

# **Factors Influencing 5G Smartphone Purchase Intentions in Vietnamese Market: A Critical Realism Approach**

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*The current debates on the fifth-generation (5G) have kindled a survival race to achieve it, but little attention has been paid from the customers' perspectives themselves. This research, thus, aims to propose what will induce customers to purchase 5G smartphones. To this end, we performed a mixed-method study under the critical realism paradigm. In addition to common factors (e.g. social influences, product features, price, and aesthetic values), we also found that purchase intentions are negatively affected by security concerns, thus contributing a fresh perspective to literature. Besides, we used qualitative data to discover generative mechanisms that cause structural relationships.*

*Keywords: 5G smartphones, purchase intentions, sequential mixed-method approach, critical realism*

## **INTRODUCTION**

The ambition to approach the fifth-generation (5G) has globally fired a survival race among information technology powers, such as the US (GMS Association, 2018), China (Yu, 2019), South Korea (Song, 2019). These predominant actions imply tremendous growth in data and IoT devices for the future. To date, minimal research has been addressed what induces customers' adoption for 5G.

Compared with neighboring countries, Vietnam is a promising and active market for 5G providers/developers. According to e-Conomy SEA 2019 report, Vietnam's Internet economy reaches \$12 billion in 2019 on a 38% annualized growth rate since 2015, leading the south-east Asian region with Indonesia (Google & Temasek/Bain, 2019). In 2019, Vietnam has 43.7 million smartphone users in a total population of 97.4 million, reaching 44.9% (Adsota, 2019). With this large number of users, Vietnam is in the top 15 markets with the highest number of smartphone users in the world. The number of 5G subscribers in Vietnam is predicted to hit 6.3 million by 2025, and deploying 5G services will bring annual revenue of up to \$300 million for Vietnamese telecom enterprises from 2025 onwards (Hari & Nikolai, 2019).

Smartphones are worthy to consider as the priority to bundle 5G services. In 2018, the Vietnamese smartphone market has recorded double-digit at 11 percent (Mishra, 2108), the highest since 2016. Along with this growth, feature phones received a steep decline of 6 percent (Mishra, 2108), indicating a significant switch towards smartphones in customers' acquisitions. Besides, We Are Social 2019 reports that 97 percent of Vietnamese Internet users prefer to use smartphones rather than other devices (Kemp, 2019).

5G services are also a double-edged sword. On the one hand, bundling 5G services with smartphones can satisfy customers. Actually, the Vietnamese spend 55 percent of their online time on online socializing and recreational activities (Kemp, 2019). It fits with advances in 5G, such as lower latency, higher speed, and broader bandwidth. The presence of 5G, thus, can foster customers' purchase intentions. On the other hand, 5G can lay the groundwork for cyber threats (Basin et al., 2018), such as cyberattacks, crypto-jacking, which are harmful to users' information privacy. In common sense, users find it uncomfortable while these invasions occur (Stanton & Stam, 2003; Solove, 2006). Consequently, their intentions to purchase 5G smartphones are possibly precluded. These cybersecurity problems, thereby, put more pressure on stakeholders to minimize customers' apprehension. Understanding the joint effects of these opposites is overriding necessary in the early stage of wide-spreading 5G but still unclear in the literature.

The common factors leading to purchase intentions are also needed to retest. Given focal research constructs and methods, the results are not convergent (Ayodele & Ifeanyichukwu, 2016; Osman et al., 2012; Martins et al., 2019). These significant differences simply imply a refinement for research models under the tenets of critical realism (Hubbard & Lindsay, 2013). Underpinned by critical realism, we delved into contextual conditions to gauge implicit reasons that caused relations between constructs, thus offering a deeper understanding.

One tradition in the literature is that academicians have overlooked characteristics related to mobile networks, such as the role of mobile services and cybersecurity, which do affect the value of smartphones and possibly boost the sales of 5G smartphones<sup>1</sup>. It is not justice for smartphones because its values are shifted towards bundle applications services (De Matos et al., 2014), which require advanced mobile networks, rather handsets. Therefore, this study also refined the previous results by closing this gap.

