

Determinants of User Satisfaction with Fixed Broadband Internet Services during the Covid-19 Pandemic

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Abstract:

The internet has made the world a smaller place and has several functions in providing exposure to other individuals, locations, ideas, global access and opportunities all over the world. Arguably all these functions require users to be satisfied with internet services to achieve their objectives. This paper reports findings from 171 users with fixed broadband services during Covid-19 pandemic in Danang, Vietnam. It argues that in certain disruptive and unfavorable events, satisfaction involves the conative, which is to continue the commitment with the current provider, and not likely to switch to new services or other brands. The study identifies that the customer services, value-added services, price structure, network quality, the convenience and responsiveness are important determinants and significantly adjuncts to the generation of satisfaction.

Keywords: Broadband Services, Users, Satisfaction, Vietnam, Covid-19 Pandemic

JEL: Consumer Marketing, Enterprise, Business Studies

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1. Introduction

COVID-19 outbreak has posed multi-facet effects and challenges to medical, social, and economic aspects worldwide. Emerged as an epidemic, the high rate of transmission of nCov (WHO, 2020), it has become a global health issue that causes sudden halt, the immobility of people (Chinazzi, Davis, Ajelli, Gioannini, Litvinova, Merler, & Vespignani: 2020). In particular, social distancing norms or the lockdown turned to be mandatory during this Covid pandemic that has produced adverse impacts on household income, economic well-being, health-related quality of life and human behavioral changes (Sheth, 2020). In some instances, disruptive events, such as the Covid-19 pandemic and similar experience of behavioral changes to adapt within the lockdown. Individuals have increased the use of the internet and internet-based services to communicate, continue their job, do home-based responsibilities concurrently (Ramos, 2021; Ishfaq, & Mengxing, 2021) and such is the

context of this paper.

Various research from different disciplines have focused on social and economic consequences on a global, national, regional level on preventive and health behaviors, including consumer behaviors. However, research on consumer behavior about how the crisis scenario has profoundly created the frustration to customers and shifted consumer behavior toward one based on technology has received less attention (Laato, Islam, Farooq, & Dhir, 2020) and has not fully explored (Sheth, 2020). Customers are likely to always demand certain requests on the wireless, fixed broadband services more than expected results for what they pay. It therefore has become a crucial issue for service providers to keep their customers content and happy with the services and with packages they provide (Ramos, 2021).

As Covid-19 began to spread in Vietnam, schools have let their students study online and companies have allowed employees to work from home. Demands in internet usages from different ages in a variety of aspects have increased dramatically that pose both opportunities and challenges to internet providers (Srikanjanarak, Omar, & Ramayah, 2021). Meanwhile, it is noted that there are dynamic activities in the Vietnam Telecom Market as the government has acknowledged the Vietnam communications industry. There is not a traditional monopolistic environment, but now there is an aggressive competition between the telecom service providers. Two government-owned providers, namely VNPT and MobiFone are of the famously-used in Vietnam while Vietnam's telecom market is also fragmented by Viettel, FPT, CMC, Hanoi Telecom, NetNam, and several foreign firms (Vietnam Express, 2020). Companies are in constant efforts to create customer-oriented strategies to attract new subscribers, to amplify productivity and profitability in the service business. It is of prime importance to diagnose the determinants which create satisfaction and also identify which cause customer dissatisfaction. Given the importance of customer satisfaction in today's competitive consumer market and increasing customer complaints about fixed broadband services, there is a great need to explore the important factors behind it that this study is aiming to.

Due to the impact of the COVID-19 pandemic, households in Danang have similar experience of behavioral changes to adapt and switch to online learning, working, shopping, entertainment and thus demand for the Internet access increased dramatically (Tran, Vu, T., Latkin, Pham, Phan, Le, & Ho, 2020). The adapting to such situations in conducting classes on Zoom, Google Meet, and other online meeting platforms have increased the demands of households for better internet speed and stability. Users' adaption to digital know-how and online approach has made telecommunications services become a part of professional services which have also witnessed a rapid digital transformation taking place within weeks (Crawford, Butler-Henderson, Rudolph, Malkawi, Glowatz, Burton, & Lam, 2020). Considering these above clarifications, this study continues to give a better understanding on household's, user's behaviors in choosing, perceiving internet access services in certain disruptive and unfavorable events like Covid 19 pandemic. The paper is to explore and examine the perceptions and determinants of satisfaction of users with fixed broadband services in Danang, Vietnam. Thereby, telecommunication businesses in Da Nang will have foresight; better understand the desires of consumers to plan, implement appropriate strategies, support concurrently to serve users better during the epidemic or any in certain

disruptive, unfavorable events.

2. Literature review

2.1. Internet-based consumer behavior and the impact of Covid-19

Scholars have long noted that consumer behavior encompasses people's behavior in their search, purchase, usage, and disposal of goods and services. Through the analysis of psychological factors, motivations, behaviors, research outcomes direct and predict affects the actions, preferences and satisfaction of consumers towards certain products, services or experiences. Research on consumer behavior seems “an on-going process (Ishfaq, & Mengxing, 2021; Naylor, Pritchard, & Ilgen, 2013) as to secure, select, and arrange experiences, products, services, experiences, or ideas to satisfy the consumer and society (Kuester, Homburg, & Hess, 2012). Four basic types of behavior that are the most commonly found in the literature review include technical behavior, instinctive behavior, intellectual behavior, and responsive behavior and consumer behavior is highly predictable that enables many good predictive models and consumer insights based on past repetitive buying behavior at the individual level (Borg, 2018; Sheth. 2020).

