THE EFFECTS OF TECHNOLOGY READINESS AND SERVICE DESIGN ON SERVICE EXPERIENCE QUALITY IN TOURISM

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Abstract: Although past studies have advocated that a technology-oriented service could be treated as one of competitive advantages for the tourism industry, few empirical evidence was found to indicate whether it can truly bring better service experience for tourists. Therefore, in this paper, we explore the effects of the tourist's technology readiness (TR) and the type of service design on service experience quality. After conducting a survey with 73 tourist as participants of the Bopiliao Historic District in Taipei city, this study found that : 1) low-TR group received a higher level of agreement of "peace in mind" satisfaction with static design than interactive design, but high-TR group showed the opposite results; 2) both of TR and the type of service design could affect service experience quality. Finally, this study provides some suggestions on the improvement of service experience quality for the practices of service design and discusses some ideas for future research.

Keywords: tourism, technology readiness, service experience quality

1. Introduction

21st century is an era of the emerging experience economy (Pine & Gilmore, 1998). Compared with traditional tourist services, there are growingly tourism programs that currently focus on the operation of how to provide a life-enhancing trip to the tourists. For the tourism industry, service quality is usually treated as the satisfaction and pleasantness of travel experience (Kvist & Klefsjö, 2006). Several researchers (Chen & Tsai, 2007; Smith, 1994) have argued, theoretically and empically, that the service experience quality could influence the tourists' satisfaction directly. Kandampully (2000) further asserted that businesses are unable to avoid the impact of technology and competiton in the tourism industry. In general, a firm could adopt different design strategies and customized services to provide unique services to ensure good service quality (Comm & Labay, 1996; Mossberg, 2007; Murphy, Pritchard, & Smith, 2000). In recent years, service design has become an emerging professional field of design (Vogel, 2009). Mager and Sung (2011) embraced the notion that "service design looks at the experience by focusing on the full customer journey, including the experiences before and after the service encounters" (p.1). In essence, tourism is one of the pioneer industries using technology to drive service encounter satisfaction in service (Parrinello, 2001; Werthner & Klein, 1999). In order to reduce the cost of labor and to satisfy tourists' needs or wants, there are several forms of tourism which have adopted emerging technologies to assist the management and innovativeness of the service. Applying appropriate technology to the tourism industry can not only solve problems during a tour promptly, but also help the service provider to innovate new services

(Buhalis & O'Connor, 2005). However, technology is not a panacea for a variety of service problems. While facing technologies, the tourists have to cope technology paradoxes, such as control vs. chaos or new vs. obsolete (Mick & Foyrnier, 1998). Parasuraman (2000) offered the concept of technology readiness (TR) as a systematic metric or measurement system that supports assessments of the maturity of a particular technology and the consistent comparison of maturity between different types of technology. Thus, the main purpose of this study is to explore how TR and the type of service design affect the service experience quality in tourism.

2. Literature review

2.1 Tourism industry

Tourism as a compilation of activities, services and industries that delivers a travel experience is the business of providing tours and services for tourists. (Chen, 2010; Mossberg, 2007; Murphy et al., 2000; Otto&Ritchie, 1996). Tourism as the world's largest industry is of vital importance to the global economy and its contribution has risen dramatically over recent decades (Bardgett, 2009, p. 3). For tourism services, Dwyer, Edwards, Mistilis, Roman, and Scott (2009) argued that tourists normally expect it can obtain more customizing services, real experiences, unforgettable memories, and attractive service contents. In fact, the technology has influenced the development of the tourism industry (Guttentag, 2010). Compared to the past, the application of technology in the tourism industry gives the tourists more convenient and pleasure nowadays. Therefore, this study designed several service design concepts with technology and evaluated their influences on tourists.

2.2 Technology readiness

Parasuraman (2000) defined technology readiness (TR) as individual's propensity to embrace and use new technology-oriented service or product for accomplishing goals in daily life or at work. Dabholkar and Bagozzi (2002) and Parasuraman (2000) have argued that client's personal characteristic could be one of the main factors to determine whether using technology-based service or not. Furthermore, the client's attitude or intention has a great relation with self-innovation, intention, requirements of interaction, and social value. In other words, TR could be viewed as an overall state of mind rather than ability. In general, TR results from a gestalt of mental enablers and inhibitors that collectively determine an individual's predisposition to use new technologies. (Parasuraman, 2000). In general, the turists detonate the positive and negative emotional responses simultaneously while using technology-based services, and then they have an effect on the faith of the service itself and the trust for the service provider. After that, these perceptions that come to customers through using technology-based service is called TR (Parasuraman, 2000). Parasuraman (2000) proposed technology readiness index (TRI) and four dimensions, which include: 1) optimism, 2) innovativeness, 3) discomfort and 4) insecurity. In this study, we adopted four dimensions of TRI suggested by Parasuraman (2000) to measure the TR.

