	• Layout accessibility • Facility aesthetics • Seating comfort • Electric equipment and display	Leisure
	Lin (2004)	• Visual cues (color, lighting, space/function) • Auditory cues (music, non-musical sound) • Olfactory cues (scents, ambient odors)	Hospitality
	Ryu and Jang (2007)	• Facility aesthetics • Lighting • Ambience • Layout • Dining equipment	Restaurant
Social servicescape	Tombs and McColl-Kennedy (2003)	• Purchase occasion (context) • Social density (perceived crowding) • Displayed emotions of others (emotional contagion)	Literature review (conceptual)
	Rosenbaum and Massiah (2011)	• Employee-customer support • Customer-to-customer interaction • Social density • Displayed emotions of others	Literature review (conceptual)
	Johnstone (2012)	• Nurturing and supporting non-commercial relationships • The need for social connectedness • Identifying with place	Patronage decision in shopping

Table 1 exhibits the servicescape dimensions that many researchers have investigated based on Bitner's servicescape categorization in different service sectors such as leisure, hospitality, and restaurant. Particularly in smart services, the equipment or artifacts, such as smart devices, could be a critical element, so this study adapted the preliminary components of the physical servicescape as (1) equipment, (2) space, (3) ambience, and (4) design aspect. Moreover, the social aspect of the servicescape, namely the "social servicescape," was added to this environmental perspective to include non-commercial or social relationships such as indirect interactions with other customers, the need for connectedness, and social density, as well as direct interactions in the form of employee-customer support (Johnstone, 2012; Rosenbaum & Massiah, 2011; Tombs & McColl-Kennedy, 2003). Accordingly, the initial elements of the social servicescape in this study were defined as (1) the in-service relationship and (2) the non- commercial relationship. Meanwhile, Rosenbaum and Massiah (2011) additionallyproposed a socially symbolic (e.g., ethnic symbols) and a natural (e.g., nature and wildlife) dimension, but they were excluded in this study due to their low relevance to smart services.

Service Blueprinting

The process of identifying new and realistic dimensions of the smart servicescape would require a grounded theory approach by observing users' service experiences. Hence, to be utilized as an analytic framework of service experiences, this study adopts Service Blueprinting. Service Blueprinting, pioneered by Shostack (1984), is a diagrammatic method to profile how the process of service provision is understood in service deisgn. Service Blueprinting plots all the key activities and their linkages involved in service delivery and visually separates frontstage/backstage interactions and physical evidence from service delivery to emphasize the perspective of customers (Patrício, Fisk, Cunha, & Constantine, 2011). As shown in Table 2, Bitner, Ostrom, and Morgan (2008) clarified the components of Service Blueprinting as customer actions, physical evidence, onstage touchpoints, backstage actions, and support processes. More recently, Patrício et al. (2011) proposed the Service Experience Blueprint, intergrating the design logics of Service Blueprinting and Activity Diagrams which are more appropriate to structure the (software) service system interface.

Based on two representative concpets in the literature, this study established an initial framework of the service experience blueprint comprised of the following elements:

- Service encounters are the main steps a customer takes to interact with an organization's service, which parallel the customeractions.
- Physical servicescape in the literature (i.e., equipment, space, ambience, and design aspect) could correspond to the physical evidence that originally represents the touchpoints that customers interact with.
- Frontstage interactions are the visible actions between the user and the service provider that could be matched to onstage touchpoints; the line of interaction distinguishes frontstage interactions from the physical servicescape; the line of visibility separates frontstage interactions from the backstage actions.
- Backstage actions are the internal service provision mechanisms that are not visibleto the customer but directly impact the customer experience.
- Support processes are originally the internal processes that indirectly impact the customer experience, such as interactions between the organization and partners or third- party suppliers. As this study will focus more on the interaction and relationship aspect, the support processes were substituted by the social servicescape of in-service/non-commercial relationships.

In this way, the service blueprint framework could be infused with the service experience viewpoint comprised of service encounters and the servicescape.

Table 2. Service experience blueprint framework

<table>
<tr><td>Service blueprint components (Bitner et al., 2008)</td><td>Service experience blueprint (Patrício et al., 2011)</td><td colspan="3">Initial framework of service experience blueprint</td></tr>
<tr><td>Customer actions</td><td>Customer</td><td colspan="3">Service encounter
(Interaction steps between customer and provider)</td></tr>
<tr><td>Physical evidence
Line of interaction</td><td>Service interface
Line of interaction</td><td>Physical servicescape
(equipment, space, ambience, design aspect)
Line of interaction</td><td rowspan="4"></td><td rowspan="4">Service -scape</td></tr>
<tr><td>Onstage touchpoint
(visible actions of provider)
Line of visibility</td><td>Frontstage
Line of visibility</td><td>Frontstage interactions
Line of visibility</td></tr>
<tr><td>Backstage actions
(invisible/internal service provision mechanism)
Line of internal interaction</td><td rowspan="2">Backstage support</td><td>Backstage actions</td></tr>
<tr><td>Support process</td><td>Social servicescape
(in-service relationship, non-commercial relationship)</td></tr>
</table>