However, all consumer behaviors in terms of consumer's consumption are bound and anchored to location and over time about what to consume, when and where (Sheth.J; 2020) within the process of searching for information, shopping and post consumption waste disposal. In particular, consumer behavior studies have been done in the context of disruptive events such as COVID-19 pandemic (Arora, Charm, Grimmelt, Ortega, Robinson, Sexauer, Staack, Whitehead, & Yamakawa, 2020). Actually, prior outbreaks from recent decades like SARS, Influenza A, and H1N1 present another type of disruptive event, which consumer behavior scholars have largely ignored (Laato et al. 2020). Current knowledge on human behavior during disease outbreaks stems from other social and human sciences. Two consumption-behavior types have been noted: purchasing necessities and protective equipment, and curbing leisure outside the home (Sheth, 2020). For example, Goodwin, Haque, Neto, & Myers, (2009) found that the purchase of protective items (e.g., masks and personal hygiene items) and food rose significantly during the influenza A, and H1N1 outbreaks, as people engaged in stockpiling. Many consumers also intend to shift their spending largely to essentials, such as grocery and household supplies and cut back on discretionary categories. Thus, regarding Covid 19 in Vietnam, people also altered their daily activities to use the modes of internet-based services more regularly than usual.

On the other hand, Ishfaq, & Mengxing, (2021) indicated that Covid-19 as a disruptive event can also be classified by their nature (e.g., pandemic, war, natural disaster, extreme social violence and terrorism and personal calamity) that remind them of difficult times and, thus, buy new products (Cruz-Cárdenas, Arévalo-Chávez, 2018). Thus, the failure to shed enough light on consumer behavior during the COVID-19 crisis encourages continuous research to contribute to understanding the pandemic-induced consumer behavior, because they affect a greater number of consumers simultaneously and in similar fashion (Ishfaq, & Mengxing, 2021). Consequently, recent research in COVID-19 pandemic argues that Covid-19 has affected consumer behavior in key ways, some of which will have a lasting and long-term impact. Specifically, people have been witnessing the extensive and continuing use of the internet and such information systems at the same pace to communicate, interact, and work online from home (Kamal, 2020). There is the shift to value and essentials. Studying and working are crucial concerns in meeting basic life needs for satisfaction and stability as there is a dramatic shifting of traditional classes, meetings to the online mode of conducting classes, meetings (Tang, Abuhmaid, Olaimat, Oudat, Aldhaeebi, & Bamanger, 2020). Similarly, there

is a flight to digital and Omni channels. Actually, some natural disasters are carefully monitored and the anticipation of such events also induces a behavior of stockpiling basic necessities (Pan, & Zhang, 2020) while others cannot be anticipated in the short.

In particular, a recent research on impact of Covid-19 on consumer behavior, Sheth (2020) similarly indicated that lockdown and social distancing resulted in location constraint and location shortage while working, schooling and shopping all have shifted and localized at home. Consumers' choice and satisfaction of the place to shop is restricted. Consumers, thus, seem to have mobility shifts and mobility shortages. Meanwhile, eight Immediate Impact of Covid-19 on Consumption Behavior have been explored in Sheth (2020) research include: 1. Hoarding. 2. Improvisation 3. Pent-up Demand 4. Embracing Digital Technology 5. Store Comes Home. 6. Blurring of Work-Life Boundaries. 7. Reunions with Friends and Family. 8. Discovery of Talent.

This research also emphasized the major driver of consumer behavior is technology. It has transformed consumer behavior significantly since the Industrial Revolution with the invention of automobiles, appliances, and airplanes. This was followed by the telephone, television, internet and now social media and the user generated content as today the internet is as important as electricity and more important than television.

The next section is going to further discuss factors determining the satisfaction of internet-based users'.

2.2. Fixed broadband users' satisfaction

Roberts, Vivienne, (2005) has defined broadband as any technology – currently, cable, telephone-based (DSL), wireless, or through electric power lines – that permits users to communicate at rates substantially faster than older generation “dial-up” services, and unlike dial-up services, is “always on.” Meanwhile, Lee, (2008) explained that communication technologies which provide high-speed, always-on connections to the Internet for large numbers of residential and small-business subscribers are commonly referred to as broadband. For many people, the term “broadband” conjures up images of individuals plugged into their PCs, browsing the Internet, and frequently downloading songs or even movies at speeds once thought to be impossible (Roberts, & Vivienne, 2005)

It is important to understand citizens' use of, and satisfaction with telecommunications services during COVID-19, especially, owing to the availability of internet-based services, individuals and organizations are able to work from home and the workplace on alternative days with an exemption of attendance (Hasan, Mahi, Hassan, & Bhuiyan, 2021). The internet becomes crucial for most services in the field of education, health, financial institutions, press, social media, electronic/smart commerce, and many more (Dutta, & Fischer, 2021). Internet-based services are likely to become the new normal in every household globally, in individuals of different ages. Therefore, research, projects, organizations have made continuous efforts and tried to understand the usage patterns and behaviors of individuals involved in adaptation and use of technology particularly internet-based services (Pandey, & Pal, 2020) within Covid-19 disruptive events.

