

Exploring service quality, customer satisfaction, and customer loyalty in Vietnam's telecommunications industry



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ABSTRACT

This study aims to examine the service quality of telecommunications and to investigate how service quality and customer satisfaction affect customer loyalty in Vietnam. The research offers theoretical contributions and extends understanding of service quality, customer satisfaction, and consumer loyalty in Vietnam's telecommunications industry. We employed two methods of data collection, including direct and online surveys. For direct surveys, we sent questionnaires directly to customers at the two biggest shopping centers in Hanoi, Vietnam. Online surveys were provided to customers who have used telecommunication services. We received 300 survey responses in that 100 direct respondents and 200 online respondents. The data were analyzed by using descriptive statistics, factor analysis, and regression to consider the relationship between service quality, customer satisfaction, and customer loyalty. The results showed both service quality and customer satisfaction have a positive relationship with customer loyalty. The study also indicated service quality plays a more important role compared to customer satisfaction in its impact on customer loyalty. The findings of this study suggest that in order to improve customer loyalty, the telecommunication providers should focus on dimension "customer services and pricing structure" of service quality because it has the strongest positive impact on customers' satisfaction and then customer loyalty. Other studies have not put pricing structure as the main point in which they emphasize in customer services. The findings of this study cannot be generalized to other categories of services due to the difference in the nature of each industry.

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1. Introduction

Recent years have witnessed the liberalization of the telecommunications sector in many developing countries, which ultimately resulted in a significant expansion of their telecommunications networks and improvements in performance. The supply of telecommunications services has changed from monopoly- or government-based, to market- or competition-based approaches. Those reforms have lifted the overall competitiveness of the telecom sector, making it a typical characteristic that is worth following for other sectors in Vietnam in terms of liberation and integration. In 2007, Vietnam was classified as the world's second fastest growing

telecom market by the International Telecommunications Union (ITU). The telecom sector in Vietnam is now considered a backbone industry of the overall economy and an enabler of development, contributing significantly to improving the lives of the people and increasing economic growth. In practice, Vietnam's telecommunications market has developed rapidly during the last 10 years. The total revenue of the telecommunication increased from US\$ 2.77 billion in 2006 to US\$ 8.47 billion in 2019. By December 2019, Vietnam reached 131.6 million mobile phone subscribers.

At present, there are five authorized enterprises, which are providing fixed and mobile telecommunication services in Vietnam. They are Vietnam Post and Telecommunications Group (VNPT); Saigon Postel (SPT); Gtel Mobile; FPT Telecoms; Hanoi Telecoms; Vishipel; Viettel Group; VTC; Dong Duong Group; CMC Telecoms; SCTV, and AVG. However, as a result of the Government's determination to deal with the situation whereby one person uses many mobile SIM cards at the same

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time, this number dropped to 123.74 in 2017. The number of fixed-phone subscribers reached a peak of 17.43 million subscribers in 2019 and has fallen since then. From 2017 to 2019, the number of fixed phones subscribed dropped nearly two thirds. It was only 6.73 subscribers in 2019. The main reason for such a decrease, of course, is that customers now prefer using mobile phones to using fixed line phones. Besides, mobile phone operators have launched various promotion programs to attract new subscribers, especially pre-paid subscribers. Recent reports show that a cloud of uncertainty seems to be hanging over the whole Vietnam telecommunication market. Subscriber growth is weak after the market had gone backward for a while. The providers are now operating in an environment where the regulator is keeping a tight hold on pricing, and competition is, in effect, discouraged. A further problem emerging for mobile operators is that network performance is deteriorating across the board.

This research aims to examine a model of relationships among service quality, customer satisfaction, and customer loyalty in the Vietnam telecommunication sector. That addresses the lack of research of these relationships in terms of the research setting and provides information for telecommunication companies in Vietnam, improving their performance and competitive abilities. After reviewing the literature, which reveals that the relationships among service quality and customer satisfaction and customer loyalty have been studied by many researchers in various service fields, including telecommunication. Therefore, a quantitative approach has been employed to confirm the relationship between service quality and customer satisfaction, service quality and customer loyalty, customer satisfaction, and customer loyalty in the Vietnam telecommunication setting. Data was collected in a survey of telecommunication customers in Vietnam, and then it was analyzed by SPSS 20.

