

## An Empirical Study of Service Innovation's Effect on Customers' Re-purchase Intention in Telecommunication Industry

### UNE ÉTUDE EMPIRIQUE DES EFFETS DE L'INNOVATION DES SERVICES SUR L'INTENTION DE RACHAT DES CONSOUMMATEURS DANS L'INDUSTRIE DE TÉLÉCOMMUNICATION

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**Abstract:** Based on the review of the relevant researches in the field of repurchase intention as well as the field of service innovation, this research analyzed the Service Innovation's Effect on Customers' Re-purchase Intention in Telecommunication Industry, and developed the Theoretical model. And 198 users of mobile telecommunication were chosen for our investigation. The result shows that service innovation made by the operators in telecommunication industry has important effect to users' intention when they are in need to repurchase the mobile telecommunication.

**Key words:** service innovation; repurchase intention; telecommunication industry

**Résumé:** Sur la base des études appropriées dans le domaine de l'intention de rachat, et dans le domaine de l'innovation des services, cette recherche a analysé l'effet de l'innovation des services sur l'intention de rachat des consommateurs dans l'industrie de télécommunication, et a développé un modèle théorique. 198 utilisateurs de télécommunication mobile ont été choisis pour notre enquête. Le résultat montre que l'innovation des services effectuées par les opérateurs dans l'industrie de télécommunication a un effet important sur l'intention des consommateurs quand ils sont dans le besoin de racheter la télécommunication mobile.

**Mots-clés:** innovation des services, intention de rachat; industrie de télécommunication

## 1. INTRODUCTION

In 1967, V•Fuchs (S002) firstly advanced the concept of "service economy", which sent a signal to people: services is becoming increasingly important. Subsequently, Daniel • Bell (1974), the American scholar in the field of management put forward the "theory of post-industrial society". This theory indirectly gave one explanation that: the service in different periods and different sectors should keep innovative in order to

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adapt to the changing business environment, specially services in the service sector enterprises. As one typical service business, several domestic companies in the mobile telecommunications industry have been constantly looking for innovation and changing for competition. After several rounds of industry reshuffle, the three domestic mobile operators, started the whole business competition regardless of originally designated fields. All the three operators have introduced new products and new packages to attract customers. However, with the increasing homogenization of the communication products, all the 3 major mobile operators found loss of customers a growing problem. According to statistics: the customer losing rate in China Mobile Communication Co., Ltd. is about 12.6%,relatively small; which in the CDMA field of China United Telecommunications Co., Ltd. is 17.9%, as well as the GSM field is up to 32%.

Evidence shows that the profit of a company will improve 25% - 85% if the customer losing rate reduced 5%. Currently, the service coverage of tele-communication in most parts of China is more than 100%. So obviously, the room of developing new customers has been become smaller and smaller; while the room of customers' repurchasing will be the researching priority. The issue that how to keep the existing customers choosing their current mobile operator when they have to replace the existing business service for some business or personal needs has become the concern for scholars. The result of the following study shows that service innovation will be an important role in process of promoting the existing customers to re-purchase services in the same operator.

## 2. LITERATURE REVIEW AND HYPOTHESES

### 2.1 Concepts define

The main purpose of this study is exploring the service innovation's effect on customers' re-purchase intention in telecommunication industry. The basic theory is Theory of Reasoned Action (TRA) and Innovation Diffusion Theory (IDT). In the process of designing items for the questionnaire, five concepts were involved: service innovation, attitude, subjective norm, relative advantage and repurchase intention.

Currently, a large part of domestic researches in the field of service innovation are based on the Four-dimensional Model of Service Innovation which was put forward by Bilderbeek et. Al Among these researches, there is a large proportion of applying researches and prospecting researches, while few measuring researches. Further more, the measurement researches in the field of the tele-communication industry are hardly fewer. Therefore, this study designed measurement items for service innovation in the telecommunications industry, which is used to measure the service innovation's effect to customers' repurchase intention. The following is the operating definition the concepts which the study involved.