In fact, the competition in the broadband internet services market is dramatically increasing but research conducted in the telecommunication industry's customer satisfaction has not fully explored or in telecom broadband services (Ishfaq, & Mengxing, 2021). Various areas are taken as research areas on customer satisfaction generally assumed to be a significant determinant of repeat sales, positive word-of-mouth, and customer loyalty. Satisfied

customers return and buy more, and they tell other people about their experiences Fornell, Johnson, Anderson, Cha, & Bryant, 1996).

The original interest in customer satisfaction research was on customer's experience with a product episode or service encounter (Anderson, Fornell, & Lehmann, 1994; Semley, Horner, & Brunt, 2017). Customer satisfaction also refers to the customer's overall evaluation of patronage experience. It can also be defined as "customer satisfaction as the overall retrospective judgment about how far the customer expectations concerning a service have been fulfilled in use of situations" (Gerpott, et al. 2001; Salmiah, 2012). Some researchers found that high customer satisfaction will lead to repeat visitation to store, repurchases, and also encourage positive word-of-mouth" (Fornell et al., 1996; Trinh, & Ryan, 2013). In contrast, a customer with dissatisfaction will always associate with frustration. As far as customer satisfaction is concerned, not only looking at cumulative satisfaction, the role of emotions, emotional reactions as satisfaction has gained attention in the literature (Bigné, J.E., Mattila, & Andreu, 2008). Satisfaction is not attribute based but is 'experiential' and 'emotions may intervene or act as a mediator between performance and satisfaction' (Fornell et al., 1994; Trinh, & Ryan, 2013). As such, satisfaction can be seen as a state of mind, an individual's cognitive-affective state that can be derived from the customer's perception he or she has consumed and experienced a product or service (Trinh, & Ryan, 2013).

Satisfaction has been used in the settings of telecommunication industry and broadband services (Rahhal, 2015). Rind, Shaikh, Kumar, Solangi, & Chhajro, (2018) contributed empirical studies in the context of service quality, customer retention and customer satisfaction of broadband service and argued that recent studies have focused on cumulative satisfaction defined as customer's overall experience to date with a product or service provider. This approach to satisfaction concept provides a more direct and comprehensive measure of a customer's consumption utility, subsequent behaviors and economic performance (Ashfaq, 2019; Saroha, & Diwan, 2020). Measurements of satisfaction of customers including the use of internet-based services tended to be based on evaluations of product attributes, but over time these measures have been measured by repeat purchasing, willingness to pay/buy and recommendation/Internet continuance intention/ not switching to another internet brand/providers (Ashfaq, 2019).

There is a lack of similar research work in developing economies like Vietnam, specifically in the context of telecommunication and other related service industries within Covid- 19-disruptive events that become more significant to be explored. Satisfaction with the use of internet-based services can be determined by many factors such as a direct/indirect effect of an individual's attitude and direct/indirect effect of perceived usefulness, perceived ease of use and other external factors which leads to the actual perception that will be addressed in next section.

2.3. Determinants of fixed broadband users satisfaction, Conceptual Model and Hypotheses Development

2.3.1. Network quality

The network is referring to a quality of network provided by the telco. It is measured by the frequency of drop calls in the network coverage area of the network (Sharma, 2004). Research's Ocloo and Tsetse (2013) had proposed that a customer service improvement and network quality improvement plan was believed to be able to maintain the consumer's satisfaction and to retain the existing customers. Network quality encounters the stability, reliability of system/ service under stated conditions in use and over a specified time by means of error freeness, information richness, speed connection, signal strength, reach of the

network, signal disturbance as the determinants of satisfiers (Wang, Lo, & Yang, 2004; Johnston, 2005; Negi, 2009; Finley, 2017).

2.3.2. Customer service

Customer service, which is derived from a service provider's ability to provide a service or product to the customer as promised, included in the service quality dimension. For example, "what and how is product/ service delivered to the users?" is the outcome component of user satisfaction or dissatisfaction. Jeng, & Bailey, (2012) mentioned that the service provider should provide comprehensive solutions while interacting with the customer. Therefore, customer service quality should be determined by the customer representative skills set, such as knowledge, courteousness, and excellent listening skills, among others Chee, & Husin, (2020). The nature of the interaction between the users and the service providers, the utility and guidance of the information booklet to the customers relate to purchase service aspects. Telecommunications service providers are making efforts from tariff competition to service competition (Kwizera, Mico, Nayebare, Garba, Saint, Deen, 2018; Hajar, Ibrahim, Darun, M. & Al-Sharafi, 2020) as it is closely related to consumer satisfaction as it reflects the customers' evaluation of the performance of service providers (Zhao, Lu, Zhang, & Chau, 2012; Ashfaq, 2019).