2. Literature review

2.1. Service quality, customer satisfaction, and customer loyalty

Service quality is a concept that has aroused considerable interest and debate in the research literature because of the difficulties in both defining it and measuring it with no overall consensus emerging on either (Wisniewski, 2001). There are a number of different "definitions" as to what is meant by service quality. One that is commonly used defines service quality as the extent to which a service meets customers' needs or expectations (Dehghan et al., 2012). Service quality can thus be defined as the difference between customer expectations of service and perceived service. If expectations are greater than performance, then perceived quality is less than satisfactory, and hence

customer dissatisfaction occurs (Parasuraman et al., 1985; Lewis et al., 1994).

Customer satisfaction has been a critical marketing research topic for more than forty years. A seminal experimental study by Cardozo (1965) found that customer satisfaction was not only influenced by perceived product quality but also by the overall shopping experience and expectations. Since then, customer satisfaction has been defined in various perspectives. From the perspective of antecedents, satisfaction is the consumer's response to the evaluation of the perceived discrepancy between expectations and perceived performance of the product or service after its consumption (Tse and Wilton, 1988). From the perspective of consequence, customer satisfaction is the generator of repeated buying behavior and the advantage of sustenance and development to any business (Dubrovski, 2001). From the perspective of dissatisfaction, Kondo (2001) asserted that customer satisfaction is reducing customer complaints, which could lead to dissatisfaction. Oliver (1997) described satisfaction: Satisfaction is the consumer's fulfillment response. It is a judgment that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfillment, including levels of under- or over fulfillment. The diversity of customer satisfaction definitions represents the complexity of this construct. However, Oliver's (1997) definition used in his study seems to be more consistent with the theoretical and empirical evidence.

Customer loyalty is an important aspect of service provision because maintaining existing customers may generate a higher profit than attracting new ones (Reichheld and Detrick, 2003). Consequently, creating customer loyalty has become a major goal of many businesses, particularly for those in the service sector (Bove and Johnson, 2000). In the past, customer loyalty was manifested by the act of repurchase. However, a number of studies show that customer loyalty measurement can be conducted and considered roughly in 5 levels, (1) re-purchase willing, (2) derivatively positive oral administration, (3) recommendation willing, (4) tolerance to price adjustment, and (5) consumption frequency (Polyorat and Sophonsiri, 2010; Dick and Basu, 1994; Jones and Sasser, 1995; Zielonka, 2004).

2.2. The relationship among service quality, customer satisfaction, and customer loyalty

Several researchers examine links between and among service quality and satisfaction (Cronin et al., 2000; Garbarino and Johnson, 1999; Spreng et al., 1996). Not surprisingly, they find that high service quality and high value correlate with relatively high customer satisfaction (Alireza et al., 2011). While some suggest that satisfaction drives quality, the preponderance of evidence indicates that quality drives satisfaction (Dabholkar et al., 2000).

A positive relationship between service quality and customer loyalty has been confirmed by various

studies such as Zeithaml et al. (1996), Baker and Crompton (2000), and Chow et al. (2007). While Cronin and Taylor (1992) stated that service quality has no significant effect on repurchase intentions. Cronin et al. (2000) posited that the association of perceived service quality with behavioral intentions differs from industry to industry. Over the years, several researchers such as Ganesan (1994), Geyskens et al. (1998), Mittal and Iaccarino (2005), and Mittal and Kamakura (2001) regarded satisfaction as an important factor that may affect the customer.

2.3. Telecommunications service quality

In recent years, the interest in conceptualizing and measuring service quality in the mobile telephony sector increased due to the steep increase of penetration rates in most countries around the world and rapid technological advances. Some researchers used Servqual to investigate service quality in the telecommunications industry (Wal et al., 2002; Johnson and Sirikit, 2002). While others developed specific service quality conceptualization

and measurement models for this sector (Aydin and Özer, 2005; Santouridis and Trivellas, 2010; Kim et al., 2004; Gerpott et al., 2001; Lee et al., 2001; Lim et al., 2006; Srivastava and Rai, 2013). The models developed suggest several dimensions, whose definitions and meaning overlap to a great extent. Choi et al. (2007) showed four main dimensions network, device, contents, security, convenience, and computer support. Whereas, there are three factors on telecommunication services are core services, value-added services, and price, according to Lee et al. (2001). Moreover, Kim et al. (2004) listed six major dimensions, which are call quality, mobile device, value-added services, convenience in procedures, customer support, and price structure, while network quality, data service, billing system, customer service, and price were defined by Lim et al. (2006). Wang and Liao (2007) used content quality, appearance, ease of use, and service quality as models on dimensions of telecommunication services quality. Table 1 shows a summary of previous models on dimensions of telecommunication services quality.

