COMPARISON OF SERVICE INTERFACES BASED ON INDUSTRY AND SERVICE PROCESS

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ABSTRACT. *One of key elements in designing service systems is to design service interfaces, where the interaction between service delivery system and customers happens. However, there were few studies, which investigated service interfaces according to the types of service industry and the stages of service process. In this study, a survey was conducted to investigate the service interfaces for 4 representative types of service industry and 3 stages of service process. A total of 200 participants responded to the questionnaire based on their service experiences. As a result of the investigation, we can find significant service interface design factors according to the characteristics of service industries and service processes. This study provides guidelines for designing service interfaces according to the types of service industry and the stages of service process.*
Keywords: Service industry, Service process, Service interface, Service usability

1. **Introduction.** One of the most important factors in the design of service systems is the interaction between service delivery system and customers [6]. Like product interfaces, service interfaces, where the interaction between service delivery system and customers happens, are considered as a key element for designing service systems. Service interfaces vary depending on what type of service industry or sector the service delivery system belongs to and what kind of stage the service delivery system processes at. However, there were few studies, which investigated service interfaces according to the types of service industry and the stages of service process. This study aims to investigate service interfaces according to the types of service industry and the stages of service process. In this study, four business sectors, namely hypermarket, dental clinic, coffee shop and haute restaurant, were selected to represent four types of service industry each, and the service process is divided into three stages, namely entry, service experience and payment. This study examined the design factors for service interfaces that affected service usability, which means how usable customers feel at service interfaces, in each of four business sectors and each of three service process stages. A survey was conducted to investigate significant design factors for service industries and service process stages. Based on empirical data, guidelines for designing service interfaces were derived for service industries and service process stages.

2. **Related Work.** There are studies to discover significant factors that significantly affect the service delivery system. Lee and Hwang [3] identified eight design factors, which influenced service interfaces, and verified reliability and validity of eight design factors. Those eight factors include 'visualization', 'speediness', 'utilization of customer records', 'formulization', 'quality of unmanned service', 'information of manned service providers', 'separation between manned service and customers' and 'quality of manned service'. Schmenner [7,8] mentioned that all services can be separated by two dimensions,

namely degree of interaction with customers and customization, and degree of labor intensity, and divided into four independent service industries, as shown in Table 1. Mass service shows relatively lower interaction with customers and higher labor intensity than other service sectors. Hypermarket that sells products by wholesale is selected as a representative business of mass service. Professional service has relatively higher interaction with customers and higher labor intensity than other service sectors. Dental clinic is selected as a representative business of professional service. Service factory shows relatively lower interaction and lower labor intensity than other service sectors. Coffee shop is selected as a representative business of service factory. Service shop has relatively higher interaction and lower labor intensity than other service sectors. Haute restaurant is selected as a representative business of service shop. Shostack [1] referred to the service blueprint. Service blueprint is a picture or a map that accurately portrays the service system so that people can understand and deal with it objectively [2,5,9]. It contains all of activities and procedures needed to provide and produce a service. Service map is a technique that can help solve the problem of resource allocation, and internal and external customer's satisfaction in service organizations to expand the service blueprint scheme [4]. The service process can be divided into three stages through the service blueprint: Entry, service experience and payment. Entry stage is for stepping up the service process. Service experience stage is substantially to get a main service provided after entering in service process. Payment stage is for paying for value of service experience.

TABLE 1. Classification of service and service industry [7]

		Degree of interaction & customization	
		Low	High
Degree of labor intensity	High	Mass service (Hypermarket)	Professional service (Dental clinic)
	Low	Service factory (Coffee shop)	Service shop (Haute restaurant)

Note. A business in bracket is an example of service industry

3. **Methods.** A survey was conducted to investigate significant design factors for service interfaces according to service industries and service process stages. The questionnaire included 18 questions for measuring eight design factors, which were referred to by Lee and Hwang [3], and four questions for measuring service usability, which include satisfaction, usefulness, efficiency and convenience of service experience (see Table 2). As shown in Table 2, the reliability of service usability is satisfied in terms of Cronbach's alpha and composite scale reliability index. These 22 questions were responded for each of 4 representative service sectors, namely hypermarket, dental clinic, coffee shop and haute restaurant, and for each of three service process stages, namely entry, service experience and payment stages in a seven-point Likert type scale. A Total of 200 participants responded to the questionnaire, which means 50 respondents for each of four representative service sectors. Survey participants are 102 males (51%) and 98 females (49%), and they are 27 years old on average (standard deviation: 10.3).

4. **Results.** To find significant design factors for service interfaces, stepwise multiple regression analysis with eight design factors as independent variables and service usability as a dependent variable was conducted on the overall service sectors and whole service process. The results of stepwise multiple regression analysis are summarized in Table 3. Six factors were extracted as significant design factors that influenced service usability. 'Quality of unmanned service' ($\beta = 0.317$) has the biggest impact on service usability.