The current paper explores (1) factors influencing purchase intentions for 5G smartphones, and (2) ranking of significant factors, and (3) generative mechanisms. Adhering to the critical realism paradigm (Hubbard & Lindsay, 2013; Zachariadis et al., 2013), we externally exposed the generative mechanisms under the study, which both researchers and practitioners should consider. This is indicated as the following research questions (RQs).

**[RQ1]:** *What will affect customers' intentions to purchase 5G smartphones?*

**[RQ2]:** *How does the ranking list of significant factors look like?*

**[RQ3]:** *Which mechanism plays as implicit reasons leading to such causality between the factors and purchase intentions.*

The rest of this research is structured as follows. Section 2 introduces our reviews on the extant literature to highlight the existing gaps. In section 3, we present our proposed research model and hypotheses, after which show our research design, and results and meta-inferences in section 4 and 5, respectively. Our contributions to research and practice are in section 6. The final section concludes our research (section 7).

## **BACKGROUND AND RELATED WORKS**

### **The Fifth-Generation (5G)**

In Telecommunications and Technical literature, the discussions of 5G standards are on-going thus lead to various terms and definitions to describe 5G. Actually, 5G is a cellular network, in which the service area is split into small geographical areas, or "cells" (Shafi et al., 2017). All 5G wireless devices within a cell are communicated with to the Internet and telephone network by radio waves via a local antenna in the cell. The European Commission defines 5G as:

“...a set of all relevant network infrastructure elements for mobile and wireless communications technology used for connectivity and value-added services with advanced

performance characteristics such as very high data rates and capacity, low latency communications, ultra-high reliability, or supporting a high number of connected devices.” (The European Commission, 2019, p.5)

The International Telecommunication Union (Husenovic et al., 2018) proposed some technical standards for 5G. As mentioned, 5G advance 3G and 4G by dramatically increasing data rates and reducing latency (less than 1ms). Thus, this innovation especially fits mission-critical services in which data are time-sensitive. Its high-speed capability (10 Gbit/s) allows 5G networks to serve a range of high-speed broadband services and play as an alternative to last-mile access. With the remarkable increase in bandwidth, the 5G network is expected to play as service providers among ubiquitous digital devices (e.g. laptops, desktop computers, tablets, smartphones). All of these are meaningful for new applications, such as the Internet of Things (IoT), machine-to-machine (M2C) areas. Table 1 exhibits a comparison between 5G, 4G, and 3G in technical standards.

**TABLE 1**  
**A COMPARISON OF MOBILE NETWORKS**

Generation	5G	4G	3G
Theoretical Download Speed	10 Gbit/s	1 Gbit/s	56 Mbit/s
Latency	< 1ms	60-98 ms	212 ms
Sources: Husenovic et al. (2018)			

Bundling 5G with smartphones have a binary effect. Its service quality is dramatically increased and provides users with bundled applications that link to their daily life to the digital world. In turn, their purchase intentions could be higher. However, 5G services are (or perceived as) not easy-to-use, which could inhibit users' purchase intentions (Venkatesh et al., 2012; Teh et al., 2014).

Meanwhile, 5G is assumed to create an era of cyber threats (Basin et al., 2018). By superb high-speed services, 5G allows information to be rapidly spread on social networking sites. Thus, it can drive social change (Husenovic et al., 2018). When 5G is exploited for malicious purposes, it can harm users. For instance, hackers can attack and steal the personal privacy of users, then commercialize it. In a report published by the European Commission and European Agency for Cybersecurity (NIS Cooperation Group, 2018), security issues surrounding 5G is warned when it is used against using a single supplier for a carrier's 5G infrastructure, especially those based outside the European Union. In these cases, many incidents can occur, such as cyberattacks, cyberbullying. This means customers need to risk their information privacy. To our best knowledge, minimal studies address this issue in the context of 5G smartphones. In this research, we incorporate this aspect to fill this gap in the literature

### **Purchase Intentions**

As first introduced in 1985 by Ajzen, the theory of planned behavior has been broadly applied in social psychology and marketing research to examine customer behavior. This theory is developed based on the theory of reasoned action that hinges on the interrelationships between attitudes, subjective norms, intentions, and behaviors. But, the theory of planned behavior goes beyond its major limits, which is of limited use in predicting behavioral intention (by adding perceived behavioral control). Besides, the theory of planned behavior allows additional variables to better explain each construct (Conner & Armitage, 1998). As such, we took the theory of planned behavior as the theoretical foundation, and look at what can explain customers' purchase intentions of 5G smartphones.