Table 1: Previous models on dimensions of telecommunications service quality

	Choi et al. (2007)	Lee et al. (2001)	Kim et al. (2004)	Lim et al. (2006)	Wang and Liao (2007)
1	Network	Core services	Call quality	Network quality	
2	Device		Mobile device		
3	Contents	Value-added services	Value-added services	Data service	Content quality
4	Security			Billing system	Appearance
5	Convenience		Convenience in procedures		Ease of use
6	Customer support		Customer support	Customer service	Service quality
7		Price	Price structure	Price	

2.4. The relationship among telecommunications service quality, customer satisfaction, and customer loyalty

• **Customer Loyalty:** Customer loyalty is often examined from a behavioral point of view by measuring items such as the number of repeat purchases, “share of wallet,” and purchase frequency. A frequent assumption is that loyalty translates into an unspecified number of repeat purchases from the same supplier over a specified period. In this line, Oliver (1997) defined loyalty as “a deeply held commitment to rebuy or patronize a preferred product/service consistently in the future, thereby causing repetitive same-brand purchasing, despite situational influences and marketing efforts having the potential to cause switching behavior.” However, the definition of loyalty based solely on repurchase behavior doesn’t provide a holistic view of this complex concept. This drove researchers to propose alternative and more comprehensive definitions. Dick and Basu (1994) suggested that loyalty has both attitudinal and behavioral elements and argued that it is determined by the strength of the relationship between relative attitude and repeat patronage. Examining loyalty under the attitudinal lens, it can be derived from psychological involvement, favoritism, and a sense of goodwill towards a particular product or service.

Overall, despite the fact that there are plenty of different approaches aiming at the definition and conceptualization of loyalty, there is a general convergence towards the view that both behavioral and attitudinal features must be included. The behavioral view is usually based on the monitoring of the frequency of repeated purchases and brand switches, while the attitudinal approach assumes that loyalty is derived from psychological involvement and preference and focuses on issues such as brand recommendations, resistance to superior products, repurchase intention, and willingness to pay a price premium (Cronin and Taylor, 1992). Therefore, the first hypothesis is:

H1: Service quality has a significant, positive relationship on customer loyalty in the context of Vietnam’s telecommunication.

• **Customer satisfaction:** The study of satisfaction had always received large attention from researchers. It is, however, a subjective concept, as it can be inferred from the different definitions found in the literature. Having said that, it must be pointed out that there is a wide consensus that “satisfaction is a person’s feeling of pleasure or disappointment resulting from comparing a product’s perceived performance (or outcome) in relation to his or her expectations” (Kotler, 2003). Therefore, satisfaction is closely related to

consumers' expectations. More specifically, the narrower the gap is between the consumers' expectations and the actual performance of the product or service, the higher is the consumer's satisfaction.

Customer satisfaction can be measured as either a single-item scale or as a multi-item construct assessing the satisfaction for each component of the service. For example, Cronin and Taylor (1992) measured customer satisfaction as a one-item scale that asks for the customers' overall feelings towards an organization, while Anderson and Srinivasan (2003) used a 6-item construct to measure customer satisfaction in the context of electronic commerce. Comparing these, the use of a multi-item scale for measuring summary evaluation does not increase reliability over time, but it can lead instead to poor response rate and artificial answers by respondents.

Customer satisfaction has been considered as a fundamental determinant of customer loyalty. Anderson and Sullivan (1993) found that satisfied customers have a greater propensity to be retained and resist to alternative options, while Fornell and Johnson (1993) stated that high satisfaction results in customers with increased loyalty, less prone to be

approached from the competition. Moreover, satisfaction enhances repeat purchase and positive word of mouth by customers (Reichheld and Sasser, 1990; Wirtz, 2003). Overall, it can be concluded that research has shown that customer satisfaction has significant effects on both behavioral and attitudinal aspects of loyalty.