2.3.3. Convenience

Consumer demand for convenience has continuously risen and is closely attributed to socioeconomic change, technological progress in more competitive business environments. Its convenience relates to consumers' time costs, opportunity costs that have risen with all types of convenience that reduce both consumers/ time or effort in purchasing, transacting, operating hours or credit availability that belong to the domain of service convenience. up-to-date equipment, convenient operating hours that positively create satisfaction for service users (Gagliano, & Hathcote, 1994; Berry, Seiders, & Grewal, 2002).

2.3.4. Price structure

Pricing is also able to influence customer satisfaction. Reasonable price, variety, and flexibility of pricing plan are among the content that affects pricing structure (Kim, Park, & Jeong, 2004). Santouridis, & Trivellas, 2010; Shafei, & Tabaa, 2016). In addition to that, the accuracy of the bill, billing content and billing issues rectification are also considered as part of customer satisfaction (Gerpott, Rams, & Schindler, (2001).). The pricing is more attractive, customer satisfaction will be increased and further influenced customer loyalty (Ranaweera and Neely, 2003).

2.3.5. Responsiveness

Responsiveness has been defined as a quicker way to assist customers for bringing the service back in action (Wang et al. 2004; Rahaman, & Rahman, 2011). The willingness to help customers in time and provide prompt service can be called responsiveness (Cronin, Brady, & Hult, 2000). Responsiveness focuses on the provision of post service assistance for customer care and is most of the time part of pre service provision agreement between consumers and service providers. Customers demand immediate, soon response in case of any failures or disruption in service (Cronin, et al. 2000). The responsiveness shows the flexibility, politeness, professional approach of staff to put propriety with customers during, even the sudden issues customers have experienced with broadband services (Ishfaq, & Mengxing, 2021). In another research of telecom services, it was found that service provider's responsiveness, quality of service and behavior towards customer are important factors of customer satisfaction and behavior intention (Wang, Lo, & Yang 2004).

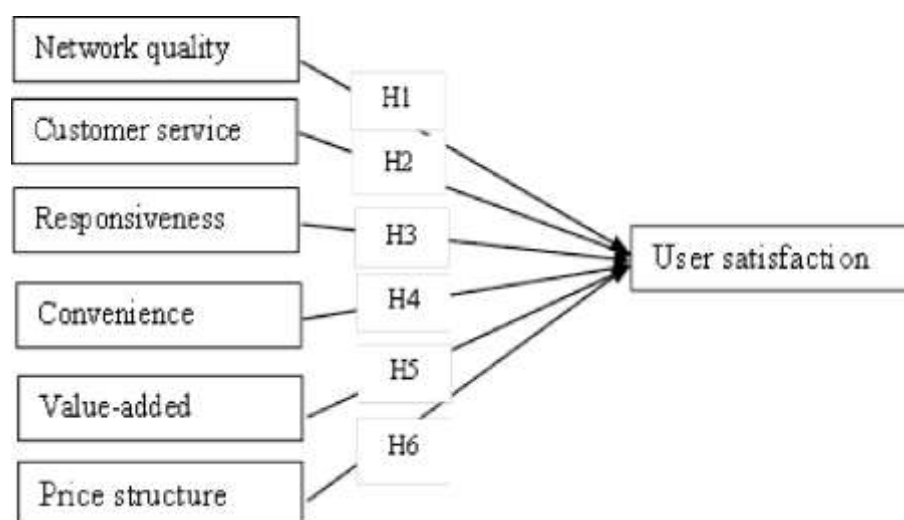
2.3.6. Value-added service

There has been continuous improvement in customer satisfaction in the telecommunication industry. In particular, various value-added services have been added, such as communication services, entertainment services, information services, money transfer services or in after sales service (Srikanjanarak, Omar, & Ramayah, 2021). Some research in mobile broadband has value-added service provided by the company such as caller tunes or customized ringtones, the jokes, astrology topics, daily of news update, and sport regardless domestic, international, and customized as user need ((Santouridis et al., 2010; Kim et al., 2004). Other researchers have defined value-added service as the precision of billing service, and the ease of access service provider (Lee, & Feick, 2001; Ishfaq, & Mengxing, 2021). Value-added service is actually identified in terms of the focus of the additional services, supplementary, customer care (Gronroos, 1984) in order to fulfill customers' needs, expectation and satisfaction (Hajar, 2020; Srikanjanarak, Omar, & Ramayah, 2021)

Consequently, it can be hypothesized that

- H1: Network quality is positively associated with user satisfaction of fixed broadband service.
- H2: Customer service is positively associated with user satisfaction of fixed broadband service.
- H3: Responsiveness is positively associated with user satisfaction of fixed broadband service.
- H4: Value-add service is positively associated with user satisfaction of fixed broadband service.
- H5: Convenience is positively associated with user satisfaction of fixed broadband service.
- H6: Price structure is positively associated with user satisfaction of fixed broadband service.