Service. Customer service is one invisible and easily disappearing process, involves the transmission system through which the servicing process produced. Since the American Marketing Association (AMA) first proposed the definition of services in 1960, scholars working in various fields put forward their own service definitions for different research purposes as well in different research backgrounds. With the expansion of the scope of service study, the concept of service has been always defined in a broad scope: it contains the invisible interacting process between customers and providers, as well as all the physical resources involved in the process, such as the goods, the technology systems, and so on. This type of definition of service brings much complexity for the service measurement study. In order to make the measurement of service innovation more specific and accurate, this study will define the concept of service according to the opinion of Fitzsimmons.

Service innovation. Based on the definition of service, we define the concept of service innovation in telecommunication industry: service innovation is some change in the process of the service. Service innovation is some progress produced in the invisible and easily disappearing process which is provided by the telecom industry operators with the participation of customers, contains the progress of the delivery system through which service be transferred. The conception contains two dimensions- innovation of customer interface and innovation in the delivery system. The innovation of customer interface is all the progress happened in the interface between customers and the providers of telecommunication services, such as the progress of the servicing methods of the staff, the improvement of the environment (physical environment and network environment), and so on. The innovation of service delivery system means all the improvement in the invisible preparing progress that the customers could experience which made by

telecommunication companies. The improvement contains both the positive changes happened in its own business organization and all the impacts to the staff which resulting from the changes of the organization and management.

Relative advantages. The definition of relative advantage derived from the operation of Rogers and Shoemaker's study—relative comparative advantage is the effectiveness the customers could experience after their using the service innovation provide by the telecommunication companies.

Subjective norm. The definition of subjective norms is based on Azjen's study- subjective norm is the pressure customers felt which from the social custom and the opinions of surrounding people while using the services provided by some telecommunication company.

Attitude. The definition of attitude is based on Davis' study - attitude is customers' recognition and evaluation of telecommunication services after using them. Repurchase intention. This definition of repurchase intention is based on the base of the concept taken from Oliver and Swan's study— repurchase intention is the behavior tendency of the customers to choose the services provided by the same communications operator when they need to purchase telecommunication service again in the future.

## 2.2 Hypothesis propose

### 2.2.1 Service innovation's impact on the subjective norm

According to theories of social psychology, people beings are thought to be socaial animals, who's perception, judging, understanding, demonstrates the attitudes will be consistent with those of the majority as people beings action are always be impacted by the around groups.

According to the results of the herd mentality experiment made by Ash, one American psychologist, only 25% of the people will act relatively independent, who will not be impacted by the around groups; Most individuals will subjected to the pressure from the surrounding groups before they deciding whether to take a particular action.

Specifically, we suppose that service innovation in one certain mobile communication operator was excellent, obviously, the operator would be appreciated by the customers, and further more this part customers would effect another part customers who had need to change the mobile communication service. When individuals purchase the mobile communications service, they would take the consisting behaviour wih the the surrounding community.

In summary, for the relationship between service innovation and consumers' subjective norms, the paper made the following assumption: service innovation has positive effect on subjective norms——

H1a:Innovation of the customers interface has positive effects on consumers' subjective norms.

H1b:Innovation of the service delivery system to consumers has positive effects on consumers' subjective norms.

### 2.2.2 Service innovation's impact on the relative advantages

Mobile telecommunications Company typically belongs to service industry. According to the datas of 2008, the proportion of residents transport and communication costs in their personal incomes is accounted for 9.8%, obviously the mobile telecommunication service has become one indispensable part for people's everyday life. Compared to the non-daily necessities (for example, the luxuries), people are sensitive to the properties of daily necessities, contains the price, the quanlity, as well as the consuming process. Therefore, with the increasing personalizing need of customers, as well as the increasing importance of the service process, mobile telecommunications services operators should have service innovation to meet the growing needs of people.

When consumers perceived the certain operator's services innovation, they will appreciate the company's positive image for pursuing reforming to meet the consumer s ' demands, therefore grows potential positive sense for the telecommunication operator. For example, the better service hall environment, the improving attitude of the staff (in the hall or on line) and the increasing professionalism will help the customers to choose most suitable for their own communications business, hus enhancing their working or communicating performance.

In summary, for the relationship between service innovation and service relative advantages, the paper made the following assumption: service innovation has positive effect on relative advantages——

H2a: Innovation of the customers interface has positive effects on service relative advantages.

