The Effects of Service Innovation on Customer Retention:
An Integration of Customer Satisfaction

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Abstract--Services are becoming driving forces of economies currently resulting in much attention on innovation of new services from firms to satisfy customer needs. Customer satisfaction and their behavioral intention play a critical role in firm's performance and have been investigated carefully in both business and academic practices. Many previous studies have conducted to investigated the key role of service innovation on firm's performance and firm's competitiveness. But, few studies in the service literature have simultaneously examined the effects of service innovation on customer satisfaction as antecedents of customer retention, especially in telecommunication. This study focuses on addressing the end user issue of service innovation. This study examines service innovation from end consumers' perspective. A data of 400 telecom service users sample from Vietnam is collected for empirical hypotheses testing of relationship among variables. The conceptual model investigates the relevant relationships among the constructs by using confirmatory factor analysis (CFA) and structural equation modeling (SEM). Findings show that two components of service innovation namely interactive and supportive are the key determinants of customer satisfaction and customer retention. The paper also includes a discussion on the theoretical and managerial implications of the research results.

I. BACKGROUND AND MOTIVATION

Nowadays, in a modern economy, customers' preferences are changing quickly resulting in many challenges for any business [1]. Advancements in technology, especially in ICT (information and communication technology) make service innovation possible with rapid technological evolutions [2]. These new technologies brings business players with competence, new service challenges, and are seeking chances to provide consumers with innovative services not only in order to pursue the long term relationships with customers [3] but also to make themselves different [4] from other rivals and hence to increase their competitiveness. Telecom providers in Vietnam are also in the trend. Telecom industry is becoming matured, services provided to customers are easily copied, especially for value added services which has a short life cycle. Telecom players in Vietnam are trying to not only utilize the huge infrastructures invested but also create new services or functions to add into the basic ones. Quantity of users are limited, but service providers are in need of increasing number of subscribers by launching many new values added to their services. However, few researches theoretically focused on whether such efforts of telecom players can make the consumers return or even catch the customers out of the hand of other rivals.

Recently, innovation is considered as the term to describe the development and changes resulting to new technologies in the manufacturing field [5]. But it is now used increasingly in the service sector [5], and called service innovation. Huse et al.[6] argued that innovation seems to be the only means for a firm to convert change into opportunities and thus succeed [7]. Service innovation, the term combining the knowledge of customers and frontline staffs, has strong impacts on sales [8]. A lot of literatures have paid attention to aspects of service innovation such as service delivery [1], decisions of service innovation adoption [9], characteristics [10], typologies [11], service strategy and process[12]. Moreover, the increasing important role of service innovation in firms' performance has been investigated by many authors including its role in overall performance[13, 14], in competitive advantage [15, 16]. However, despite an increasing amount of academic material, most of which are focusing on firm's performance as the results of service innovation process, and also practitioner oriented, there remains a little agreement about what end users' perceptions (not B2B customers) are and how service innovation should be developed by firms in order to satisfy and then retain their own customers. But, what makes a good performance of a firm? We all know that customers are the key element of any business. Thus, understanding the effects of service innovation on end users' satisfaction and retention toward their service provider is chosen as the main purpose of this study. Taking a sample of users using services of three telecom players in Vietnam, this study investigate the effects of two antecedents of service innovation including interactive and supportive on customer satisfaction and retention.

II. LITERATUTE REVIEW

Some of literatures are relevant to service innovation have been widely investigated such as: strategic management of innovation[17]. Specific fields of marketing study are also relevant to service innovation including a research into consumer satisfaction [18, 19], long term commitment [20]. Similarly, information service researchers have an obligation to contribute to inter-disciplinary research on services [21]. Several key points appear from the literature review of service innovation and its impacts as follow:

Firstly, a lot of literatures argue that service innovation has positive impacts on firm's performance and it can enable the firm to provide consumers with superior and different value in comparison with other rivals. Service innovation is the combination of customer knowledge and front line staffs' knowledge and those has strong impact on sales performance

[8]. Service differentiation and a focus on service innovation enhances competitive advantage[22]. Though, most of those attentions focus on service innovation final outcomes – which are performance of the firm. However, the ease of copying services and difficulties in patenting services [23] are often cited reasons by those who against innovation-base competitive advantage. But those who support ague that the key of long term performance lies in the capabilities [24], and firm can achieve competitive advantage through distinctive capabilities in the processes of supporting [16]. While this debate remains continuing, more studies should be done to model the antecedents of service innovation in service industry settings.