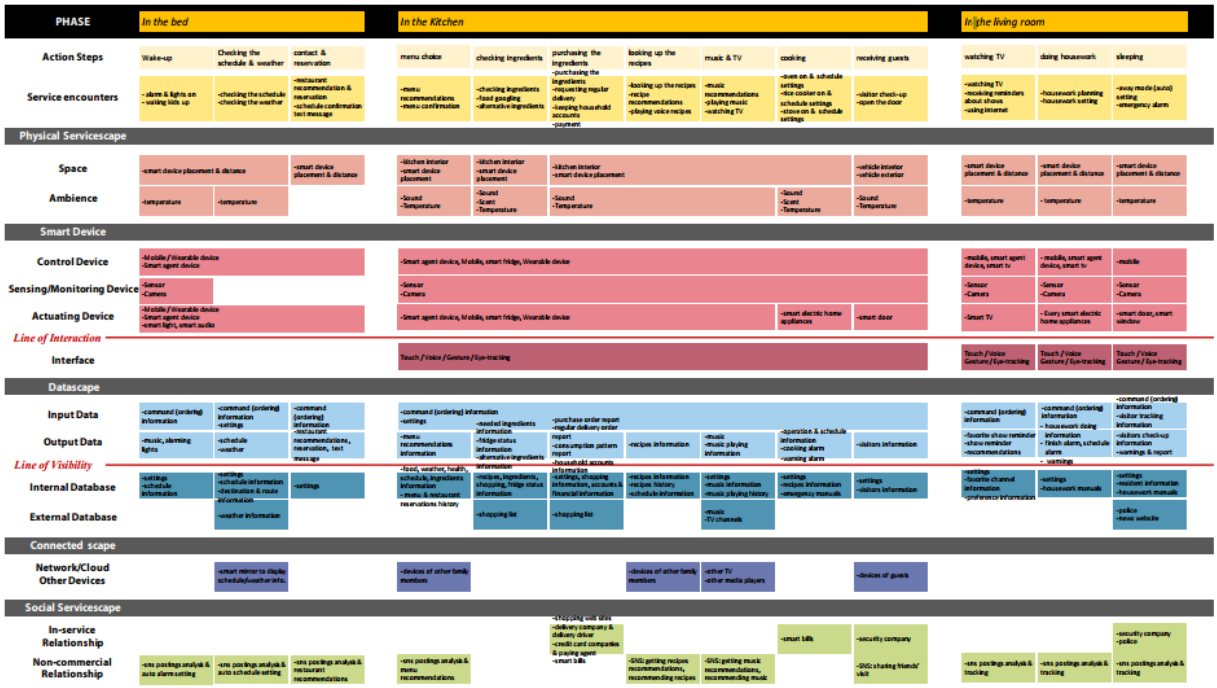
Research Methods

As previously mentioned, a grounded theory approach that observes users' service experiences would be suitable for exploring the new and realistic dimensions of the smart servicescape. However, smart services, including the smart home services on which this study focuses, are not yet widespread in our normal life, and thus certain kinds of simulated smart home environments would be required. Instead, as a preliminary study, the researchers collected 20 user scenario movie clips from the website YouTube™, which were produced and uploaded officially by ICT corporations that have been developing and offering smart home services (e.g., Amazon, Google, LG, Naver, Samsung, and Philips).

The researchers first watched the movie clips to gain a general consensus about the level of smart home services. They then developed a representative user journey—namely, the series of interactions or service encounters—that embraced the various service experiences demonstrated in the movie clips. This user journey was specified into a general phase, more detailed action steps, and service encounters. For instance, "*In the kitchen*" phase consisted of action steps such as *Select menu, Check ingredients, Purchase the ingredients, Look up the recipes, Cook*, and so on. In terms of service encounters, *Menu recommendation* and *Menu confirmation* were the main interactions of "*Select menu*" action step. The action steps and

service encounters were adjusted repeatedly while checking the reference movie clips. Next, the service experience blueprint framework established from the literature (Table 2) was adopted as an initial analytic framework. The observed content items from the reference movie clips were assigned according to the user journey, and the addition, combination, relocation, and relabeling of content and categories were repeated to improve the framework to make it more suitable for the smart servicescape.

Subsequently, a service experience blueprint of the smart home service, as displayed in Figure 1, has been developed. Accordingly, Figure 2 exhibits the final framework for the smart servicescape, as derived from the smart home service experience blueprint of Figure 1.



	Service Experience Blueprint	Smart service experience			
	Customer actions/ Service encounters	Series of interaction (between service provider and user)			Service encounter
	Physical servicescape	**Space**	Layout, Function, Design		Smart service-scape
		Ambience	Sound, Light, Air condition, Scent		
		Smart device	Device	*Controlling, Sensing/monitoring, Actuating*	
Line of Interaction					
	Frontstage interactions		Interface	*Visual, Touch, Voice, Gesture, Eye-gaze*	
		Datascape	Content	*Input data Output data*	
Line of Visibility					
	Backstage actions		Internal database		
			External database		
		Connected scape	Network/ Cloud Other devices		
	Social servicescape	**Social scape**	In-service relationship		
			Non-commercial relationship		

Figure 2. A framework for the smart servicescape matched with the service experience blueprint

Results and Discussion

During the qualitative analysis to elaborate a more explicable framework for the smart service experience, particularly for the smart servicescape, as shown in Figure 2, four modification points have emerged.

First, most parts of the equipment corresponded to smart devices, as smart services are mostly delivered through them, and thus the equipment was relabeled as *Smart device*. Furthermore, the *Smart device* was specified in device and interface; the device was categorized as controlling, sensing and monitoring, and actuating types; and the interface type was classified as visual, touch, voice, gesture, eye-gaze, and so on. Although the *Smart device* encompassed both the device and the interface elements, the line of interaction was positioned in-between separating them.

Second, though the data was not considered in a physical or social environment, it was a critical element in the process of the smart service experience, since real-time data collection and the continuous data exchange of intelligent objects are key characteristics of smart services. Therefore, *Datascape* was newly added as an independent dimension of the smart servicescape. In addition, input and output data were specified in terms of data content. Besides this, the internal database in which the customized data was accumulated, and the external database (e.g., big data) that the internal database refers to and communicates with, were added to this *Datascape*. The line of visibility was located between the data content and the database, as the content of the input/output data could be

perceptible to service users.

Third, *Connected scape* was also added as a separate category of the smart servicescape to explain the network infrastructure, which enables smooth data communication—namely, the smooth function of *Datascape*. In addition to the network infrastructure, cloud computing or connection with other devices such as N-screen were the example elements of *Connected scape* observed in the movie clips.

Finally, the design aspect, which was the component of the physical servicescape in the initial framework, revealed relatively less importance compared to other dimensions during the analysis, because the elements relevant to the device interface design could be classified as belonging to *Smart device*. If there is any non-device design element, it could be applicable to the space environment. Therefore, the design was located as a sub-dimension of *Space* such as layout and function.

The value of this framework for the smart servicescape can be identified in two aspects. First, this framework proposes new dimensions to reflect the characteristics of smart services that have not been identified in conventional servicescape frameworks, including the addition of *Datascape* and *Connected scape*, and the relabeling of equipment as *Smart device*. Second, this framework suggests the structure of the service experience blueprint based on the service blueprinting and infused with the perspective of the service experience, which consists of service encounters and the servicescape. Consequently, the particular dimensions of the smart servicescape are presented according to the structure of the service experience blueprint.

Nevertheless, several limitations have been observed in the framework for the smart servicescape. The demonstration of service blueprinting clearly distinguishes the range of physical evidence, visible frontstage interactions, and invisible backstage actions. However, smart services have the characteristic of real-time connectedness, and the data collection and communication among users, smart devices, and environments occur in a ubiquitous way. Consequently, the omnipresence of *Datascape* and *Connected scape* could influence and also be influenced by *Smart devices*, *Space*, *Ambience*, or *Social scape*. For this reason, the borders of the line of interaction or the line of visibility might be ambiguous in reality. To improve this limitation, therefore, further research is currently underway to ameliorate this framework accurate enough to reflect the omnipresent nature of the smart servicescape and to expand the scope of smart service domains, including smart cars or smart health services.

Conclusion

The growth of smart services has been stimulated by the active innovation and development of IoT technology. Compared to the proliferation of smart services, academic research in terms of service experience and service design is still in the initiation. Particularly with regard to a service experience viewpoint, it would be indispensable to consider the context and environment of smart services—namely, the "smart servicescape," as it could influence users' whole experience. Here has occurred the research opportunity about what kind of different characteristics the smart servicescape would have compared to the conventional servicescape due to the convergence of online and offline connected environments.

With this background, the research aim of this study was to propose a framework for the smart servicescape by identifying new dimensions that would reflect the characteristics of smart services. First, literature on the conventional servicescape and on the service blueprinting were reviewed in order to establish an initial analytic framework of service experience blueprint. Next, twenty user-scenario movie clips on smart home services officially produced by ICT corporations were collected, were analyzed in a qualitative way through grounded theory, and were classified according to the analytic framework. During the qualitative analysis process, the framework structure was improved to make it more appropriate for the smart servicescape.

The framework for the smart servicescape, derived from the smart home service experience blueprint, exhibited four differentiated points: (1) *Smart device* was positioned as a separate dimension and specified in device and interface; (2) *Datascape* was newly added to reflect the key characteristics of smart services (i.e., real-time data collection and the continuous data exchange of intelligent objects); (3) *Connected scape* was also added to explain the network infrastructure, which enables the smooth function of *Datascape*; and (4) design aspect was divided into the sub-properties of *Smart device* and *Space*. The values of this framework can be identified in two aspects: (1) by identifying new dimensions to reflect the characteristics of smart services; and (2) by suggesting the structure of the service experience blueprint infused with the perspective of service experience, which consists of service encounters and the servicescape.

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