H2b: Innovation of the service delivery system to consumers has positive effects on service relative advantages.

### **2.2.3 Service innovation's impact on attitude**

Consumers are individuals with feelings and personal emotion, the service innovation in telecommunication will bring consumers the impact of emotional and cognitive, which leaving good or bad impression in the minds of consumers. Once the service innovation has been recognized by consumers, the part which related to the service innovation in consumer's subjective feelings and emotions will change positively, and further more the customers will grow the psychological tendency for the evaluation of the service innovation. On contrast, if the service innovation has not been recognized or be considering not necessary, then the part of consumers' subjective feelings and emotions will not largely change, or even change negatively, so the customers will grow negative psychological tendency for the evaluation of the service innovation. Specific to the relation to mobile communication service innovation and the relationship between consumers' attitude in this study, we believe that the customer interface is the very interacting platform between actors (contain the customers and the staff of the company), so the customers acting on the platform would assess all things about the service platform they can perceive, thus affect their attitude to the telecommunication service company; at the same time the customer can perceive the changes in the delivery system through their process of accepting telecommunication services to the very telecommunication company, thus produce their evaluation of it and then affect their attitude to the telecommunication company.

In summary, for the relationship between service innovation and customers' attitude, the paper made the following assumption: service innovation has positive effect on customers' attitude——

H3a: Innovation of the customers interface has positive effects on customers' attitude.

H3b: Innovation of the service delivery system to consumers has positive effects on customers' attitude.

### **2.2.4 Relative advantages' impact on attitude**

As mentioned above, the meaning of "relative advantage" concept is the improving extent of performance that the consumers could perceive after their using of the service innovation launched by the telecommunication operator. Including all the performance associated with the mobile communication service, such as work performance, communication performance and so on. Through the process of experiencing service innovation of mobile communication, the consumers could perceive their extent of performance improving which is called "relative advantage", then the perceived things would further affect the consumers evaluation, cognition, and emotion of the service innovation of mobile communication, all the three we called attitude of consumers.

In summary, for the relationship between relative service advantages and customers' attitude, the paper made the following assumption: relative service advantages has positive effect on customers' attitude——

H4: Relative service advantages have positive effects on customers' attitude.

### **2.2.5 Subjective norms' impact on customers' re-purchase intention**

According to the studying results of Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB), subjective norms impact on customers' purchasing intention. At the same time, there is a large number of empirical studies prove that the pressure which consumers perceived from around group impacts their purchasing intention. Specifically in the field of telecommunication industry, if the service innovation according to competition and consumers' personal demand promoted by the mobile communication operators would be approved by a majority of consumers, then when someone individual consumer who living in the around environment has need to repurchase telecommunication service would perceive the pressure of the surrounding community, and this pressure would further more effect his or her tendency to repurchase the communication services of the same operator. In addition, after the individual making

comparing the operator which launched the service innovation with other operators, he or she would have more confidence for the sense from the surrounding communities, so this individual would increase its repurchasing behavior tendency.

In summary, for the relationship between subjective norms and customers' re-purchase intention, the paper made the following assumption: subjective norms have positive effect on customers' re-purchase intention—

H5: Subjective norms have positive effects on customers' re-purchase intention.

### **2.2.6 Relative advantages' impact on customers' re-purchase intention**

The "relative advantage" means the improving extent of performance that the consumers could perceive after their using of the service innovation launched by the telecommunication operator. Including all the performance associated with the mobile communication service, such as work performance, communication performance and so on. By experiencing mobile communication operators' service innovation, customers could perceive the performance enhancement of communication to meet or even surpass their needs, so they would generate a sense of trust and satisfaction for the very mobile communications service operator and further more to evaluate positively. When the customer have needs to change mobile communication service for some reasons such as changing work or moving to somewhere else and so on, he or she would firstly considering the same operator which got the around groups' appreciation. The repurchasing behavioral tendencies of telecommunication service are what we called repurchasing intension.

In summary, for the relationship between relative advantages and customers' re-purchase intention, the paper made the following assumption: relative advantages have positive effect on customers' re-purchase intention—

H6: Relative advantages have positive effects on customers' re-purchase intention.