Secondly, there are important differences between service innovation and manufacturing innovation [25]. For example, the incremental and continuous nature of service innovation and the absence of developmental stages and R&D departments in service firms show that service innovation is apparently distinct from manufacturing innovation [26]. Studies on service innovation suggest that integrating customers, employees in the innovation process is beneficial to service firm performance [8, 16, 27]. Clearly, while many scholars in service innovation place emphasis on the interactive and relational aspects that impact the performance outcomes, less study pays attention to how the firm satisfies and retains its customers through its innovated services.

Lastly, the concept of service innovation ranges from broad theoretical perspectives [28] to studies that present the evidence of influences of service innovation (interactive and supportive) on firm's performance and competitive advantage [16] from B2B perspective and the impacts of service innovation on customer satisfaction in recreation industry [3]. Despite the need for further research, little knowledge shows how interactive and supportive – the two forms of service innovation suggested by Salunke et al.[16] - influence customer satisfaction and customer retention from end user perspective.

III. CONCEPTUAL MODEL AND HYPOTHESIS DEVELOPMENT

A. Service Innovation and Customer Satisfaction

University of Cambridge defined service innovation as a combination of technology innovation, business model innovation, social, organizational innovation and demand innovation with the objective of improving on existing service system, create new value propositions, e.g. offerings or create new service packages/systems [5, 29]. Berry et al.[30] ague that innovation is an effective way to accelerate growth and profitability in service firms, contributing to novel ways of value creation, both for the firms and their customers [31]. While prior studies attempt to conceptualize service innovation examine service innovation dimensionality [32, 33] as well as types and degrees of service innovation [26, 34], the manner in which service firms create value through innovation, that is called "customer-centric", gets

little empirical attention. Basing on prior works [16, 33], service innovation in this study comprises: interactive service innovation and supportive service innovation.

Interactive service innovation refers to the value creating changes initiated by the service firm to the service concept, and designed to elicit cognitive, affective and behavioral responses from customers who interact with the new value proposition or service concept [16]. Although, firm's customer orientation enhances service innovation [35]. While offering new services, the customers often respond by recognizing and actualizing the potential value that such new services offer [36]. In this study, interactive service innovation is defined as the degree to which a firm changes its service offerings, service delivery, and customization changes.

Supportive service innovation refers to the indirect value creating changes at the back-end that support the new value proposition [16]. A new service offering has to be seamless in providing an adequate backstage configuration to support the new value proposition with which the customers interacts [16]. This form of service innovation indirectly creates value for the firm and customers, and is critical to ensure the continuity of core and supporting services [37]. Following the previous study of Salunke et al. [16], this research defines supportive innovation as the degree to which a firm changes its service production, sourcing, and service quality.

To operate a new service effectively, a link must be created between value propositions offered by the firm and the underlying support systems and processes. Mahjan et al. [38] has empirically demonstrated that link and argued that the linkage can mutually reinforce the marketing and operation functions. In the context of telecom service industry, whenever a service provider develops a new value as a part of its offerings, new routines are needed which may include provisioning of new resources and capabilities dedicated to support and innovate the new value through the new initiatives. The intangibility of services and the ease of renovating or creating new services lead to not only a growing of new services [39] but also the inability to fully communicate the benefits of the new service offering to customers [40]. So, the disconnection between interactive and supportive processes creates problems in service quality and may harm the firm's sales [41]. An author in management noted that while many of the important activities that support the services are invisible to the customers, understanding the fact and how those activities link to the customers is the key to assure the value proposition [42]. From such arguments, the first hypothesis is proposed:

Hypothesis 1: Supportive Service Innovation is positively related to Interactive Service Innovation

B. Service Innovation and Customer Satisfaction

This study adopts the definition of customer satisfaction from Anderson and Narus [43] that customer satisfaction is a positive affective state resulting from the appraisal of all aspects of a firm's working relationship with its customers.