TABLE 2. Reliability of service usability

Factor	Variables	Cronbach's alpha	Composite scale reliability index
Service usability	Satisfaction of service experience	0.89	0.87
	Usefulness of service experience		
	Efficiency of service experience		
	Convenience of service experience		

TABLE 3. Significant design factors on overall service sectors

Factors	Estimate of regression coefficient (β)	Significance of regression coefficient	
		t-value	p-value
Quality of manned service	0.103	$t_{593} = 2.47$	0.0132
Formulization	0.116	$t_{593} = 4.65$	<.0001
Visualization	0.210	$t_{593} = 5.7$	<.0001
Separation between manned service and customers	0.112	$t_{593} = 3.32$	0.001
Speediness	-0.121	$t_{593} = -5.26$	<.0001
Quality of unmanned service	0.317	$t_{593} = 9.08$	<.0001

'Visualization' ($\beta = 0.210$), 'speediness' ($\beta = -0.121$), 'formulization' ($\beta = 0.116$), 'separation between manned service and customers' ($\beta = 0.112$) and 'quality of manned service' ($\beta = 0.103$) also have significant impacts on service usability. Especially 'speediness' ($\beta = -0.121$) has a negative estimated value of regression coefficient, meaning that too rapid progress of service process can negatively affect service usability. On the other hand, two other factors, namely 'utilization of customer records', 'information of manned service providers', do not have significant impacts on service usability.

4.1. **Entry stage.** Stepwise multiple regression analysis with eight design factors as independent variables and service usability as a dependent variable was conducted on each of service sectors in the entry stage. The results are summarized in Table 4. In the entry stage of hypermarket 'information of manned service providers' ($\beta = 0.289$), 'formulization' ($\beta = 0.239$) and 'speediness' ($\beta = 0.206$) have significant impacts on service usability. 'Quality of manned service' ($\beta = 0.506$) in the entry stage of dental clinic, and 'visualization' ($\beta = 0.392$) and 'quality of manned service' ($\beta = 0.258$) in the entry stage of coffee shop have significant impacts on service usability. In the entry stage of haute restaurant, 'utilization of customer records' ($\beta = 0.551$), 'information of manned service providers' ($\beta = -0.479$), 'separation between manned service and customers' ($\beta = -0.348$), 'quality of manned service' ($\beta = 0.227$), 'visualization' ($\beta = -0.134$) and 'speediness' ($\beta = 0.083$) have significant influence on service usability. Especially 'information of manned service providers' ($\beta = -0.479$), 'separation between manned service and customers' ($\beta = -0.348$) and 'visualization' ($\beta = -0.134$) have negative estimated values of regression coefficients, which means that increased levels of three factors lower service usability. It can be interpreted that it is unnecessary to visualize all the service processes and to provide additional information of employees to customers in haute restaurant. In haute restaurant, customers seemingly expect closer service from employees.

4.2. **Service experience stage.** Stepwise multiple regression analysis with eight design factors as independent variables and service usability as a dependent variable was

TABLE 4. Comparing design factors in entry stage

Sectors	Factors	Estimate of regression coefficient (β)	Significance of regression coefficient	
			t-value	p-value
Hypermarket	Speediness	0.206	$t_{46} = 2.36$	0.0228
	Formulization	0.239	$t_{46} = 2.06$	0.0447
	Information of manned service providers	0.289	$t_{46} = 3.55$	0.0009
Dental clinic	Quality of manned service	0.506	$t_{48} = 5.62$	<.0001
Coffee shop	Visualization	0.392	$t_{47} = 3.12$	0.0031
	Quality of manned service	0.258	$t_{47} = 2.04$	0.0471
Haute restaurant	Visualization	−0.134	$t_{43} = -3.53$	<.0001
	Speediness	0.083	$t_{43} = 5.1$	<.0001
	Utilization of customer records	0.551	$t_{43} = 17.1$	<.0001
	Information of manned service providers	−0.479	$t_{43} = -18.08$	<.0001
	Separation between manned service and customers	−0.348	$t_{43} = -24.33$	<.0001
	Quality of manned service	0.227	$t_{43} = 6.01$	<.0001