Figure 1 provides a graphical summary of the conceptual framework that this study examines:



3. Methodology

3.1. Research approach

There were two rounds of data collection. The first, a preliminary round that obtained qualitative data and the second, a more focused round of data collection that formed the major component of the study. To fulfill the aforementioned goals, according to Oktay, (2012), grounded theory is one of the best-known qualitative research methods, both within and outside of social work that combines the advantages of quantitative and qualitative techniques. Similar work by Hashim, Hamid, Kiram, & Sulaiman, (2017) adopted this approach to investigate demand for broadband and the level of satisfaction among broadband customers in the South East Coast of Sabah of Malaysia. Sharma, & Ojha, (2004) also approached both qualitative and quantitative measures to investigate service performance in mobile communications. In particular, the initial approach of this this research that take the discussion with staff, gaining approval from the VNPT Danang management board and with current customers of the company to ensure they were aware of the research project and what it involved; The outcomes of this qualitative phase are also to test, screen, and identify the link between the variables in a theoretical model, on this basis, to suggest a model research form; meanwhile to rectify and develop the scales of that are adapted to the Vietnamese research setting. It is basically exploratory and flexible (Oktay; 2012).

From reading previous research specific to the research objectives and VNPT company that enabled to establish items, concepts incorporated into the formal questionnaire and that was finally used for the study. This process is a crucial tool for analyzing the strategic conduct of those elements to fill upscale and questionnaires. Then, designing and then testing an initial questionnaire with a sample of 40 respondents was undertaken, collecting a sample of 411 respondents over a three-month period in 2021 that determined the elements/determinants of choice and perception of satisfaction from users' the fixed broadband services during the Covid. The respondents for this survey were selected as current customers using fixed broadband services.

The questionnaires were sent in person after calling to respondents to ask for their permission in advance and then through the Internet, email or social media (google form) to the research objectives. This market research format enables to obtain accurate information from respondents, and facilitate data analysis (Brunt, Atkinson, Nefau, Martinez, Lahaie, E., Malzcewski, & Brandt, 2017) emphasized that a well-presented and engaging online survey is likely to increase the number of successful responses generated.

A form indicating the nature of the research was also provided to them. In particular, during this time interval, all Vietnamese people were told to stay indoors and could only go out for essential services, such as buying food, medicine, and other emergency cases. The citizens were required to maintain a two-meter distance between individuals; gathering in groups of more than two people in public places were prohibited; and all non-essential businesses were shut down (VOV, 2020). This maximum social distancing strategy was implemented in the second stage of fighting COVID-19 in this country with most of the cases imported from overseas and community transmission emerged (Nguyen, 2020). The inclusion criteria of respondents in our study include (1) Agreeing to participate in the study by approving the

online consent form; (2) Having the ability to access the online questionnaire; (3) Having full capacity to answer the questions.

3.2. Questionnaire design

The questionnaire is carefully prepared to satisfy the purpose of this study. The questionnaire consisted of three main sections. Section 1 contained open-ended questions on users' expectations of fixed broadband services and the geographical context of the Covid. These parts of the data are not used in this paper. Section 2 was about the users' opinions and evaluations of their experiences. The study used a 5-point Likert Scale to assess the level of agreement of the respondents. To raise response rate and quality while lowering respondents' "frustration level" (Babakus, & Mangold, 1992), a 5-point Likert-type scale (Strongly disagree -Strongly agree) that gauges whether the user agrees or disagrees with the statement, was adopted. There has emerged a debate as to whether Likert-type scales represent ordinal or nominal data, and objections have been made to the use of parametric testing on scales which have described a specific meaning, arguing that such scales are nominal or discrete in character (e.g. see discussions by Göb, McCollin, & Ramalhoto, 2007; Norman, 2010; Thompson2012). Preston & Colman (2000) found that 5-point Likert scales had higher reliability A 5-point scale was chosen over a 7-point scale for a range of reasons, including one that is the opportunity to compare reliability coefficients with previous research involving 5-point Likert Scales. Finally, Section 3 sought socio-demographic data.

After completing pilot tests for reliability and validity and ensuring the sections was to meet the objectives of the research, all the items were based on the literature relevant to the research context as indicated in Table 1

Table 1. Items and concepts – prior usage

Concepts	Sources
Customer service (CS)	Goyal, et al (2020), Deekhuntod, & Saknarong, (2019); Gagliano, & Hathcote, (1994); Berry, et al (2002).
Convenience (C)	Goyal, et al (2020), Rahhal, (2015).
Value-added service (VA)	Gronroos, (1984); Hajar, (2020); Srikanjanarak, Omar, & Ramayah, (2021).
Network Quality (NQ)	Sharma, & Ojha. (2004); Rahhal, (2015), Finley, et al (2017); Goyal, et al (2020), Negi, (2009), Wang & Lo, (2002)
Responsiveness (S)	Rahhal, (2015), Parasuraman et al (1988); Rosen and Karwan, 1994, Cronin & Taylor (1992), Goyal, et al (2020), CroninBrady, & Hult, 2000, Ishfaq, & Mengxing, (2021) Wan, (2004)
Price structure (PS)	Lim et al., (2006), Kim et al., (2004), Gerpott et al., (2001); Ranaweera and Neely; (2003).

Users' Satisfaction (US) Finley, et al (2017), Goyal, et al (2020), Rind, et al (2018),
Rahhal, (2015), Saroha, & Diwan, (2020), Ashfaq, (2019).