Since this emphasis on customer relations created a paradigm shift from transactional marketing to relationship marketing [44] , numerous studies have treated satisfaction as the essential principle for the retention of customers, and customer satisfaction has moved to the head of relationship marketing approaches. In market research, there is a tendency towards a cumulative view of satisfaction, measuring the general level of satisfaction based on all experiences with the firm [45]. Not surprisingly, firms, especially service firms, have invested substantial resources for increasing customer satisfaction [46].

Successful innovation is very crucial for the firm's performance in high-tech service industry [47], especially in the current highly competitive environment while the players are striking to survive in a matured market . In hotel service industry, service innovation is found to have a larger influence on choices[48], customer value [49], and satisfaction [50, 51]. In e-service sites, web innovation is found to have an influence on customer satisfaction [52], website-service quality, development of trust in the website, loyalty to the website and word-of-mouth behaviors toward the website[53]. In recreation industry, service innovation positively impacts customer satisfaction [3] Similarly, Walter et al.[54] proposed that innovation is positively associated with an overall relationship quality (i.e., trust, satisfaction, and commitment). Based on above discussions, the following hypotheses are developed:

Hypothesis 2: Interactive Service Innovation is positively related to Customer Satisfaction.

Hypothesis 3: Supportive Service Innovation is positively related to Customer Satisfaction
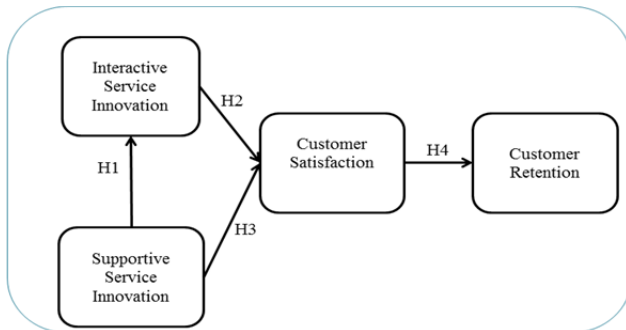

Fig 1. Research framework

C. Customer Satisfaction and Customer Retention

Customer retention is the degree to which the customer may stay and/or return [18]. Customer satisfaction plays an important role in service marketing because it is a good predictor of subsequent behavior or continuance intention [19]. In the field of mobile service, research studies show that customer satisfaction has a positive effects on the intention to continue the service [55, 56]. Similarly, many empirical studies also point out the dominant view that higher degree of customer satisfaction shall lead to higher degree of customer intention [18, 57]. It means that satisfied customers tend to purchase the same service again and use it more frequently

than dissatisfied customers do. From such arguments, the following hypothesis is proposed:

Hypothesis 4: Customer satisfaction is positively related to customer retention

IV. METHODS

A. Measurement Scales

Four items of Customer Satisfaction were adopted from Walter et al. [54]. Eight items of service innovation (including interactive and supportive service innovation) were adopted from Saluke et al. [16]. Three items of customer retention were operationalized from "behavioral intentions" which developed by Cronin et al. [58] and Lemon et al.[59]. Double-back translations (English to Vietnamese) of the questionnaire items will be used and measured based on a 5 point Likert scale (i.e., from1 = strongly disagree to 5 = strongly agree).