### **2.2.7 customers' attitude' impact on customers' re-purchase intention**

Attitude is one antecedent variable of intension in all the three classical theories: TRA, TPB and TAM. In TRA, both the two concepts "attitude" and "subjective norms" are antecedent variables of behavior intension; on the basement of the TRA, David added another variable "perceived behavioral controlling" in the TPB, "attitude" and "subjective norms" are still two antecedent variables of intension; while in the TAM, antecedent variables of behavior intension are attitude and useful perceiving. Except for the above basis theories, there is a large number of empirical Studies has proved the attitude's positive impact on behavior intension—the domestic scholar Lin Zhenxu proved attitude's impact on the customers' intension in the international field through "An empirical study of consumers' purchasing intention"; in the field of using sports drug, the result of "An empirical study of some Chinese athletes' attitude and intention on using doping" written by scholar Mao Zhixiong showed the attitude's positive effect on intension; at the same time, some scholars studying the telecommunication industry field began to study the interacting effect between customers' attitude and repurchasing intension, for example, Shi Huakang studied the factors which affect customers' using intension of mobile payment business, he believe customers' attitude has obvious impact on their purchasing intension.

In summary, for the relationship between attitude and customers' re-purchase intention, the paper made the following assumption: relative advantages have positive effect on customers' re-purchase intention—

H7: Customers' attitude has positive effects on customers' re-purchase intention.

The model studied in this research is shown in Fig.1.

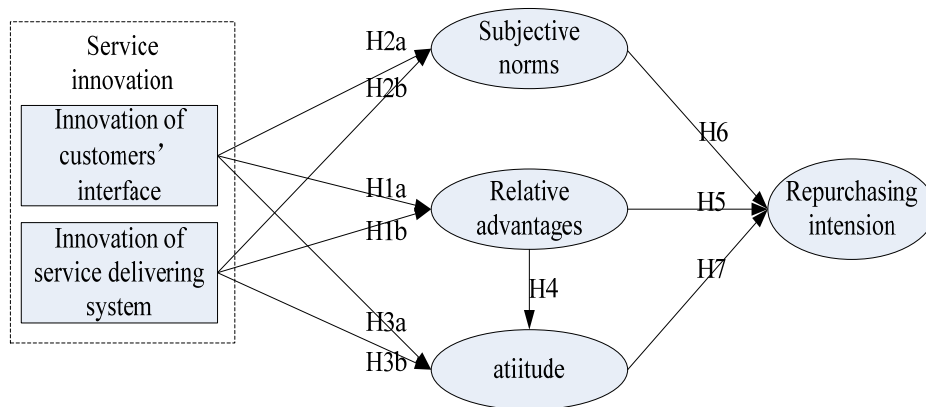


Figure 1: Relation between service innovation and customers' repurchasing intension model

### 3. STUDY DESIGN

#### 3.1 Measurement design

The main purpose of this study is to explore the impact of service innovation on customers' repurchasing intension in mobile telecommunication industry. Accordingly, related measurable variables are designed. Measurable variables mainly related to the five related concepts: service innovation (innovation of customers' interface and innovation of the service delivering system), subjective norms, relative advantages, attitude and repurchasing intension. Most items of the measurement are adopted from the studies of former scholars, and a few items are from qualitative research interviews. Specifically, items measuring innovation of customers' interface in service innovation are adopted from the study of Wang Keyi and Zhou Jun; items measuring innovation of service delivering system are from qualitative research interviews; items measuring relative advantages are from studies of Davis(1989) & Hsu (2006) and studies of Pedersen (2005); items measuring subjective norms are from studies of Fishbein & Ajzen (1990) & Pedersen (2003,2005); items measuring attitude are coming from the paper written by Davis (1989) & Pedersen (2003); items measuring repurchasing intension are from the study of Oliver & Swan (1989). The items are adopted from research of Helm. All items are measured in 5-point Likert scale ranging from "(1) strongly disagree" to "(5) strongly agree".