2.3 Service experience quality

Service experience can be defined as the subjective mental state felt by participants during a service encounter (Otto and Ritchie, 1996). Zeithaml, Parasuraman, and Berry (1990) noted that quality is a measure of how products and services provided by a firm meet or excel customer expectation. For the tourism industry, service quality means the satisfaction and joyfulness of a specific tourism service experience that tourists encounter (Kvist & Klefsjö, 2006). Therefore, service experience quality could be explained as tourists' subjective feeling and evaluation when they experience in a service. As for the tourism industry, Otto and Ritchie (1996) proposed four attributes of service experience quality, hedonic, peace in mind, participation, and recognition. In this study, we adopted these four attributes of service experience quality proposed by Otto and Ritchie (1996) for assessing service experience quality.

3. Methods

Cultural tourism has become on of the fastest growing and the largest sector of the tourism industries (Chen & Tsai, 2007). Centered upon the Bopiliao Historical District, Taipei, the study conducted a

survey on tourist TR and service experience quality. Each participant was required to watch two 3-minute demonstration of different service design types, followed by a survey in the questionnaire format. The details of this study proceeded as follows.

3.1 Participants

In this study, a purposeful sampling of 73 participants, travelled in the Bopiliao Historic District, 41 of which are female (56.2%) and 32 are male (43.8%). Each participant was required to have experienced the service in the neighborhood in advance.

3.2 Stimulants

The study discovered the current tourism experiences and the tourists' expectations on Bopiliao Historical District through the Persona method. Based on this, this study first developed several service design concepts for the tourism. Then, this study proposesd two types, static (non technology oriented) and interactive (technology-oriented), of service design demonstration to probe the effects of TR on service experience quality in the Bopiliao Historic District, Taipei. As shown in Figure 1, the static design demonstration is a 3-minute clip featuring pictures of retro-style stores in the neighborhood along with verbal illustration, while the interactive design demonstration (as shown in Figure 2) incorporates a 3-dimensional simulation demonstration into the 3-minute clip to present a dynamic experiment in the same bloc.

Figure 1. The static design domenstration

Figure 2. The interactive design demonstration

3.3 Research tools

The study conducted a structural questionnaire composed of 4 parts: personal data, personal attributes, TR assessment, and service experience quality assessment. As mentioned above, the study intended to adopt the TR assessment purported by Parasuraman (2000), which included 36 questions. However, the author only administered 18 of them after consulting with three tourism experts, considering the appositeness of research questions designed vis-à-vis the survey. The 23-question assessment of service experience quality by Otto & Ritchie (1996) truncated to 20, eliminating 3: challenge, controllable results, and cooperation with service provider, as advised by the experts. The items of belongings safety and personal safety were merged. Thus, a total of 20 questions of service experience quality were included, with an additional question on overall satisfaction. The survey employs a 7-level Likert scale—1 as strongly disagree (most dissatisfied) and 7 as strongly agree (most satisfied)—to measure TR and service experience quality.

4. Results

4.1 The results of technology readiness index

As shown in Table 1, the average TRI of all participants was 4.03, which indicated that the participants hold a somewhat neutral position towarded services or products involving application of new technology—neither excessive reliance upon nor complete intolerance of it. The participants, however, demonstrated a higher level of agreement with the dimension of "optimism" (M=5.16) and a mediocre level of agreement with "innovativeness" (M=4.00). With regard to "inadaptability" and "insecurity," the results are somewhat higher levels of agreement (M=4.17 and M=5.19). The findings yield a likelihood of use of technology-oriented services or products by most participants, but they imply a more prudence when introduced to new services or products. Furthermore, The study divided the participants into two groups based the median of TR (TRI=4.11), one of low-TR group (36) and the other of high-TR group (37). Moreover, the t-tested results showed that the two groups exhibit a significance level at the dimension of TR (p<0.05).

4.2 The results of service experience quality

Table 2 showed the means and standard deviations of service experience quality in each TR group and the type of service design (static design and interactive design). In terms of "peace in mind" as a service experience quality, the low-TR group prefered static design to interactive design. However, both groups were highly satisfied with interactive design when it came to "hedonic," "participation," and "recognition." In order to further understood the impact of TR and the type of service design on service experience quality, the study employed two-way ANOVA to obtain the interaction effect between TR and the type of service design.