Similar results have been reported in the mobile telecommunications services literature, where also satisfaction has emerged as a strong predictor of loyalty. For example, Gerpott et al. (2001), in the context of the German mobile cellular telecommunications market, Kim et al. (2004) in Korea, and Lee et al. (2001) in France had results that highlighted the causal link between customer satisfaction and loyalty. Therefore, the following hypotheses are proposed (Fig. 1):

H2: Service quality has a significant, positive relationship on customer satisfaction in the context of Vietnam's telecommunication.

H3: There is a significant relationship between Customer Satisfaction and Customer Loyalty in the context of Vietnam's telecommunication.

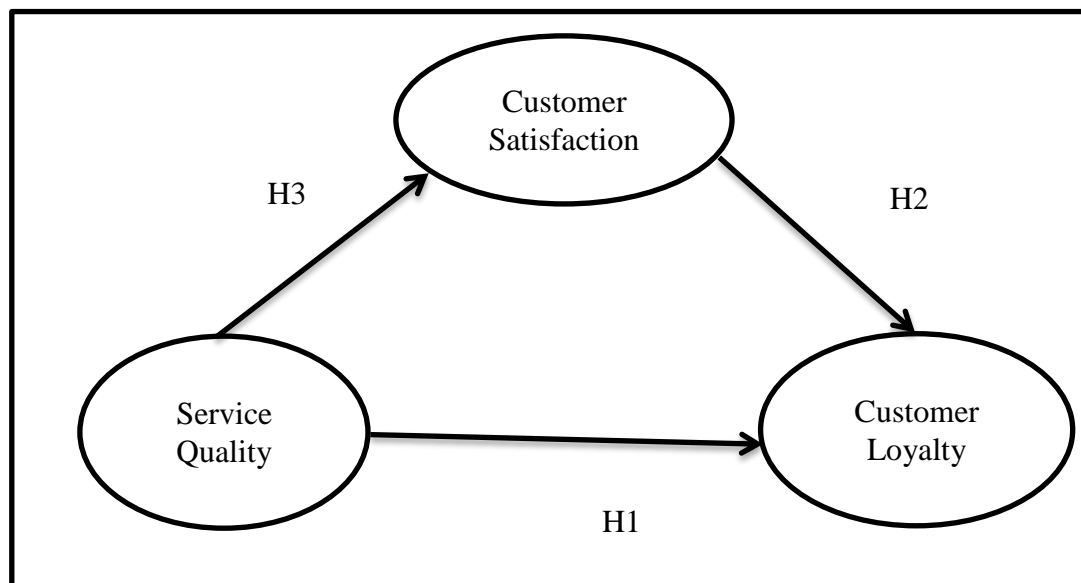


Fig. 1: Conceptual Model

3. Methodology

3.1. Evaluation indicators for potential constructs

(1) Service quality: The dimensions' choice was influenced by the work of Choi et al. (2007), who summarized and categorized the quality factors identified in research in the mobile telephony sector. Hence, service quality is conceptualized by:

- Network: The clarity of voice and the area coverage are the items that, according to Kim et al. (2004) and Lim et al. (2006) to measure this factor.

- Value-added services: As value-added services can be considered intangible objects such as SMS and MMS, WAP, GPRS, music, news, games, ring tones, etc. The variety of these services, their ease of use, and if they are up-to-date are the items that were used by Kim et al. (2004) to measure this factor.
- Customer service (four items): This factor evaluates the success of problem resolution, the courtesy of customer service representatives, the help provided by call-centers, and the provision of consistent advice. All these four items were adopted from Lim et al. (2006).
- Pricing structure (three items): The reasonability of prices, the variety of pricing schemes, and the degree of freedom to choose pricing schemes are

the items included in this factor, as were used by Kim et al. (2004).

- Billing system (three items): This dimension comprises the provision of accurate billing, the ease of understanding and resolving billing issues, and the billing problem resolution speed, as suggested by Lim et al. (2006).

(2) Customer satisfaction: The choice of a single overall customer satisfaction measurement item was made in order to avoid problems associated with the use of multi-item scales for this concept, as discussed in the relevant literature review section.