Theoretically, purchase intentions refer to the degree of customers' willingness to purchase certain goods (Ajzen, 1991). Several studies demonstrated that purchase intentions are closely and positively related to the possibility that their actual purchases will happen. Customers normally purchase a particular product or use a service after information seeking or research in advance (Rahim et al., 2016; Laroche et al., 1996) to select exact products that meet their needs and wants. Thus, purchase intentions could be

considered as the outcomes of specific evaluations on antecedent purchases of a product or service (Hawkins & Mothersbaugh, 2010; Chimona et al., 2013). Therefore, several product-related elements can jointly affect customers' purchase intentions in the early stage of purchasing via e.g advertisements (Martins et al., 2019), online information sources (Chen et al., 2016), etc. This idea also attracts scholars to explore what induces customers to purchase smartphones (Malviya et al., 2013; Ayodele & Ifeanyichukwu, 2016; Osman et al., 2012).

### Prior Relevant Research

Smartphones differ from feature phones not only in their stronger hardware capabilities but also in extensive mobile operating systems. Academicians attempted to explore what persuade customers to purchase smartphones, but their view-points stand at handsets only. It leads to uncertainty to apply their findings in explaining customers' purchase intentions because the values of the smartphone have shifted towards bundled applications (De Matos et al., 2014).

The first dimension of smartphones, *handsets*, refers to the core functionality of smartphones (calling, audio, and texting). This facet is dissected by many academicians, hoping to find what convince customers to purchase (Ayodele & Ifeanyichukwu, 2016; Suki et al., 2013; Sujata et al., 2016; Harun et al., 2015; Liew, 2012; Osman et al., 2012; Lim et al., 2013; Sujata et al., 2016). Thus, several factors have been offered like price, product features, aesthetic values, brand image, hardware factors, social influences. However, their findings are mixed albeit using quantitative methods (especially surveys) with similar research objects. It may originate from the socio-economic differences, which consist of contextual conditions and boundaries. Hubbard & Lindsay (2013) contended that significant differences imply a need to refine models and results. It is the first gap that the current research aims to close.

The second dimension is *operating systems*, which allows users to enjoy bundled applications. Customers' expectations for these services can partly reflect their expectations for 5G smartphones' operating system. In technology research, several technical efforts have been offered to standardize the 5G network. In commercial contexts, customers' acceptance is equally important for technology innovation to get viral. The mobile service literature proposed attempts for 3G (Ismail & Ali, 2014; Ong et al, 2008) or 4G (Aziati et al, 2016; Ramadhania et al, 2015) that aims to understand customers' acceptance. Consistently, their results indicate that the quality of mobile services is significant to drive users' acceptance or diffuse such innovations. However, smartphones are not taken as a case and thus hardly apply these results for smartphones. For example, 4G services bundled with smartphones differ from tablets, because users tend to interact with smartphones more frequently. Because of that, they request higher requirements from applications with smartphones. Therefore, we argue that the role of the mobile network should be tested in the context of smartphones. Table 2 summarizes our reviews of relevant research.

**TABLE 2**  
**RELEVANT RESEARCH**

<b>Category</b>	<b>Subjects</b>	<b>Key Findings</b>	<b>References</b>
<b>Consumer Behaviors</b>	Purchase Intentions, Purchase Behaviors	Handsets: Prior studies are succeeded to search for drivers of purchase intentions/behaviors, such as price, aesthetic values, social influences, brand name, product features, dependency, hardware factors.	Alrwashdeh & Aljuhmani (2019), Ayodele & Ifeanyichukwu. (2016), Bringula et al. (2018)., Chen et al. (2016), Haba et al. (2017), Harun et al. (2015), Kaushal & Kumar. (2016), Leelakulthanit & Hongcharu. (2012), Lim et al. (2013), Mad Lazim & Sasitharan. (2015), Malviya et al. (2013), Mohd Suki. (2013), Naing & Chaipoopirutana.