The sampling frame consisted of a state-owned telecommunications company at VNPT Danang. The customer offices in the selected areas of Danang were approached to provide the list of customers who use their fixed broadband service. Participants were recruited by convenience sampling technique. Non-probability sampling method was used for data collection. Many early recommendations focused on the importance of absolute sample size. The bottom line question is "How large is large enough?" (Kline, & Tamer, 2016) and there is no easy answer to it because like many other statistical procedures both the number of variables analyzed and the absolute number of subjects should be taken into account DeVellis, (2017). In this research, the sample calculation formula can be used to determine the minimum sample size. Using the formula of Cochran (1977), it is suggested that sample sizes greater than 30 and less than 500 are appropriate for most studies. While qualitative research explores the themes in-depth (Vaismoradi, Jones, Turunen, & Snelgrove, 2016), the number was sufficient (Semley, Horner, & Brunt, 2017). Based on the research objectives of the study approaching the previous research about consumer satisfaction and with the allowance of access to consumers, the study adopted the approach of Floyd, & Widaman, (1995) and Gorsuch, (1983) in sampling techniques. In particular, a subjects-to-variables ratio of 4:1 or 5:1 was sufficient for exploratory factor analysis and that there should be at least 5 participants per variable and that a sample size should not be less than 100, of at least 200 is recommended to ensure good data analysis in EFA exploratory factor analysis. The proposed questionnaire has a total of 31 observed variables (questions using the Likert scale), so the minimum sample will be $31 \times 5 = 155$. Therefore, the number of official respondents used for analysis was 200 respondents.

Data processing methods were implemented, including collecting data from questionnaires; encoding the data, evaluating the reliability of the scale with Cronbach's Alpha coefficient; The measurement properties of the items were examined in several ways from the distribution properties, e.g. normality, were assessed for each item by taking histograms with a normal distribution curve, EFA exploratory factor analysis based on KMO coefficient (Kaiser-Meyer-Olkin) and Bartlett test of sphericity; correlation analysis and regression analysis - checking the suitability of the research model.

4. Findings and Discussions

4.1 Nature of characteristics

The entire sampling method, 200 questionnaires, was distributed to fixed broadband users, who are staying in Danang City, collecting 171 samples (gained rate of 85.5%), 29 samples were removed before data processing, because invalid due to lack of information or not being part of the study population, using total 171 reliable samples to observe in this study.

Table 2. Sample characteristics

	Categories	Frequency	Percentage
Gender	Male	92	53.8
	Female	79	46.2
	Other	0	0
Age	18–25	5	2.9
	26–35	26	15.2

	36–50	127	74.3
	Above 50	13	7.6
Occupation	Executive	39	22.8
	Student	36	15.2
	Self-employed	34	19.88
	Housewife	26	15.20
	Workers	23	12.87
Income (million VND)	< 5	53	30.99
	5-10	57	33.39
	> 10 million	61	35.57
How long have you used this fixed broadband service?	> 4 years	41	24.56
	> 3 years	37	21.64
	> 2 years	37	21.64
	1-2 years	32	18.71
	< 1 year	24	13.94

In 171 respondents, 79 are female (accounted for 46.2%), 92 are male, accounting for 53.8%, this shows that the ratio of male and female customers is quite balanced, the difference in numbers between male and female customers is not really significant. According to the obtained results, the income of the in the groups is relatively equal, which shows that the demands in the fixed broadband services are very increasingly necessary no matter how much or little their income is as the needs of using the service for work, study and entertainment during Covid 19 seems basic, crucial and urgent. The majority of respondents in the sample are working in professional majors, accounting for 22.81%, followed by business and trade 19.88%, professional occupation 15.20%, housewife 16.37% remaining other occupations and students, 12.87% for each group.

The table also shows that the number of customers using more than 4 years accounts for the highest proportion of 24.56%, followed by the number of customers using more than 2.3 years reaching 21.64%, customers with a time of use Using less than 2 years accounts for 18.87% and finally the number of new customers using less than 1 year accounts for 13.45%. This shows that the number of long-term customers accounts for the largest proportion, which proves that customers are relatively satisfied with the services of VNPT Da Nang and stick with the company for a long time. Next sections are going to give results of determinants of users' satisfaction in detail.

4.2. Descriptive data and Reliability of the Scale (Cronbach's Alpha)

The scales were examined for reliability measures in a number of ways that included the totality of all items and then broken down into the separate components as shown in Figure 2. In all cases, the Cronbach alpha coefficient remained above 0.70 and split half measures in excess of 0.8, meeting the normally desired values. Variables are used in the subsequent EFA analysis.

Table 3. Summary table of Cronbach's Alpha coefficients of the scales

Items	N of Items	N of Items satisfying	Cronbach's Alpha
Network quality (NQ)	4	4	0.772
Price structure (PS)	3	3	0.874
Value added services (VA)	3	3	0.887
Convenience (C)	5	5	0.910
Responsiveness (R)	3	3	0.817
Customer service (CS)	8	8	0.946
Users' satisfaction (US)	5	5	0.923

4.3. Exploratory Factor Analysis EFA

31 observation variables were included in the EFA factor analysis with the —Principal Componentl method and the —Varimaxl rotation. Mayers, L.S., Gamst, G., Guarino A.J. (2016) indicated that in factor analysis, Principal Components Analysis associated with Varimax rotation is the most-commonly used approach.