B. Sampling Procedures

Vietnam is one of a high growth rate country in telecom service industry. The market is matured with six players existing currently of which three of them (Viettel, Vinaphone, and Mobifone) are considered as the dominant ones. So, without new services and new model of business, telecom players in Vietnam may lose their long-term profits, customer loyalty, and market shares. Thus, telecom providers must find out the ways to develop innovative services and new ways of retaining customer in order to compete and survive in service competition environments.. This study is an attempt to do survey on telecom field in Vietnam. To ensure that appropriate respondents were included in this study, a sampling plan was used as proposed by Bowerman, O'Connell, and Orris[60], and the following formula illustrates how the sample size is selected. $N = p \, (1 - p) \left(\frac{Z\alpha/2}{B}\right)^2$, where *N* equals the sample size;*Zα/2*equals the confidence level, and *B* equals the error tolerance. As suggested by Bowerman et al. (2004), *p* should be .5 in terms of acquiring a normal distribution; Zα/2 should be 1.96 by setting the confidence interval at .05, and B (error bond or error tolerance) should be .07 (7%). Thus, the sample sizes of each destination in this study should be at least 196 respondents. Similarly, structural equation modeling requires a minimum of 200 respondents for effective parameter estimation [61]. Therefore, the data of this study is collected from 350-400 respondents using services of 3 telecom service players in Vietnam including Viettel, Mobifone and Vinaphone. These three players are the major ones and dominate most of the shares in Vietnam Telecom market. Data collected from these 3 players will be treated for one result corresponding to the purpose of this study.

C. Data Analysis Procedures

Confirmatory factor analysis (CFA) will be performed using LISREL 8.80 to evaluate the distinctiveness of the

measures used in the present study. Anderson and Gerbing's[62] procedure was adopted to assess the convergent and construct validity of measurement model. According to Koufteros, Babbar, and Kaighobadi[63], the CFA procedure consists of two factor models, a first order-factor model and a second order-factor model. A first order-factor model was adopted to examine the individual research constructs. Then, a second-order factor model will be also conducted to examine the overall model fit of each research construct. The following goodness of fit indices will be chosen for this analysis, based on suggestions that can be found in previous studies [i.e., 61, 63, 64-66]. Absolute fit indices are intended to assess the overall model-to-data fit for structural and measurement models together [61, 67, 68]: chi-square goodness-of-fit test (χ^2), ratio of χ^2 to degrees of freedom (χ^2/df) < 3, root mean squared error of approximation (RMSEA) < .05, goodness of- fit index (GFI) >.90, and adjusted goodness-of-fit index (AGFI) >.90; whereas incremental fit indices are intended to compare the target model to the fit of a baseline model, normally one in which all observed variables are assumed to be uncorrelated [65, 66]: comparative fit index (CFI) >.90, and non-normed fit index (NNFI) >.90. Then, LISREL software package will be also used to test the proposed research hypotheses, respectively.

V. RESULTS AND DISCUSSION

A. Reliability test

Questionaires were translated into Vietnamese and sent to telecom users via internet using Google drives and some social networks such as Facebook, Twitter. 407 users responded and 402 of their responses are usable. Table 1 shows the measurement model output. Confirmatory factor analysis – CFA was conducted to assess convergent and construct validity of he measurement model. First order-factor model was adopted to examine each individual construct, the result of these procedures indicated that standardized loading for all items should exceed 0.70, and t-values should be higher than 1.96 (p<0.001), which satisfied the threshold as recommended by Hair et al.(2010). Then, the second order CFA was performed to examine the overall measurement model. The table-1 above shows the result of CFA process. In that table, one item which is CS1 was deleted due to low factor loading and not significant at t-value >1.96. Thus, the remaining items indicate that those items relate to the constructs they aim to specify and confirm the relationships among research constructs in the hypotheses. Reliability estimates for each construct, using the alpha coefficient, and composite reliabilities all exceed the recommended level 0.7. The average variance extracted – AVE- show the degree of representation that the indicators share with the constructs. The lowest value of variance extracted for the sample is 0.711.