(3) Customer loyalty: The scale used for this concept's measurement was based on the work by Aydın and Özer (2005). The scale's items include the repurchase intention, the resistance to switch to a superior competitor's product, and the willingness to recommend the preferred provider to others. Hence, loyalty is measured based on both attitudinal and behavioral approaches in an attempt to get a holistic view of customers' loyalty to mobile companies in Vietnam.

3.2. Reliability and item analysis, exploratory factor analysis (EFA), and data collection

The reliability analysis tested the discriminant level of each indicator by comparing the mean scores of each indicator for the top and bottom 25% of respondents on sum scores of the evaluation indicators. The indicators for which no significant difference was observed have a low discriminant level and were eliminated. For the reliability analysis, the Cronbach's coefficients were calculated separately for the potential and the extracted constructs to assess the consistency of the service quality indicators for each construct of interest. The construct with Cronbach's coefficient exceeding 0.7 is considered to possess satisfactory internal consistency.

Exploratory factor analysis (EFA) was used to extract the constructs of service quality from the retained indicators for telecommunication service. The extracted constructs with an eigenvalue greater than 1 should be retained. Additionally, the total variances explained by all extracted constructs should exceed 60%.

The questionnaire consisted of a total of 33 questions in sections: Filter question, general questions, customer satisfaction, customer loyalty, and service quality. It took approximately 10 minutes to complete the survey. In this study, the target population included all Vietnam telecommunication users, including fixed-line services, Internet services, and mobile services. The number of the target population was estimated by calculating subscribers from the three above main services, which reveals the overall population is approximately 7 million subscribers. In this study, the accessible population was limited to subscribers living in Hanoi, Vietnam, who could be reached by directly meeting in telecommunication service

stores. The nature of the study requires collecting responses from a sample of telecommunication users after completing the process of purchasing at least one of three telecommunication services mentioned above, including fixed-line services, Internet services, and mobile services.

3.3. Sample

In this study, a total of 300 responses were received. After refining the data, 280 responses were satisfied for analyzing accounting for 92.58% of total received responses. In which we divided into 6 main characteristics such as gender, monthly income, education, package of use, monthly expenses for telecommunication, and length of use (Table 2).

Table 2: Personal characteristics of the participants

	Percentage	
Gender	Male	51%
	Female	49%
Monthly income (USD)	Less than 100	12%
	100-300	30%
	300-500	30%
	500-1000	17%
	More than 1000	11%
Education	Primary school	10%
	Secondary school	24%
	College	36%
Package of use	Undergraduate	15%
	Postgraduate	13%
	Prepaid	54%
Monthly expenses for telecommunication (USD/month)	Postpaid	46%
	Less than 5	10%
	5-10	27%
	10-20	38%
	20-50	19%
Length of use (Months)	More than 50	6%
	Less than 6	12%
	6-12	16%
	12-24	42%
	More than 24	30%

4. Results

4.1. Descriptive analysis of measurement scales

The average item score for the customer satisfaction scale was 3, which shows that customers just satisfy with their current providers at a normal level. It means Vietnam telecommunication providers should do more to increase their customer satisfaction. The average item score for the customer loyalty scale was 3.16, which means that customers were loyal to their current providers. However, this score was not high enough to maintain that customers would not change their minds when having good offers from other competitive providers.

The average item score for the service quality scale was 3.23. This means that the service quality of Vietnam telecommunication companies assessed by customers via five dimensions is at a good level.

4.2. Exploratory factor analysis (EFA)

The KMO test result was 0.913, exceeding the 0.5 threshold value suggested for use in this

investigation by various academics (Field, 2013; George and Mallery, 2003), and the probability value of Bartlett's test of sphericity was 0.000. Both results indicate that the sampling data with 287 valid responses gathered for the 15 service quality indicators can be used for factor analysis.

EFA was performed to explore the structure of the extracted constructs and their associated indicators. Three constructs were extracted from the retained 14 service quality indicators based on the eigenvalue criteria. The eigenvalues of three extracted constructs are 6.744, 1.261, and 1.036, respectively, accounting for 60.276% of the accumulated total variance for the 14 retained indicators.