After confirming the initial questionnaire, five mobile communications operating managers with master's degree and the author of this paper discussed and communicated carefully to ensure the content effectiveness of measuring items. All participants carried out the questionnaire independently. Also they evaluated on the content, items, questionnaire format, whether or not the questionnaire is easy to understand, the accuracy of terms used and so on, then proposed suggestions on what topics should be increased, adjusted or deleted. Questionnaires were delivered to 120 mobile telecommunication customers later on as pre-test and adjusted the items according to the feedback. Through this process, a total of 25 items were identified, with 10 used for measuring service innovation, 3 for relative advantages, 6 for subjective norms, 3 for attitude and 3 for repurchasing intension.

#### 3.2 Data collection

With field survey, interviews and internet survey, this study randomly selected 400 mobile telecommunication customers as participants, and investigated their feedback on purchasing service in the three mobile communication service operators and the pressure from the around groups, the performance improved they could perceived and their attitude and repurchasing intension of the service. The details of the sample are shown in Tab.I. 400 questionnaires were distributed, 245 questionnaires were retrieved, and the return rate was 61.25% which met requirement of 20%. 198 valid questionnaires took up an valid rate

of 94%. There were 76 individual investors accounting for 31.5% of total and 165 institutional investors accounting for 80.82%.

**Table 1: Sample Description**

Demographic variables		Proportion	Basic communication services purchased		Proportion
gender	male	53%	Average monthly expenditure of calls	Below 50	32%
	female	47%		51-150	54%
age	below18	0		151-250	7%
	19-29	92%		251-350	5%
	30-39	1%		Above 351	2%
	40-49	4%	Has Transformed operators or not	Yes	49%
	above50	3%		no	51%
Highest level of education	High school	5%	How many times have you purchase service in China Mobile Communication Co., Ltd.	1	7%
	college	7%		2	29%
	university	35%		3 or more	64%
	Guaduate and the above	53%			

## 4. DATA ANALYSIS AND HYPOTHESIS TEST

### 4.1 Reliability test

SPSS software is used in this study. Internal consistency of measurement tools is tested through the Cronbach's alpha coefficient. The alpha coefficient of service innovation is 0.9712; the alpha coefficient of relative advantages is 0.9475; the alpha coefficient of subjective norms is 0.9642; the alpha coefficient of attitude and the alpha coefficient of repurchasing intension is 0.9568. All the coefficients of Crobach's alpha are exceeding the minimum criterion of 0.70 which indicates high reliability of the scale.

### 4.2 Validity test Model

Validity analysis is an important standard for measuring the quality of the scale, which is used to test whether the attribute and characteristic measured by the scale are necessary indeed. In this research, exploratory factor analysis was used to give a preliminary test on one-dimensional scale, and then convergent validity and discriminate validity analysis were conducted to test the construct validity.

Exploratory factor analysis. Exploratory factor analysis results of this study showed that KMO value is 0.969, greater than the criterion of 0.5 with a notable level of  $p < 0.001$ , indicating that the items were correlated and suitable for factor analysis. The results produced four factors are greater than 1, corresponding to the four variables of this study. Factor loading of each item on single-dimension ranges from 0.799 to 0.900, exceeding the minimum loading criterion of 0.5. This shows a good convergent validity and single-dimension.

Convergent validity. Confirmation factor analysis (CFA) was introduced here to evaluate convergent and discriminate validity by AVE in the context of Lisrel8.7 by using maximum likelihood estimation. The result shows that AVE value of the six factors are 0.9292,0.9422,0.663,0.792,0.703,0.856. All the values exceed the minimum acceptable level of 0.5, which indicates a high degree of convergent validity.

Discriminate validity. Discriminate validity means the degree of different dimensions or concepts distinguished by scales. If there is a lower correlative degree of measuring tools between the scale and different conceptions, it is able to demonstrate that the scale has the ability to discriminate validity. In details, discriminate validity can be assessed by comparing the square root of AVE with the correlations between concepts. The relevant results are shown in Tab.II. The square root of each potential variables are bigger than correlative coefficient of other potential variables, which means there are higher discriminate validity among these concepts.