Table 1. Means and standard deviations of TRI

Aspect	Question	M	S.D.
Optimism	01 Technology gives people more control over their dailt lives.	5.92	1.00
	02 Technology makes me more efficient in my occupation.	5.78	1.16
	03 Products and services that use the newest technologies are much more convenient to use.	5.36	1.17
	04 I prefer to use the most advanced technology available.	4.45	1.31
	05 I find new technologies to be mentally stimulating.	4.86	1.12
	06 I feel confident that machines will follow through with what my instructed them to do.	4.59	1.27
	Average	**5.16**	
Innovativeness	07 Other people come to me for advice on new technologies.	3.92	1.69
	08 It seem I am learning more about the newest technologies than my friends are.	3.96	1.55
	09 In general, I am among the first in my circle of friends to acquire new technology when it appears.	3.33	1.67
	10 I can usually figure out new high-tech products and services without help from others.	4.62	1.33
	11 I have fewer problems than other people in making technology work for me.	4.19	1.47
	Average	**4.00**	

	12 If I buy a high-tech product or service, you prefer to have the basic model over one with a lot of extra features.	5.00	1.66
	13 It is embarrassing when I have trouble with a high-tech gadget while people are watching.	3.88	1.53
Discomfort	14 There should be caution in replacing important people-tasks with technology because new technology can breakdown or get disconnected.	5.33	1.46
	15 Many new technologies have health or safety risks that are not discovered until after people have used them	4.62	1.46
	Average	**4.71**	
	16 I worry that information you send over the Internet will be seen by other people.	4.96	1.68
Insecurity	17 Whenever something gets automated, I need to check carefully that the machine or computer is not making mistakes.	5.15	1.53
	18 When you call a business, you prefer to talk to a person rather than a machine.	5.47	1.30
	Average	**5.19**	
TRI		**4.03**	

Note: N=73; TRI= Optimism/4 + Innovativeness /4 + (8- Discomfort)/4 + (8- Insecurity)/4; M=Mean;
S.D.=Standard Deviation.

Table 2. Means and standard deviations of service experience quality in each TR group and the type of service design

Type	Low-TR group (N =36)				High-TR group (N =37)			
	Static Design		Interactive Design		Static Design		Interactive Design	
Aspect	**M**	**S.D.**	**M**	**S.D.**	**M**	**S.D.**	**M**	**S.D.**
Hedonic	5.29	0.97	5.93	0.72	5.18	1.06	6.21	0.70
Peace in Mind	**5.91**	0.92	**5.84**	0.90	6.02	0.81	6.26	0.73
Participation	5.18	1.11	5.86	0.75	5.06	1.08	6.17	0.70
Recognition	4.58	1.27	5.67	0.85	5.07	1.31	6.05	0.86

Note: N=73; M=mean; S.D.=standard deviation.

4.2.1 The effects of *TR and* the type of service design *on "hedonic"*

Table3 showed no significant interaction effect between TR and the type of service design on "hedonic" (F-3.412, P=0.069>0.05). No significant main effect for TR (F=0.280, P=0.618>0.05), means no impact is posed by TR on "hedonic." However, the type of service design was marked by a significant main effect (F=59.067, P=0.000<0.05). The participants were better satisfied with interactive type (M=6.07) than static design (M=5.24), indicating a stronger preference of the participants to interactive design.

Table 3. The two-way ANOVA results of "hedonic"

Source	SS	df	MS	F-value	P-value
TR	0.280	1	0.280	0.251	0.618
Type	25.067	1	25.067	59.634	0.000 ***
TR ×type	1.434	1	1.434	3.412	0.069
Within-subjects	109.133	142			
Between factor	79.288	71	1.117		
Residual	29.845	71	0.420		
Total	135.914	145			

Note: N=73; ***p<0.001.

4.2.2 The effects of *TR and* the type of service design *on "peace in mind" of service experience quality*

Table 4 showed a significant interaction effect between TR and the type of service design on "peace in mind" (F=4.522, P=0.037<0.05). This study found that low-TR group received a higher level of agreement of "peace in mind" satisfaction with with static design (M=5.91) than interactive design (M=5.84), while high-TR group received a lower level of agreement of "peace in mind" satisfaction of service experience quality with static design (M=6.02) than interactive design (M=6.26). This

result can be interpreted that the participants of low-TR group were not familiar with technology features and functions, insufficient confidence in use, and even skepticism about the efficiency of technology oriented services. In other words, participants of the low-TR group might feel psychological or physiological tension when exposed to interactive service. Those who were habitually familiar with high-tech products and services may generally demonstrate more inclination toward such service. In sum, the results indicated that the high-TR group had more calmness and comfort when introduced to the interactive design than low-TR group.