The first rotated construct, accounting for 24.336% of the total variance, contains 6 indicators, named "customer service and pricing structure." The second rotated construct, which accounted for 21.312% of the total variance, includes five indicators, named "network and billing system". The third rotated construct, which accounted for 14.629% of the total variance, includes three indicators, named value-added service.

4.3. Reliability analysis

4.3.1. Reliability of telecommunication service quality measurement scale

Factor 1: Customer services and pricing structure: Cronbach's Alpha for factor F1 was 0.874 exceeding 0.6, which implies that this factor ensures reliability.

Factor 2: Network and billing system: Cronbach's Alpha for factor F2 was 0.831 exceeding 0.6, which implies that this factor ensures reliability.

Factor 3: Value-added services: Cronbach's Alpha for factor F3 was 0.67 exceeding 0.6, which implies that this factor ensures reliability.

4.3.2. Reliability of customer loyalty measurement scale

Cronbach's Alpha for customer loyalty was 0.653 exceeding 0.6, which implies that this scale ensures reliability.

4.4. The relationship between telecommunications service quality and customer satisfaction

The correlation matrix of relevant variables shows that there are relationships between factors measuring service quality and customer satisfaction. The Pearson Correlation coefficients of those variables are all bigger than 0.7 at the significance level of 0.01. Regression analysis was employed to test the relationship between service quality and customer satisfaction in telecommunication in the Vietnam context. Customer satisfaction was considered as dependent variable Y (Q21: I overall satisfaction with the services); interdependent variables were indicators of service quality measurement scale derived from the result of the above EFA procedure. A regression model was proposed as Eq. 1.

$$Y^{\wedge}=Q_0+Q_1F_1+Q_2F_2+Q_3F_3 \quad (1)$$

The relationship between telecommunications service quality and customer satisfaction (Table 3) is manifested in a regression Eq. 2.

$$Y^{\wedge}=0.125+0.402F_1+0.305F_2+0.255F_3 \quad (2)$$

Table 3: The relationship between telecommunications service quality and customer satisfaction

Model	Coefficients						Collinearity Statistics	
	Unstandardized Coefficients		Standardized Coefficients		t	Sig.	Tolerance	VIF
	B	Std. Error	Beta					
(Constant)	0.125	0.092			1.355	0.176		
Variables	F1	0.402	0.035	0.428	11.524	0.000	0.556	1.800
	F2	0.305	0.031	0.344	9.775	0.000	0.619	1.615
	F3	0.255	0.031	0.281	8.112	0.000	0.637	1.569

a. Dependent Variable: Y

Testing the significance of the regression coefficients showed that factors F1, F2, and F3 had levels of statistical significance below 0.05, which means these factors were all significant in the model. These coefficients had positive values supporting a positive impact of service quality on customer satisfaction. In other words, the hypothesis H1 has been confirmed. Factor F1, "Customer services and pricing structure," had the biggest Standardized Coefficients at 0.428, which leads to its strongest impact on customer satisfaction.

Besides, together with testing the impact of service quality on customer satisfaction, I also included demographic variables in the regression model. Those demographic variables play as control variables that help to compare the satisfaction

among different groups of customers. In this analysis, I chose four demographic variables, including gender, package, monthly expenses of telecommunication, and length of use. The reason is that telecommunication service providers have information on those variables, while others have less or not exact information about their potential customers' education and monthly income (Table 4).

The regression model with demographic variables is:

$$Y^{\wedge}=0.096+0.401F_1+0.305F_2+0.255F_3+0.072Q_{15} \quad (3)$$

In the above model, all regression coefficients are different from 0 with P-value ≤ 0.05 . The result shows that among demographic variables, there is only

variable Q15: “package” is significant. This means that there are differences in customer satisfaction between different groups of customers categorized by “package.” The regression coefficient of Q15 is 0.072, which means that customers using postpaid service more satisfying than using the prepaid

package. However, this difference is rather small. The regression result also reveals that there are no differences in customer satisfaction among groups of customers categorized by other demographic variables.