**Table 2: Discriminate validity analysis**

	CI	SDS	RA	SN	A	RI
CI	<b>0.6953</b>					
SDS	0.56	<b>0.7766</b>				
RA	0.68	0.52	<b>0.8053</b>			
SN	0.65	0.57	0.68	<b>0.7981</b>		
A	0.64	0.56	0.74	0.76	<b>0.8082</b>	
RI	0.66	0.50	0.61	0.75	0.73	<b>0.8304</b>

\*\*P < 0.01; values on the diagonal refer to the root of AVE

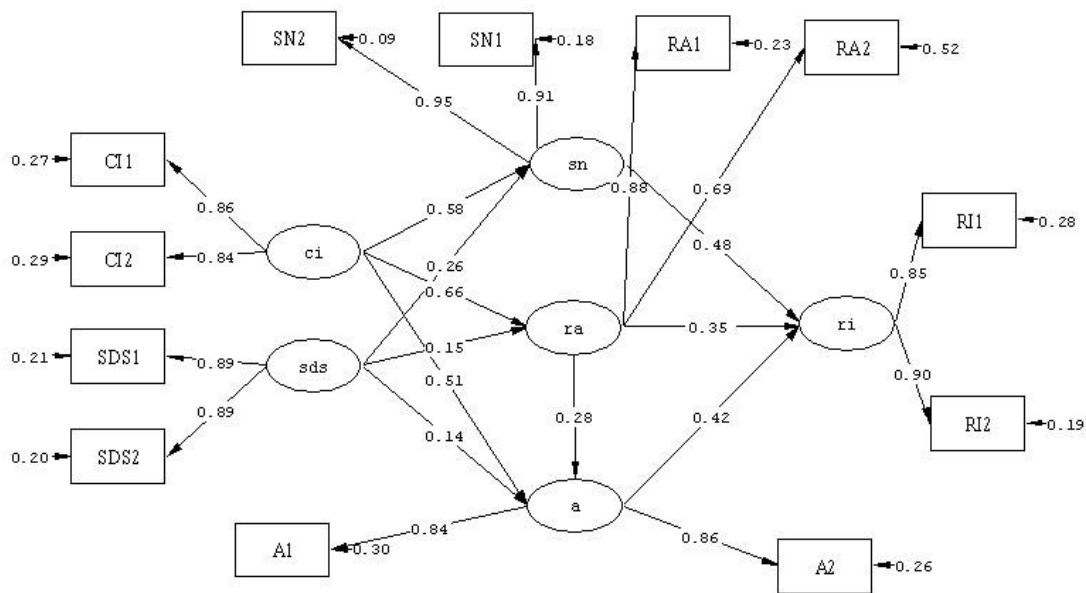
**4.3 Analysis and results discussion**

We used LISREL8.7 to test the theoretical model, and the results of the analysis are shown in Tab.III.  $\chi^2/df = 2.13$  for the model is acceptable. RMSEA and RMR are both lower than the recommended standard 0.08.GFI, NFI, CFI and AGFI all exceed the recommended standard 0.9.

**Table 3: The results of SEM analysis**

$\chi^2$	df	$\chi^2/df$	GFI	AGFI	NFI	CFI	RMSEA	RMR
563.30	264	2.13	0.91	0.90	0.94	0.97	0.076	0.051

So based upon this overall model analysis, highly favourable fit statistics indicate the theoretical model proposed to be structurally sound, as shown in Fig. 2.



Chi-Square=100.46, df=43, P-value=0.00000, RMSEA=0.082

**Figure 2: Structural equation model**

T-value is followed to give a further test and the results are shown in Tab. IV.



**Table 4: Assessment of research hypothesis**

<i>Hypotheses</i>	<i>Linkages in Model</i>	<i>Estimated value</i>	<i>T-Value</i>	<i>Assessment</i>
H1a	CI $\longleftrightarrow$ RA	0.63	6.30	supported
H1b	SDS $\longleftrightarrow$ RA	0.18	2.02	supported
H2a	CI $\longleftrightarrow$ SN	0.54	6.34	supported
H2b	SDS $\longleftrightarrow$ SN	0.28	3.47	supported
H3a	CI $\longleftrightarrow$ A	0.36	3.03	supported
H3b	SDS $\longleftrightarrow$ A	0.19	2.22	supported
H4	RA $\longleftrightarrow$ A	0.36	2.85	supported
H5	RA $\longleftrightarrow$ RI	0.11	1.06	not supported
H6	SN $\longleftrightarrow$ RI	0.54	6.77	supported
H7	A $\longleftrightarrow$ RI	0.23	2.09	supported