All shared variances extracted for each construct are acceptable as they exceed the threshold value of 0.5 [69]. The results shows the overall goodness of fit assessment for the whole model is satisfied with the threshold, thus, demonstrates that the research model can be presented as a good model fit with adequate convergent validity and construct reliability [61, 70]. Overall, the measurement model statistics provide support for the good psychometric properties of the survey instruments, implying validity of the inferences from the structural model's results.

TABLE 1-RESULTS OF CFA AND CONVERGENT VALIDITY

Items		Items reliability		Composite Reliability	Average variance extracted
		Factor loading	t-value		
Interactive Service Innovation				0.913	0.889
The mode by which the Telecom provider interact with me	ISI1	0.713***	9.300		
The speed in which the services are provided to me	ISI2	0.777***	8.466		
The areas of expertise that the Telecom provider is engaging	ISI3	0.750***	8.195		
The products and services provided by this Telecom provider	ISI4	0.836***	A		
Supportive Service Innovation				0.894	0.711
The ways in which the Telecom provider takes care of its own customers and myself are very innovative	SSI1	0.795***	5.285		
The quality of services and products(if any) provided by this Telecom provider is improving	SSI2	0.741***	4.454		
The processes that the Telecom provider solves the complaints from customers are improving	SSI3	0.897***	6.009		
The ways in which the Telecom provider's staffs deal with complaints from customers make me comfortable	SSI4	0.715***	A		
Customer Satisfaction				0.877	0.802
Compared to my ideal, I am satisfied with the performance of this provider		0.502	(deleted)		
All in all, I am satisfied with this provider	CS2	0.791***	A		
I am not completely satisfied with this provider (reverse score)	CS3	0.955***	8.842		
With reference to my expectations, I am very satisfied with this provider	CS4	0.901***	7.786		
Customer Retention				0.949	0.815
I extremely satisfy with services/products provided by this provider	CR1	0.850***	A		
I intend to use the service that I am using provided by this provider forever	CR2	0.819***	14.128		
I intend to try new services developed by this provider whenever I have a chance to	CR3	0.792***	10.062		

Notes: Chi-square = 78.904, df= 67, GFI = 0.921, AGFI = 0.901, RMSEA=0.012
***p<0.001, **p<0.01, *p<0.05, and significant level at a t-value >1.96

TABLE 2—RESULTS OF SEM

Constructs	Items	Standardized Coefficients	C. R.
Interactive Service Innovation	ISI1	0.645	9.308
	ISI2	0.614	8.402
	ISI3	0.611	8.311
	ISI4	0.717	A
Supportive Service Innovation	SSI1	0.609	5.297
	SSI2	0.890	12.019
	SSI3	0.867	11.789
	SSI4	0.765	A
Customer Satisfaction	CS2	0.819	A
	CS3	0.631	4.853
	CS4	0.601	4.611
Customer Intention	CR1	0.907	A
	CR2	0.891	14.070
	CR3	0.687	9.065
Path Relationship			
Supportive Service Innovation → Interactive Service Innovation (H1)		0.311***	5.006
Interactive Service Innovation → Customer Satisfaction (H2)		0.212**	4.211
Supportive Service Innovation → Customer Satisfaction(H3)		0.323***	5.761
Customer Satisfaction → Customer Intention (H4)		0.394***	6.114
Fit index			
Chi-Square		106.912(p=0.000)	
Degree of freedom (d. f)		45	
GFI		0.942	
AGFI		0.904	
RMR		0.041	

B. Hypotheses test

Structural equation modeling – SEM – was adopted to test the maximum likelihood estimate method and hypotheses (Fig-2 and Table 2). The results show that all the values generated satisfies the threshold as suggested by Hair et al. [61]. There are four hypotheses in this research, and all of them are shown to be significant. However, hypotheses 2 is only significant at level of p <0.01. Other three hypotheses are significant at level of p <0.000. Results of fit index are all satisfied the recommended threshold which is GFI and AGFI are higher than 0.9, RMR is less than 0.05,etc.Taken together, this result implies that all hypotheses proposed in this research are strongly supported.