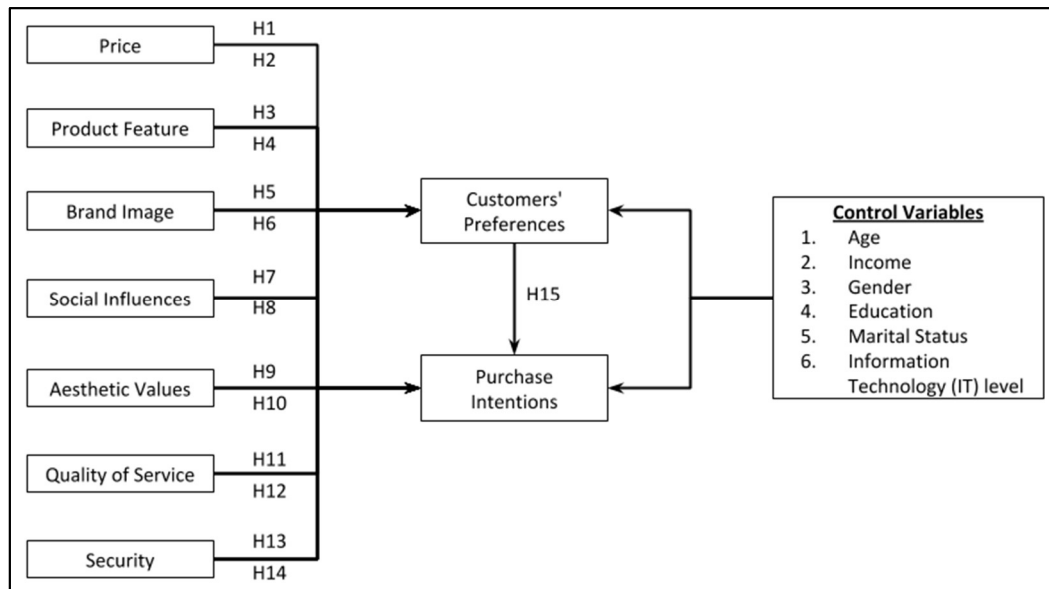


			(2014), Osman et al. (2012), Rahim et al. (2016), Sujata et al. (2016), Tjahjono & Rezza. (2016), Toufani et al. (2017).
		Mixture: All friends adopt the iPhone 3G, then the probability of the ego to adopt increases by 15 percent on average.	De Matos et al. (2014)
<b>Telecom Network</b>	3G/4G Acceptance	Quality of services (speed, stability) is important for users to use the mobile network. Factors in TAM (Davis, 1989) such as perceived ease-of-use, perceived usefulness, attitude, are useful to predict users' adoptions. The theory of diffusion is incomprehensive to explain students' intentions (Ong et al., 2008).	Aziati et al., (2016), Eizan & Omar. (2013), Ramadhania et al. (2015), Rawashdeh. (2015), Ismail & Ali (2014), Ong et al. (2008), Tapanainen et al. (2018), Kenny. (2011), Revels et al. (2010).
	Broadband services	Addressing Individual reflexivity, supported as it is by personal biography, context, and personal concerns, in adoption decisions. In addition, it exposed potential barriers for adoption, such as Inner dialogue conducted from different modes, situational contexts, and the projects and life concerns of individuals. Other factors influencing broad services adoption are extensively point out, such as primary influences, self-efficacy, relative advantage, hedonic outcomes, and facilitating conditions resources. Theory of Planned and Diffusion Innovation Theory is useful and extended.	Dobson et al. (2013), Ooi et al. (2011)
<b>Cybersecurity</b>	Cyber threats associated with mobile networks	Customers tend to be uncomfortable when their privacy is attacked and threatened. The degree of uncomfortableness depends on how important their privacy is.	Alsaleh & Alarifi (2017), Basin et al. (2018), Becher et al. (2011), Bulgurcu et al. (2010), Chin et al., (2012), Das & Khan. (2015), Funnisia et al. (2018), