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## Designing and Testing Service Experiences (Mobile, Web, Public Displays) for Airport Transit

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### Abstract

*The importance is growing of user experience as part of service design to enhance competitive differentiation for companies. In conceptual and practical terms, it is challenging to design service experiences and measure differences in the utility value of service experiences. Our research question is: What is the best way to design and test user experiences of services? We extracted seven service experience factors from literature. For the case under study, an airport transit service, we used Kansei Engineering to design various user experience scenarios. Via four pre-test iterations, we selected three promising factors for service experience differentiation, as well as five target variables to assess experiential utility. We tested user experience based on an orthogonal conjoint analysis (n=123). The main finding is that using the factors from literature as design inputs within an overall Kansei Engineering approach is practically feasible and results in distinctly different user experiences. With regard to the airport case for example, emotional service clues were found to contribute strongly to 'feeling valued' and customer participation was found to enhance comfort.*

**Keywords:** service design, user experience, conjoint measurement, Kansei

## 1 Introduction

Tidd (2003) states that despite the fact that, 85% of employment involves the delivery of services, little is known about how to manage service innovations. According to Voss and Zomerdijk (2007), it has proved difficult to measure and predict the returns on services. This in turn has led many companies to overinvest or under invest in (experiential) services. Service innovation has proved to be a challenging endeavour for

various reasons, including the intangibility of services, the heterogeneity of services, the fact that much service innovation focuses on processes rather than on products, and the lack of an identifiable R&D function (Vermeulen and Van der Aa, 2003). This complexity is increased by the current trend in service innovation, which has come to be known as designing “experiential services”. *“Experiential services are considered services where the focus is on the experience of the customer when interacting with the organisation, rather than just the functional benefits following from the products and services delivered. Every touch point that the customer has with the organisations is an experience, no matter how mundane the product or service that is being delivered.”* (Carbone and Haeckel, 1994).

Although this experiential factor has been implemented in various forms within the retail environment, it is also emerging as a critical design element within mass public service environments, such as airports and flight carriers (i.e. Virgin Atlantic source: Voss & Zomerdijs, 2007). As the diversity and number of passengers grow, demand on these services increases. Service performance is increasingly becoming a competitive factor for airport operators. At the same time, continuous technological change and increasing business network dependencies have made the process of service innovation more complex (E-Cab, 2008). In this research, we focus on airport transit services, which are provided by multiple parties (airlines, airport and ground services) and across multiple interfaces (Mobile, Web, public displays). Although we are fully aware of the importance of the organizational and technical challenges involved, we focus on the service experience design challenges: What are the main factors that explain how people experience a service? Can these factors be used to guide design decisions? And does that lead to service experiences that are valued differently by customers? Because these questions are raised during the design of services, we have adopted a design science approach (Hevner, March, Park and Ram, 2004): we make the design factors explicit, generate various service experience designs and test their impact on customers (Verschuren and Hartog, 2005). Hence, the main research question is:

How to design and test service experiences for the case of airport transit services?

To answer this research question, this paper is structured as follows. We begin by presenting relevant literature, after which we address our research methodology and discuss the results of the conjoint analysis.

## **2 Theory**

There are various theories that address service experience design. In this section, we begin by reviewing several of them. Inspired by Fynes and Lally (2008), we group the theories in an overall framework, discussing seven service experience factors. Finally, we briefly discuss Kansei Engineering, which is the overall design approach used in this study.

Falk and Dierking (1992) focus on customer experiences as related to interactions and contexts. According to Nijs and Peters (2002), their model provides a valuable depiction of the way customer experiences depend, on mood, the service provider and prior

knowledge. Experiences are unique for each individual and they are determined by the personal, social and physical context.

Several scholars have studied experiential services in terms of theatre performances. One example is Stuart and Tax (2004), who argue that, although services have evolved over the last thirty years, one fundamental constant has not changed – they are performances. In this view, the value of a service experience can be seen as a function of how well the provider integrates theatrical components to generate performances. This is in line with the ideas of Pine and Gilmore (1999), who point out that a great performance generates a memorable experience. In their study, they present an exhaustive list of experiential design components in terms of theatrical constituent parts. They argue that theatrical concepts make it possible to describe critical design elements in terms of producers (executives), directors (managers), actors (service providers), audience members (customers), a script (customer and service provider training, customer contact, service processes and customer involvement), stage decorations and props (physical facilities, service-scape and equipment), costume design (uniforms), rehearsals (pilot tests) and backstage production (hidden factory).

In a different approach, Voss and Zomerdijk (2007) have studied the design process of a number of consultancy firms, service industry organisations and providers. One of their conclusions was that these companies innovated in five distinct design areas: the physical environment, service employees, service delivery process, fellow customers and back office support, which all directly or indirectly contribute to a customer's experience.

According to Berry, Carbone and Heackel (2002), every service-oriented company should have an "Experience Motif". The "Experience Motif" reflects the organisation's core customer experience-oriented values and branding strategies. Captured in a few words, the motif serves as a guide to all experience management efforts. Similarly, Shaw (2005a) speaks of the "Customer Experience Statement", considering it critically important in terms of evoking the right emotions with their customers.

Strategic Experience Modules constitute a branding approach aimed at generating compelling and memorable experiences for (potential) customers. In their approach, Smitt and Bernd (1992) emphasise the sequence in which people learn new experiences. They base their approach on the classical hierarchical learning effects model, which describes learning as a process of becoming aware of (external) stimulus, followed by an understanding of the stimuli and by an (affective) response towards the stimuli, ultimately followed by action (i.e. buying a product). The authors present five strategic experience modules in their approach: (1) *Sense*; attract attention (of the potential customer); (2) *Feel*; create an affective bond; (3) *Think*; develop a permanent cognitive interest; (4) *Act*; stimulate the buying behaviour; and (5) *Relate*; places the experience beyond the individual level and puts in a larger social context.

In their work on multi-channel service experience blueprinting, Patrício, Fisk and Cunha (2008) state that designing services has become very different from the time when service firms only had physical storefronts. Technological trends have brought about the emergence of multi-interface services. According to Patrício et al, (2008) and Simons and Bouwman (2004), customer experience is the result of all interactions with the firm through its different interface channels, including Internet-based channels.

In a study on turning service concepts into service experiences, Fynes and Lally (2008) reviewed existing service concept development literature and identified five common factors: perception, process, physical, people and service benefits (see Table 1). Next, they argued that customer experiences transcend services, meriting two additional factors: emotional theme and participatory activities.

**Table 1:** Overview of experience factors and service components from theory

Experience Factor	Service Components	Scholars
Service Benefits	Service functions & Customer Experience Statement	Fynes and Lally (2008) Shaw (2005a, 2005b)
People	Primary Customers Fellow Customers Service Employees Back Office Employees	Voss, Zomerdijk (2007) Berry, Carbone and Heackel (2002)
Physical	Sensory Design Sight, Sound, Touch, Smell, Taste, Physical Clues Signs, Symbols, Artefacts	Voss, Zomerdijk (2007) Fulberg (2004) Berry, Carbone and Heackel (2002)
Process	Flow Management	Voss, Zomerdijk (2007) Patrício, Fisk & Cunha (2008)
Perception	Service Clues Emotional (cordial, empathic) and Physical (see above)	Stuart, Tax (2004) Berry, Carbone and Heackel (2002)
Emotional Theme	Customer Experience Statement	Shaw (2005a, 2005b)
Participation Activities	Co-creative process and social interaction Artefact Inclusion	Stuart and Tax (2004)

In Table 1, we have combined the service experience factors from Fynes and Lally and the service components suggested by the other authors. The service experience factors are explained below:

*Service Benefits* can be seen as the range of Value/Benefits to be made available to customers to meet their identified needs and the desired outcomes. An experience should deliver service benefits as well as supplementary desired experience benefits.

Experience benefits stem from the unique emotional and participative elements of the experience.

*People.* The arrangement of human resources required to deliver the core service. These resources contribute to social interactions and facilitate participative activities.

*Physical;* Practitioners are guided to purposefully design the physical environment and sensory clues that are both related to the context in which the experience is delivered, and that are part of the experience itself.

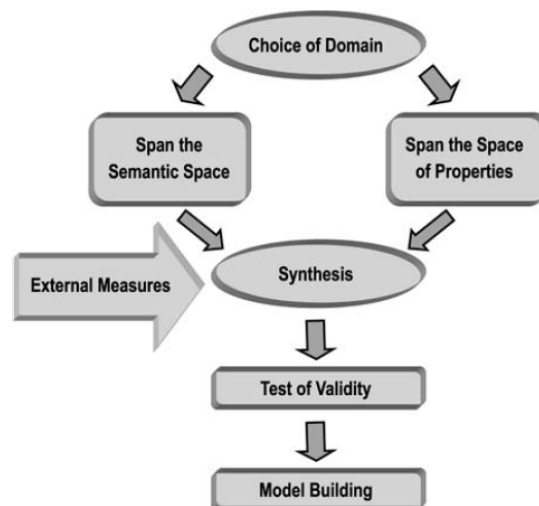
*Process;* The organisational activities and resources that enable the delivery of the service benefits and desired outcomes.

*Perception;* Given that customer expectations with regard to experience services are often considerably higher than for the services as such, managing the way people perceive experiences is of vital importance.

*Emotional Theme;* The articulation of the emotional outcomes the experience aims to satisfy is critical to the success of the experience offering. There should be a strong link between the emotional outcome and the design of experience clues throughout the experience.

*Participatory activities;* Designing opportunities for active customer participation what allow for the creation of inherently individual experiences for each customer.

As a final topic, we briefly introduce Kansei Engineering. We used the factors presented in Table 1 in the overall design approach of Kansei Engineering, which is illustrated in Figure 1.



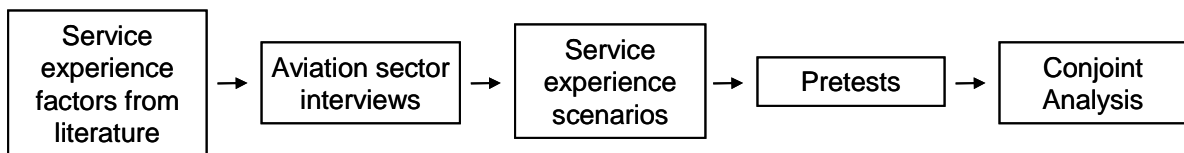
**Figure 1:** Overview of Kansei Engineering

As shown in Figure 1, after a specific domain is chosen for the design, Kansei engineering offers an approach to eliciting the emotion and feelings of consumers with regards to a particular product or service configuration. In the phases of synthesis and

testing the validity of the properties of a design (in our case service experience factors and components) are explicitly connected to Kansei goal variables, which capture the relevant feelings intended in the semantic space. The final step in Figure 1, model building, is used when there is a need for quantified weights between design properties and goals. The next section describes how the service experience factors from Table 1 are used within the Kansei Engineering approach.

### 3 Methodology: Applying Design Approach to Airport Case

In this section, we describe our design research approach, moving from theory-based factors via a range of designs of service experiences for an airport transit case to an empirically testing of potential experiential impacts of the designs using conjoint analysis. In this section, we describe how the case application has affected the operationalization of the service experience variables and how the conjoint analysis was designed.



**Figure 2:** Illustration of the service design cycle in this research

After identifying the seven service experience factors from literature (Table 1), we conducted stakeholder interviews to determine which service experience to design (transit services), which experience factors are promising when it comes to designing service experiences, that make a difference, and which Kansei goal variables to choose. Interviewees were asked to capture inputs from a diverse set of stakeholders: a large scale transit hub airport, an originating/destination airport, a leisure class airline, a high class airline, a large scale ground services operator, a research institute and a consultancy firm for the aviation industry.

**Table 2:** From theory based factors to selection for service experience scenarios

Factors from theory	Selection based on interview	Selected after four pretests
1. Service Benefits	[not included, in order to keep functional benefits constant]	[not included]
2. People	Fellow Customers	[discarded]
3. Physical	Physical Clues	Physical Clues High, Medium, Low
4. Process	[not included, in order to keep scenarios similar]	[not included]
5. Perception	Emotional Service Clues	Emotional Service Clues High, Low
6. Emotional Theme	[not included; is not explicit enough for customers]	[not included]
7. Participation Activities	Self-service participation	Self-service participation High, Medium, Low

Based on the stakeholder interviews and case analysis, we designed service experience scenarios based on four factors (Table 2). Three factors were excluded: the emotional theme, because it is difficult to make explicitly visible in the service scenarios; service benefits, because they often contain functional aspects, which are outside the scope of this research; and varying processes across transit scenarios, because that was considered too cumbersome. On the one hand it, would create scenarios with changing storylines, which are by definition more difficult for respondents to assess. On the other hand, we feared that variation in processes would introduce unintended service benefits in the perception of respondents, which would disturb our research design.

We conducted four pre-test iterations were conducted. The first three were conducted among consultants, academic referents and students, while the final one was conducted among twelve respondents from the potential target population. During the pre-tests, we refined and simplified the scenarios, the service experience components that were used and the Kansei goal variables. Most markedly, (a) scenarios became shorter, (b) fellow customers was discarded as a service experience component since it was not found to contribute to differentiating transit scenarios and (c) some changes were made in the Kansei goal variables (due to translation into Dutch and following respondent suggestions). The final research design we used for the conjoint analysis is illustrated in Figure 3.



You are arriving back at Paris ‘Charles de Gaulle’ International Airport, from a vacation in Dubai. You are in transit for your connecting flight to Schiphol Airport. After passing through the security check you are free to move about in the lounge area.

*[Physical Service Clues - High]* As you enter the lounge area you receive a message from your airline on your mobile phone. It states that your connecting flight is leaving in two hours from gate D26, which is a 30 minute walking distance.

You decide to take a seat in the lounge area and look at the pictures of your vacation. Because you want to arrange some details for your flight you go to a helpdesk.

*[Emotional Service Clues - Low]* The assistant is busy with a colleague and gives you a questioning look after a while.

You ask if it is possible to arrange a specific seat for your flight.

*[Participation - High]* The assistant checks her computer screen and shows you a top view of the airplane interior. “Please choose an empty seat to your liking.” You choose a window seat. Next, she gives you the opportunity to choose from a menu of in flight meals and movies. You choose and thank the assistant.

**Figure 3:** Service experience scenario example, as used in conjoint analysis

The physical service clues in our design can either be low (no screens; just oral mention of the departure time), medium (public displays of information) or high (personal SMS service). The emotional service clues can be either low (no specific empathy) or high (empathic service employee). And participation could be low (no self-service choice), medium (one self-service choice) or high (three self-service choices). There are five Kansei goal variables in the study. The first two are ‘satisfied’ and ‘exceeds expectations’, which are well known from service quality literature. Secondly, we also included a variable from the positive experiences of Shaw (2005a, b), ‘feel valued.’ Lastly we included two variables by extracting them from the explorative study with stakeholders from the industry. These were ‘comfort’ and ‘feel assured’.

To summarize, the conjoint analysis was conducted with three service experience variables (one having two levels and two having three levels) and five Kansei goal variables. SPSS orthoplan generated an orthogonal design where every respondent had to rate nine scenarios in relation to the five goal variables. The conjoint analysis was conducted among 123 respondents.

The results of the study are slightly biased in terms of gender: 58 percent of respondents were male. In addition, there is a bias towards working population, and towards the younger population (78% age 21-40 and 20% age 41-65). We do not know to what extent this affects the preferences the respondents expressed. Furthermore, a majority of the respondents have flown with a commercial flight provider in the last two years (94

percent), whilst 67 percent flies at least once a year. 17 percent of respondents fly once a month.

#### 4 Service Experience Results from Conjoint Analysis

In this section, we discuss how the service experience designs impact utility scores in relation to goal variables chosen for the airport transit case, i.e. satisfaction, exceeds expectations, comfort, feel valued and feel assured. Table 3 shows the results of the conjoint analysis. The standard deviation error for the analysis was low; ranging between 0.02 and 0.06, which indicates a low variability between respondents. The Pearson's R and Kendall's Tau ratings proved to be acceptable for all the analysed variables, indicating an excellent fit between the estimated utilities and the respondent group ratings.

**Table 3:** Conjoint Analysis for Service Experience Factors versus Goal Variables

	Satisfied (n=119)		Exceeds Expectations (n=122)		Comfort (n=123)		Feel valued (n=122)		Feel assured (n=111)	
	Utility	Std. Error	Utility	Std. Error	Utility	Std. Error	Utility	Std. Error	Utility	Std. Error
Physical Service Clues										
Low	-0,153	0,043	-0,147	0,027	-0,210	0,061	-0,149	0,024	-0,130	0,044
Medium	0,023	0,043	-0,035	0,027	-0,079	0,061	0,061	0,024	0,001	0,044
High	0,130	0,043	0,181	0,027	0,289	0,061	0,088	0,024	0,131	0,044
Range	0,153		0,181		0,289		0,149		0,131	
Emotional Service Clues										
Low	-0,530	0,032	-0,579	0,021	-0,333	0,046	-0,794	0,018	-0,517	0,032
High	0,530	0,032	0,579	0,021	0,333	0,046	0,794	0,018	0,517	0,032
Range	0,530		0,579		0,333		0,794		0,517	
Participation										
Low	-0,481	0,043	-0,581	0,027	-0,508	0,061	-0,368	0,024	-0,358	0,044
Medium	0,152	0,043	0,129	0,027	0,156	0,061	0,061	0,024	0,074	0,044
High	0,329	0,043	0,452	0,027	0,351	0,061	0,307	0,024	0,284	0,044
Range	0,481		0,581		0,508		0,368		0,358	
Constant	3,714	0,032	3,252	0,021	3,597	0,46	3,551	0,18	3,498	0,032
Pearson's R	0,996		0,999		0,990		0,999		0,996	
Kendall's tau	1,000		0,944		1,000		1,000		0,944	

From the first two columns of Table 3, using service quality indicators (see section 3), it can be seen that ‘emotional service clues’ and ‘participation’ provide greater utility than ‘physical service clues’. As expected, the ‘exceeds expectations’ variable, which is sharper formulated than ‘satisfied’, generates scores that are somewhat more extreme.

Secondly we discuss the results for the ‘Physical Service Clues’. For the variable *feel valued* there is a slight but significant difference between the utility levels of the service provisions. Respondents felt that the inclusion of an SMS service would increase the feeling of being valued in small amounts (0.03). This is in contrast to the variable *comfort* as the difference in utility between both forms of service provision is 0.37. This is the largest difference between both forms of the service provisions found and indicates that providing an SMS service can be expected to have the greatest positive influence on the experience of comfort.

With regard to the ‘Emotional Service Clues’ the inclusion of an empathic service employee led to a positive utility values across all variables. The most prominent result was for the variable *feel valued* (0.79). Shaw (2005b) indicated that generating the feeling of being valued is central to attaining customers, which are willing to recommend the service provider to other potential customers. The influence of the service employee is mentioned as one the primary ways of generating these feelings with customers. This is confirmed by our findings.

‘Participation’ led to the following findings. We note that the utility value for the variable *comfort* led to the highest utility (0.35) and leads us to state that ‘Multi Service Choice’ leads to the highest evaluation for the feeling of comfort. Another interesting point is the difference in utility between single service options and multi service options. The largest difference in utility between single service options and multi service options was found for the variable *feel valued*. According to these findings increasing the co-creative nature of the service provision thus seem to have the highest impact on customers feeling valued by their service provider.

The goal variable ‘feel assured’ was the most difficult one for respondents to relate to (n=111): the utility values related to this goal values were low to average for all the service experience components.

Overall, our findings indicate that for the airport transit case:

‘Emotional Service Clues’ contribute about two times as much to the feeling of being valued, assured, satisfied and surpassing expectations as ‘Physical Service Clues’

‘Participation’ (co-creative process) contributes more strongly to the service experience than ‘Physical Service Clues’ for all the variables included in the study, yet it contributes less than the ‘Emotional Service Clues’

‘Emotional Service Clues’ and the inclusion of the empathic service employee contribute more to the Kansei goal variable *feel valued* than to other variables

‘Participation’ contributes more to *comfort* than to other variables

‘Physical Service Clues’ and sending SMS notifications contribute more to *comfort* than to other variables

## 5 Discussion and Conclusion

In this section, we discuss the limitations of this study, the generalization of the findings, the management implications and the overall conclusion. There are three limitations to this study. Firstly, on average, the respondents to our survey are younger than the average population of airport visitors. We do not know whether this had an effect on the results. Secondly, not all seven service experience factors from literature, or their underlying service components, are purely non-functional or purely customer-oriented in nature, like back office design or the use of customer experience statements. Therefore, they were excluded from the service experience testing, even though they could well have an impact. Thirdly, we tested text based service scenarios. This inherently limits the richness of sensory or emotional designs which can be tested.

*This research contributes to the service design cycle* (Hevner et al, 2004; Verschuren and Hartog, 2005). Overall, we took three steps : a) extracting seven service experience factors from literature, b) using them as part of Kansei Engineering to generate service experience designs and c) empirically testing service experience impacts of those designs with customers. The question now is to what extent this approach can be generalized? Firstly, the seven service experience factors from literature are highly generic. Secondly, using them as input for the design decisions in a given case, like our airport case, is a step that can be generalized. And Kansei Engineering is quite flexible. It was developed in the automotive sector, and later applied to healthcare and financial services (Wiegel and Simons, 2008) and was proven to be applicable for the airport case at hand. What is different in each case is the detailed design: not every service experience factor will offer the same opportunities for service differentiation in all sectors and cases. Finally, using conjoint analysis for service experience impacts of design could also be extended beyond text-based scenarios. On a different note, the seven experience factors and service components from theory (Table 1) could also be used to guide ‘mystery shopper’ type of evaluations, but that is a different form of – a posteriori – evaluation of service designs.

*The implications for management* are that service experience design choices can be made much more explicit than is commonly done. This has benefits for the earliest design phases of problem phrasing, goal setting, requirements engineering and generating initial service concepts. This study has shown that service designs can be evaluated much more explicitly in terms of service experience utility which users perceive than what is commonly thought to be feasible (whether this is done a priori or a posteriori). As a final practical point: if our finding is more generally valid that physical service clues are relatively less important than emotional service clues and participation, the relatively high attention that retail chains pay to physical appearance may not always be justified (compared to the limited attention for self-service screens, other forms of participation and emotional service clues).

To conclude, the literature review revealed seven factors for service experience design, which were shown to provide feasible inputs to service design choices, when adopted within an overall Kansei Engineering approach. Conjoint analysis measurements did show robust differences in service experiences across the various service scenarios we designed. As far as the airport transit case at hand is concerned, we found that emotional service clues offered the greatest utility in relation to Kansei goal variable ‘feel valued’, participation contributed most to ‘exceeds expectations’ and physical service clues mostly contributed to ‘comfort’. From a design science perspective, this study presents a

translation from theoretical service experience concepts into an executable approach for service experience design. In addition, it demonstrates the use of conjoint analysis for statistically robust measurement of expected utility of various service experience design options within the customer target group.

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