Table 4. Kaiser-Meyer-Olkin Measure of Sampling Adequacy.

Kiểm định KMO và Bartlett		
KMO		.890
Bartlett's Test of Sphericity	Approx.Chi-Square ⁱ	3433.727
	df	325
	Sig. .	.000

After analysis, the Barlett test result with a sig.= 0.000 is less than 0.005 and a KMO coefficient of 0.890 is greater than 0.5. For Eigenvalues (1.173) > 1, the total variance extracted is 74.435% > 50% so it is possible to explain 74.435% variations of data. This suggests that the correlation observed variables are strong enough to run EFA.

Table 5. Factor loading

Items	Factor loading					
	1	2	3	4	5	6
CS3	.872					
CS2	.856					
CS4	.815					
CS7	.788					
CS1	.769					
CS5	.712					
CS6	.711					
CS8	.700					
C3		.806				
C1		.800				
C5		.785				
C4		.719				
C2		.712				
NQ2			.794			
NQ3			.779			
NQ4			.730			
NQ1			.508			
PS2				.889		
PS1				.876		
PS3				.771		
VA1					.809	
VA2					.809	
VA3					.731	
R2						.836
R3						.720
R1						.716
The coefficients satisfy the conditions						
Cronbach's Alpha	0.946	0.910	0.772	0.874	0.887	0.817
Eigenvalue	1.173					
Cumulative %	74.435					
KMO	.890					
Barlett's Test	Sig. =0.000					

Table 6. EFA analysis results for the dependent variables

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.874
Bartlett's Test of Sphericity	Approx. Chi-Square	649.280
	df	10
	Sig.	.000
Total Variance Explained		
Factor	Initial Eigenvalues	Rotation Sums of Squared Loadings

	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
US1	3.828	76.558	76.558	3.828	76.558	76.558
US2	.422	8.441	84.999			
US3	.350	7.001	91.999			
US4	.258	5.158	97.158			
US5	.142	2.842	100.000			

The KMO and Bartlett's test in factor analysis show that the KMO coefficient is high (by $0.874 > 0.5$) and the value of Bartlett's test has a significant level (Sig. $0.00 < 0.05$) showing that the EFA analysis is appropriate.

The total variance extracted = $76,558 > 50\%$ proves that 76.558% of the variation of the data is explained by the customer satisfaction group. The coefficient represents the variation explained by the factor $\text{Eigenvalue}=3,828 > 1$ and extracts a meaningful factor that summarizes the best information and satisfies the requirements of the data and for further analysis

4.4 Correlation Matrix

Correlation matrix analysis uses Pearson's coefficient to quantify the closeness of the relationship between other components. This coefficient is ranging from -1 to 1, taking the absolute value, if it is greater than 0.6, it can be concluded that the relationship is close, and the closer to 1, the stronger the relationship, if smaller. 0.3 then indicates a loose relationship.

Table 7. Correlation between variables

Correlation between variables								
		US	CS	C	NQ	PS	VA	R
US	Pearson Correlation	1	.430**	.360**	.338**	.135	.383**	.191*
	Sig. (2-tailed)		.000	.000	.000	.079	.000	.012
	N	171	171	171	171	171	171	171
CS	Pearson Correlation	.430**	1	.000	.000	.000	.000	.000
	Sig. (2-tailed)	.000		1.000	1.000	1.000	1.000	1.000
	N	171	171	171	171	171	171	171
C	Pearson Correlation	.360**	.000	1	.000	.000	.000	.000
	Sig. (2-tailed)	.000	1.000		1.000	1.000	1.000	1.000
	N	171	171	171	171	171	171	171
NQ	Pearson Correlation	.338**	.000	.000	1	.000	.000	.000
	Sig. (2-tailed)	.000	1.000	1.000		1.000	1.000	1.000
	N	171	171	171	171	171	171	171
PS	Pearson Correlation	.135	.000	.000	.000	1	.000	.000
	Sig. (2-tailed)	.079	1.000	1.000	1.000		1.000	1.000
	N	171	171	171	171	171	171	171

VA	Pearson Correlation	.383**	.000	.000	.000	.000	1	.000
	Sig. (2-tailed)	.000	1.000	1.000	1.000	1.000		1.000
	N	171	171	171	171	171	171	171
R	Pearson Correlation	.191*	.000	.000	.000	.000	.000	1
	Sig. (2-tailed)	.012	1.000	1.000	1.000	1.000	1.000	
	N	171	171	171	171	171	171	171

**. Correlation is significant at the 0.01 level (2-tailed)

According to the correlation matrix in the table above, there is a linear correlation between US (Users' satisfaction), dependent variables with independent variables Customer service (CS), the Convenience (C), Network quality (NQ), Price Structure (PS), Added services (AS), Responsiveness (R). TF, PVF, CF, because of the Sig significance level less than 0.05. Thus, the use of these linear regression analysis variables is appropriate to test the formal conceptual model below

$$Y = \beta_0 + \beta_1NQ + \beta_2PS + \beta_3VA + \beta_4C + \beta_5R + \beta_6CS + \epsilon_i$$

4.5. Multiple Regression Analysis

According to the formal research model, dependent variable users' satisfaction (US is affected by 6 independent variables: Network quality (NQ), Price structure (PS), Added -added service (VA), Convenience (C), Responsiveness (R) and Customer Service (CS).