Table 4. The two-way ANOVA results of "peace in mind"

Source	SS	df	MS	F-value	P-value
TR	2.600	1	2.599	2.153	0.148
Type	0.276	1	0.276	1.397	0.241
TR ×type	0.892	1	0.892	4.522	0.037 *
Within-subjects	100.454	142			
Between factor	79.288	71	1.218		
Residual	14.006	71	0.197		
Total	104.222	145			

Note: N=73; *p<0.005.

4.2.3 The effects of TR and the type of service design on "participation"

As shown in Table 5, there was no significant interaction effect between TR and the type of service design on "participation" (F=3.487, P=0.066>0.05). There was also no significant main effect for TR (F=0.284, P=0.596 >0.05), but a significant main effect for the type of service design (F=62.703, P=0.000<0.05). The participants were more satisfied with interactive design (M=6.02) than static design (M=5.12). One possible explanation for this result is that tourists may feel the retro-style ambience and experience interactive technology in person.

4.2.4 The effects of TR and the type of service design on "recognition"

Table 6 indicated there was no significant interaction effect between TR and service on "recognition" (F=0.117, P=0.733>0.05). Nevertheless, there was a significant main effect for TR (F=4.162, P=0.045<0.05). The high-TR group (M=5.56) exhibited a higher level of agreement of "recognition" than the low-TR group (M=5.13). One feasible interpretation of this result was that the low-TR group highly demand of basic services such as tour guide, information, and more in-depth illustration. However, their requirements were not properly met due to insufficient service facilities in the target neighborhood. In addition, there was also a significant main effect for the type of service design (F=53.370, P=0.000<0.05). The participants were more satisfied with interactive design (M=5.87) than static design (M=4.83). The study further found that the lower level of agreement of satisfaction with static design were associated with accessible assistance (the number of service providers) and exhibition content (personal experience opportunities with service). In general, the participants were more satisfied with interactive design than static design when it comes to recognition.

Table 5. The two-way ANOVA results of "participation"

Source	SS	df	MS	F-value	P-value
TR	0.355	1	0.355	0.284	0.596
Type	29.340	1	29.340	62.703	0.00 ***
TR ×type	1.632	1	1.632	3.487	0.066
Within-subjects	121.849	142			
Between factor	88.627	71	1.248		
Residual	33.222	71	0.468		
Total	153.176	145			

Note: N=73; ***p<0.001.

Table 6. The two-way ANOVA results of "recognition"

Source	SS	df	MS	F-value	P-value
TR	6.931	1	6.931	4.162	0.045 *
Type	39.086	1	39.086	53.370	0.00 ***
TR ×type	0.086	1	0.086	0.117	0.733
Within-subjects	170.223	142			
Between factor	118.226	71	1.665		
Residual	51.997	71	0.732		
Total	216.326	145			

Note: N=73; *p<0.05; ***p<0.001.

5. Conclusions and suggestions

There were two major findings in this study. First, low-TR group received a higher level of agreement of "peace in mind" satisfaction with static design than interactive design, but high-TR group had the opposite results, Secondly, both of TR and the type of service design could affect service experience quality. Nevertheless, despite the conspicuous preference of interactive design by the most participants, service industries have to take into account the comprehensive effect of how individual TR fits into customized the type of service design, given technology-oriented service is not the ultimate panacea.

As a recommendation for the development of tourism, the study proposed more in-depth comprehension of visitors' TR to tourism industry when considering appropriate the type of service design. To further promote the satisfaction of tranquility for tourists of low TR when introduced to interactive service, the study suggests several feasible ways: 1) to guide or imply the use by tourists using an intuitive mode and minimize their physiological stress, 2) to design user-friendly touchpoints (as a facility or an interface) and to avoid rigid or complex interface, 3) to provide tourists with more approachable guiding method such as music or service staff to eliminate their tension, 4) to make addition of service recovery like call bells, 5) to offer visitors more private and secure experience space, 6) to take into account any possible demands by tourists like nursery or storage needs, and 7) to establish safety mechanisms and ensure privacy of personal information.

Generally speaking, the tourism industry includes a wide array of service providers such as hospitality and communication. The study suggested further research on service experience quality in different service providers, and the impact of TR or the type of service design on the service experience quality. Confined in the Bopiliao Historical District in Taipei, the study may not be directly applied to other fields. Therefore, it is suggested that further studies were made with expanded tourist sample or with regard to different attractions so the representativeness of scholarly findings can be enhanced. Last but not least, the delivery of service is a reciprocating interaction between service providers and their users. The study also refers to the deliberation of service design impact on market, human resource, operation, or finance in the perspective of service provider.

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