conducted on each of service sectors in the service experience stage. The results are summarized in Table 5. In the service experience stage of hypermarket, 'quality of manned service' ($\beta = 0.389$), 'speediness' ($\beta = 0.324$), 'utilization of customer records' ($\beta = -0.292$) and 'information of manned service providers' ($\beta = 0.243$) have significant influence on service usability. Especially 'utilization of customer records' ($\beta = -0.292$) has negative estimated value of regression coefficient, which means that higher utilization of customer records lowers service usability. It can be interpreted that merchandising based on past purchase history of customer may cause inconvenience to customers in the process of selecting the products they want. 'Quality of manned service' ($\beta = 0.667$) and 'speediness' ($\beta = 0.194$) in the service experience stage of dental clinic, and 'visualization' ($\beta = 0.555$) in the service experience stage of coffee shop have significant influence on service usability. In the service experience stage of haute restaurant, 'quality of manned service' ($\beta = 0.616$), 'visualization' ($\beta = 0.186$), 'separation between manned service and customers' ($\beta = -0.170$) and 'formulization' ($\beta = -0.113$) have significant influence on service usability. Especially 'separation between manned service and customers' ($\beta = -0.170$) and 'formulization' ($\beta = -0.113$) have negative estimated values of regression coefficients, which means that customers prefer closer interaction with employees and it is not necessary to keep formal procedures or rules in the process of providing service at haute restaurant.

4.3. **Payment stage.** Stepwise multiple regression analysis with eight design factors as independent variables and service usability as a dependent variable was conducted on each of service sectors in the payment stage. The results are summarized in Table 6. In the payment stage of hypermarket, 'quality of unmanned service' ($\beta = 0.488$) and 'speediness' ($\beta = 0.374$) have significant impact on service usability. 'Formulization' ($\beta = 0.411$) and 'quality of manned service' ($\beta = 0.354$) in the payment stage of dental clinic, and 'visualization' ($\beta = 0.383$) in the payment stage of coffee shop have significant influence on service usability. In the payment stage of haute restaurant, 'visualization' ($\beta = 0.838$), 'separation between manned service and customers' ($\beta = -0.337$), 'information of manned service providers' ($\beta = 0.302$), 'speediness' ($\beta = -0.088$) and 'quality of manned service' ($\beta = 0.069$) have significant influence on service usability.

TABLE 5. Comparing design factors in service experience stage

Sectors	Factors	Estimate of regression coefficient (β)	Significance of regression coefficient	
			t-value	p-value
Hypermarket	Speediness	0.324	$t_{45} = 3.09$	0.0034
	Utilization of customer records	−0.292	$t_{45} = -4.35$	<.0001
	Information of manned service providers	0.243	$t_{45} = 3.3$	0.0019
	Quality of manned service	0.389	$t_{45} = 2.98$	0.0047
Dental clinic	Speediness	0.194	$t_{47} = 2.32$	0.0245
	Quality of manned service	0.667	$t_{47} = 5.58$	<.0001
Coffee shop	Visualization	0.555	$t_{48} = 4.78$	<.0001
Haute restaurant	Visualization	0.186	$t_{45} = 5.58$	<.0001
	Formulization	−0.113	$t_{45} = -4.52$	<.0001
	Separation between manned service and customers	−0.170	$t_{45} = -11.48$	<.0001
	Quality of manned service	0.616	$t_{45} = 30.37$	<.0001

TABLE 6. Comparing design factors in payment stage

Sectors	Factors	Estimate of regression coefficient (β)	Significance of regression coefficient	
			t-value	p-value
Hypermarket	Speediness	0.374	$t_{47} = 5.17$	<.0001
	Quality of unmanned service	0.488	$t_{47} = 4.33$	<.0001
Dental clinic	Formulization	0.411	$t_{47} = 3.37$	0.0015
	Quality of manned service	0.354	$t_{47} = 3.19$	0.0025
Coffee shop	Visualization	0.383	$t_{48} = 3.72$	0.0005
Haute restaurant	Visualization	0.838	$t_{43} = 6.33$	<.0001
	Speediness	−0.088	$t_{43} = -4.14$	0.0002
	Information of manned service providers	0.302	$t_{43} = 7.89$	<.0001
	Separation between manned service and customers	−0.337	$t_{43} = -5.29$	<.0001
	Quality of manned service	0.069	$t_{43} = 1.91$	0.0182

Especially 'separation between manned service and customers' ($\beta = -0.337$) and 'speediness' ($\beta = -0.088$) have negative estimated values of regression coefficient, which means that higher levels of these factors lower service usability. It can be interpreted that customers prefer closer service with the payment from employees and it is not necessary to provide quicker service of payment in haute restaurant.

5. **Conclusions.** This study investigated design factors that have significant impact on service usability in each of service sectors and each stage of service process. The results of this study suggest that service interfaces should be designed differently according to the characteristics of service industry or sector and stage of service process. For example, 'speediness' is a very important positive factor to design service interfaces of hypermarket throughout whole stages of service process. In the meantime, for haute restaurant 'speediness' has positive effect on service usability in the entry stage, but negative effect on service usability in the payment stage. Therefore, it can be concluded that this study contributes to providing meaningful guidelines for designing service interfaces in each of service sectors and each stage of service processes. This study, however, has two limitations. First, survey respondents do not have enough demographic diversity, including

various generations. Second, the study dealt with only four types of service industry. Thus, a further study needs to conduct empirical research with various generations and a variety of service sectors.

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