To test the research model of the determinants of customer satisfaction, the author uses multiple linear regression methods.

Table 8. Model summary

Model	R	R square	Adjusted R square	Std Error of the Estimate	Durbin–Watson	
1	.794 ^a	.630	.617	.61904603	1.893	
a. Predictor: (Constant) - Responsiveness (R), Value-added service (VA), Price Structure(PS), Network quality (NQ), Convenience (C); Customer service (CS)						
b. Dependent variable: Consumer satisfaction						
ANOVA ^a						
Model		Sum of square	df	Mean square	F	Sig.
1	Regression	107.152	6	17.859	46.602	.000b
	Residual	62.848	164	.383		
	Total	170.000	170			
a. Dependent variable: Consumer satisfaction						
b. Predictor: (Constant) - Responsiveness (R), Value-added service (VA), Price Structure(PS), Network quality (NO), Convenience (C); Customer service (CS)						

Table 9. Estimate the beta coefficient of the model by the Enter method

Model	Unstandardized Coefficient		Standardized Coefficients	t	Sig.	Kiểm tra đa cộng tuyến	
	B	Std. Error	Beta			Tolerance	VIF
1 (constant)	4.890	.047		.000	1.000		
CS	.430	.047	.430	9.063	.000	1.000	1.000
C	.360	.047	.360	7.576	.000	1.000	1.000
NQ	.338	.047	.338	7.126	.000	1.000	1.000
PS	.135	.047	.135	2.840	.005	1.000	1.000
VA	.383	.047	.383	8.064	.000	1.000	1.000
R	.191	.047	.191	4.025	.000	1.000	1.000
a. Dependent variable: User satisfaction							

The adjusted R² value of 0.617 shows that the independent variable included in the regression affects 61.7% of the variation of the dependent variable is explained by the independent variables. value sig = 0.000 proves that the regression model is suitable for the data set. The Durbin–Watson coefficient = 1.893 < 3, showing no correlation between variables in the model. VIF of all variables has value < 2, it means that no collinearity phenomenon occurs.

Based on the magnitude of the normalized regression coefficients Beta, the order of the level of impact from the strongest to the weakest of the independent variables on the dependent variable is: Customers service (CS) (0.430), Valued-Added services (VA) (0.383), (C)(0.360), Network quality (NQ) (0.338), Responsiveness (0.191); Price structure(0.136). In particular, results showed that the Customer service factor and Value- added services have the strongest impacts on consumer satisfaction, followed by the factor of Convenience, network quality, the Responsiveness and finally the factor Price structure has the weakest impact on customer satisfaction. Therefore, with 6 hypotheses (H1 to H6), the 6 factors that were originally set were accepted.

5. Discussion and implication

The study has systematized the basic aspects of factors affecting user satisfaction in the telecommunications industry in general and in fixed broadband service in particular. Then, the study measured which factors played an important role and the most influential part on user satisfaction, namely VNPT Danang telecommunication within the Covid pandemic.

Proposed research framework and hypothesis were formed on the basis of strong significant correlational evidences between the constructs through detailed relevant literature investigation, the study adopted the combination of both qualitative and quantitative research approach, addressing 6 factors affecting consumer satisfaction behavior with fixed broadband services in Danang city during the Covid-19. Exploring these factors is significant for the telecommunication industry, particularly for VNPT Danang Telecommunications Company to have appropriate service quality and customer relationship management policies to better meet the expectations of consumers during the disruptive time as the covid 19 pandemic as well as similar cases in the future.

In fact, findings show that the customer services factor and value-added services have the strongest influence on customer satisfaction and consumer behavior during the Covid-19

pandemic. It is crucial to keep customers with stable satisfaction, they will feel comfortable and satisfied with what is going on and do not want a change or switch to other products and services provided (Ishfaq, & Mengxing, 2021). Therefore, these customers are pleasant, have high trust in services and are willing to continue using the products, services provided by the current provider. In particular, results of the study emphasize the importance of customer service in broadband services (Al-Shammari, & AlShowaikh, 2021). Yet it is known that past studies have indicated that 'value-added services is a crucial factor that consumers take into account when assessing their experiences of fixed broadband services (Saputro, B., Hidayanto, Abidin, & Paoprasert, 2021). Consequently, the inclusion of this question led to some suggestions of consistency, necessities of value-added services to improve and increase the positive emotion, stable satisfaction and recommendation to others.

The findings of the study have contributed to recommendations, key implications, and solutions to improve the quality of services offered and increase customer satisfaction with fixed broadband services at VNPT Danang during the Covid-19 pandemic.

In terms of future research there is much to be done, and the authors are hoping to build upon this paper for future work. There may be possible differences between the different segments that form loyal and potential customers, and the current sample did not permit that to be further assessed. It will also be of interest to examine further why value-added services in the telecommunication services that bring people to the fixed broadband services when other services could be approached. There therefore remains much to be done and it is hoped that such work can be completed in the future.

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