The results indicate that service innovation has a positive impact on relative advantages (RA) ( $t=6.30$ ,  $t=0.18$ ), subjective norms (SN) ( $t=6.34$ ,  $t=3.47$ ) and attitude (A) ( $t=3.03$ ,  $t=2.22$ ), so H1, H2 and H3 are accepted. At the same time, owing to criterion coefficient of RA, SN, and A governance influenced by service innovation of customers interface ( $\beta=0.63$ ,  $\beta=0.54$ ,  $\beta=0.36$ ,  $p<0.01$ ) is greater than another coefficient caused by service innovation of service delivering system ( $\beta=0.18$ ,  $\beta=0.28$ ,  $\beta=0.19$ ,  $p<0.01$ ).

Relative advantages (RA) on attitude (A) ( $t=2.85$ ), subjective norms (SN) on repurchasing intention (RI) ( $t=6.77$ ), and attitude (A) on repurchasing intention (RI) ( $t=2.09$ ) has clear positive impacts, thus supporting H4, H6 and H7. H5 has not been supported by data.

## 5. CONCLUSION

This paper studies the service innovation's effect on customers' re-purchase intention in telecommunication industry and builds and tests the Theoretical model.

The results show that service innovation in telecommunication industry has positive effect on customers' relative advantages, subjective norms and attitude. Moreover, the effect of innovation of customers' interface is greater than the innovation of service delivering system. Therefore, the mobile service communication operator should take much more attention to launching innovation of customers' interface. In addition to improving the environment, improving the quality of staff is also one aspect of service innovation. At the same time, subjective norms, and the relative advantages and customers' attitude impact their repurchasing intention, and further more the impact by subjective norms is greater than relative advantage and attitude. This result shows that customers are easily effected by the around groups' pressure when repurchasing mobile communication service. Thus mobile communication service operators' striving for maintaining the existing consumers would be helpful for attracting and retaining more consumers to repurchase the service. For mobile communication services, consumer pressure by the surrounding population is relatively large. To sum up, the action of launching service innovation for mobile communication service operators, especially the innovation activities of customers' interface, would improve customers' repurchasing intention of its service to a certain extent.

## REFERENCE

- Azjen. (1991). The theory of Plannde Behavior[J]. *Organizaitongal Behavior and Human Decision Processes*, 12:179-211.
- Azjen, Fishbein. (1980). *Understanding Attitudes and Predicting Social Behavior*. Prentice-Hall.
- Azjen. (1985). *From Intentions to Acions:A Theory of Planned Behavior, Action Control:From Cognition to Behavior*. .New York:Springer Verlag.

- Bilderbeek R, Hertog PD, (1998). Marklund G, et al. Service Innovation: Knowledge Intensive Business Service As Co-producers of Innovation[J]. *The Result of SI4S Synthesis Paper*, 3.
- Davis.F.D., Bagozzi.R.P, Warshaw.P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models[J]. *Management Science.*,35(8):982-1003.
- Hu.P.J, Chau.P.Y.K, Sheng.O.R.L. (1999). .Examining the technology acceptance model using physician acceptance of telemedicine technology [J].*Journal of Management Information Systems.*,16: 91-112.
- M RE. (1983). Diffusion of innovations.
- Oliver R, Swan J. (1989). Equity and disconfirmation perceptions as influences on merchant and product satisfaction[J]. *Journal of Consumer Research.*,16(3): 372-83.
- Pedersen.P.E. (2005). Adoption of mobile Internet services:An exploratory study of mobile commerce early adopters[J]. *Journal of organizational computing and electronic commerce*,15(3):203-21.
- Pedersen.P.E. (2003). Nysveen.H. Usefulness and self-expressiveness: extending TAM to explain the adoption of a mobile parking service. In: Bled, Slovenia, editors. *the 16th Electronic Commerce Conference Jun9-11*.
- Rogers, Shoemaker. (1971). *Planning for innovation through dissemination and utilization of knowledge*. MI:University of Michigan.