Fig.2. Structural model

C. Discussion of findings

This research presents a comprehensive examination of the key factor of customer satisfaction and customer retention in the telecom context in Vietnam. That key factor is service innovation and defined as comprising two forms including interactive and supportive. The procedure of data analysis finds out that there are significant and positive impacts of service innovation on customer satisfaction and retention. In particular, while having impact on interactive service innovation positively, both supportive and interactive service innovation affect customer satisfaction, and customer satisfaction has positive influence on customer retention. The findings of this research contribute to the literature on service innovation in two important ways.

Firstly, the novel of conceptualization of service innovation as comprising of interactive form (considered as value creating changes visible to the customers namely image, delivery, and customization) and supportive form (considered as value creating change invisible to the customers, or the back-stage support) advances the service innovation literature in telecom context. Moreover, the result also shows the positive effect of supportive service innovation over interactive service innovation. The findings imply that while interactive innovation is necessary to outperform rivals, and adequate march with a supporting backstage configuration is needed. It means that, in order to be superior, a telecom firms must be both good at interacting with and supporting its own end users. This interpretation of results has some support in service literature where researchers argue against over-promising and under-delivering [41]. As mentioned above, the intangibility of services and the ease of renovating or creating new services lead to not only a growing of new services [39] but also the inability to fully communicate the benefits of the new service offering to customers [40]. So, the disconnection between interactive and supportive processes creates problems in service quality and may harm the firm's sales [41]. However,

this findings needs to be confirmed by extending to the other contexts beside telecom industry.

Secondly, the findings contribute to the theory of service innovation by examining the role of interactive and supportive service innovation over end user satisfaction and behavioral intention from B2C point of view. On one hand, supportive service innovation positively affects interactive service innovation, then interactive service innovation has strong impact on customer satisfaction and then customer intention (H1, H2, H4). This result concurs with some previous studies [16, 57], but from B2B perspective. On the other hand, this study finds that supportive service innovation has strong and direct impact on end user satisfaction and then intention (H3, H4). So, innovative changes at the backstage need to be suitable with what the end user wants, and are dictated by the value creating strategy contingent upon interacting with the end users. Overall, the results show that in telecom industry, two forms of innovation (interactive & supportive) are the predictors of customer satisfaction, and hence, enhance the customer behavioral retention. This finding is separated from what previous literature found in service innovation. While previous studies finds that service innovation influence firm's performance and competitiveness, this research is focusing on end user perception. However, the data and results are limited to telecom service industry in Vietnam, and may not be able to apply to other contexts.

VI. LIMITATION AND FUTURE RESEARCH

Some limitations has emerged in this research. Firstly, the data collection and analysis limit the inferences drawn. The research examines impacts of service innovation over customer satisfaction and retention for one firm, but data is collected from three telecom service providers that may vary the findings. The future research may ask respondents from one firm, or one context setting to avoid the varied data, and thus, the findings shall clearly reflect the phenomenon. Secondly, the measurements of service innovation are limited, and too simple. Those items are not clear enough to represent the two form of innovation in service industry. A more comprehensive effort should be paid to develop multidimensional scales for these constructs. While the study represents and important steps in filling the gap of service innovation literature, more caution should be exercised in generalizing findings as with extending the model to other context settings.

VII. CONCLUSION

The research extends the service innovation literature by conceptualizing and measuring service innovation as comprising both interactive and supportive forms in telecom context and from B2C perspective. The study argue the need for balancing those two forms in pursuing higher customer satisfaction and customer retention degree, especially in the telecom service context where creation of superior values requires efficient provision of clients solution. Overall, the research advances the understanding of how telecom firms behave in the war of extending market share by retaining and attracting customers. So, the insightful findings show a practical approach that allows practitioners to sustain, satisfy, and retain customers.

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