Table 4: The relationship between telecommunications service quality and customer satisfaction (including demographic variables)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	0.762	0.106		7.180	0.000		
	F1	0.741	0.034	0.788	21.604	0.000	1.000	1.000
2	(Constant)	0.372	0.096		3.879	0.000		
	F1	0.514	0.036	0.546	14.466	0.000	0.658	1.519
	F2	0.367	0.034	0.413	10.939	0.000	0.658	1.519
3	(Constant)	0.125	0.092		1.355	0.176		
	F1	0.402	0.035	0.428	11.524	0.000	0.556	1.800
	F2	0.305	0.031	0.344	9.775	0.000	0.619	1.615
	F3	0.255	0.031	0.281	8.112	0.000	0.637	1.569
	(Constant)	0.096	0.092		1.037	0.301		
4	F1	0.401	0.035	0.426	11.550	0.000	0.555	1.800
	F2	0.305	0.031	0.343	9.827	0.000	0.619	1.615
	F3	0.255	0.031	0.281	8.155	0.000	0.637	1.569
	Package	0.072	0.035	0.056	2.042	0.042	0.999	1.001

4.5. The relationship between telecommunication service quality and customer loyalty

The correlation matrix of relevant variables shows that there are relationships between factors measuring service quality and customer loyalty with a significance level of 0.01 with P-value=0. The Pearson correlation coefficients of factors F1, F2 is bigger than 0.5, which means that there are strong correlation relationships between F1, F2, and customer loyalty. The Pearson correlation coefficients of factors F3 is 0.44, which means that its relationship with customer loyalty is at a moderate level. However, those Pearson correlation coefficients are appropriate for regression analysis.

Regression analysis was employed to test the relationship between service quality and customer loyalty in telecommunication in the Vietnam context. Customer satisfaction was considered as dependent variable Y (Q22 to Q26). Interdependent variables were indicators of service quality measurement scale derived from the result of the above EFA procedure. A regression model was proposed as Eq. 4.

$$Y^{\wedge}=B_0+B_1F_1+B_2F_2+B_3F_3 \quad (4)$$

The relationship between telecommunications service quality and customer satisfaction (Table 5) is manifested in a regression Eq. 5.

$$Y^{\wedge}=0.725+0.39F_1+0.341F_2+0.085F_3 \quad (5)$$

Table 5: The relationship between telecommunications service quality and customer loyalty

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
Variables	(Constant)	.725	.177		4.102	.000		
	F1	.390	.067	.351	5.812	.000	.556	1.800
	F2	.341	.060	.326	5.690	.000	.619	1.615
	F3	.085	.060	.079	1.404	.161	.637	1.569

a. Dependent Variable: Y

Testing the significance of the regression coefficients showed that factors F1, F2 had levels of statistical significance below 0.05, which means these factors were all significant in the model. These coefficients had positive values supporting a positive impact of service quality on customer loyalty. This results in a conclusion that the hypothesis H2 has been confirmed. Factor F1, “Customer services and pricing structure,” had the biggest Standardized Coefficients at 0.351, which leads to its strongest impact on customer loyalty. Interestingly, factor F3 had a level of statistical significance at 0.161 above 0.05, which means this factor was not significant in the model, or in other words, there was no clear

impact of this factor on the customer loyalty (Table 6).

The regression model with demographic variables is:

$$Y^{\wedge}=0.871+0.407F_1+0.347F_2+0.223Q16c \quad (6)$$

In the above model, all regression coefficients are different from 0 with P-value≤0.05. The result shows that among demographic variables, there is only variable Q16c: “monthly expenses” is significant. This means that there are differences in customer loyalty between different groups of customers categorized by “monthly expenses.” The regression coefficient of Q16c is 0.223, which means that

customers have monthly expenses for telecommunication 20-50 USD/month more satisfying than other groups of customers. Interestingly, this difference is quite strong. The

regression result also reveals that there are no differences in customer satisfaction among groups of customers categorized by other demographic variables.

Table 6: The relationship between telecommunications service quality and customer satisfaction (including demographic variables)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.191	.165		7.226	.000		
	F1	.651	.053	.586	12.221	.000	1.000	1.000
2	(Constant)	.807	.167		4.837	.000		
	F1	.427	.062	.385	6.918	.000	.658	1.519
	F2	.362	.058	.345	6.210	.000	.658	1.519
3	(Constant)	.871	.167		5.206	.000		
	F1	.407	.062	.366	6.591	.000	.647	1.546
	F2	.347	.058	.331	5.977	.000	.651	1.535
	q16c	.223	.089	.116	2.518	.012	.937	1.067

4.6. The relationship between customer satisfaction and customer loyalty

The regression model of the relationship between customer satisfaction and customer loyalty was proposed as:

$$Y^{\wedge}=B_0+B_1Q21$$

Y is customer loyalty to their service provider; Q21 is customer satisfaction with telecommunication services.

The regression model of the relationship between customer satisfaction and customer loyalty (Table 7) is manifested in the regression Eq. 7.

$$Y^{\wedge}=1.114+0.681Q21 \tag{7}$$

Table 7: The relationship between customer loyalty and customer satisfaction

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)1	1.114	0.175		6.361	0.000
Q21	0.681	0.057	0.577	11.922	0.000

Testing the significance of the regression coefficients showed that customer satisfaction had a level of statistical significance below 0.05, which means this factor was significant in the model. The Unstandardized Coefficients had positive values supporting a positive impact of customer satisfaction on customer loyalty, which means the hypothesis H3 has been confirmed.

5. Conclusion and recommendation

5.1. Conclusion

The results of the survey indicate that telecommunication users in Vietnam just slightly satisfy with their current service providers, which means these providers should do more to increase their customer satisfaction. This situation is also true to customer loyalty, with the average item score was 3.16. Scoring at the ordinary level of customer loyalty implies that telecommunication subscribers

are easy to change their providers when they have been offered a better plan from competitors.

The research findings reveal that telecommunications service quality in the Vietnam context is measured by three dimensions, including “customer services and pricing structure,” “network and billing system,” and “value-added services.” These dimensions all positively influence customer satisfaction. Among them, the factor “customer services and pricing structure” has the strongest positive impact on customer satisfaction. However, the telecommunications service quality in Vietnam was at an ordinary level. That was the reason for the low level of customer satisfaction. Both service quality and customer satisfaction have a positive relationship with customer loyalty. In there, service quality plays a more important role compared to customer satisfaction in their impact on customer loyalty when it explains 42.6% the variance of customer loyalty while the latter explains 33.3%.

5.2. Recommendation

Vietnam’s telecommunication providers could measure their service quality through three dimensions with fourteen indicators: “customer services and pricing structure” comprising of six indicators, “network and billing system” containing five indicators, and “value-added services” consisting of three indicators. The higher the score of each indicator and also each dimension, the higher the service quality is. Drawing from the survey result, Vietnam telecommunications service quality is weak at indicators relating to network and billing systems.

To improve network and billing system, Vietnam’s telecommunication service providers should improve their network coverage both in domestic Vietnam and international. To do that, providers should invest more in their infrastructure and look for collaborations with others to exploit and share infrastructure. They also have to issue accurate and detailed bills that help customers less confuse when paying. If customers want to claim for their bills, they can do this conveniently. For example, through call centers, the call center team

should quickly address customers' requests without any confusion.

In order to improve customer satisfaction and customer loyalty, telecommunication service providers should focus on dimension "customer services and pricing structure" of service quality because it has the strongest positive impact on satisfaction as well as customer loyalty. For example, providers should have courteous and enthusiastic representative teams who have good communication skills and firm knowledge of provided telecommunication services. They are also given the power to address some popular customers' requests directly.

Customer loyalty is the primary aim of business management performances. In the telecommunication industry, customer loyalty is influenced by both customer satisfaction and service quality. Herein, the key solution is by improving service quality, especially focus on the "customer services and pricing structure" dimension.

5.3. Limitation and suggestion for future research

- Limitation: The quota and convenience sampling methods are non-random and may introduce sampling bias, threatening external validity. The results obtained by the quota and a convenience sampling method were difficult to generalize to the population because a quota and convenience sampling method was a type of non-probability sampling and the characteristics of data-producing samples partially matched those of quota samples.
- Suggestion for future research: The limitation of this study was to examine the causal relationships among service quality, customer satisfaction, and customer loyalty. In any future study, other significant variables, such as customer expectations, electronic service quality, perceived value, customer complaint, and electronic recovery service quality, may be added into the hypothesized causal structural model. Future studies may test whether electronic recovery service quality is a dimension of electronic service quality and whether it indirectly affects customer satisfaction through electronic service quality for consumer electronics e-tailers.

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Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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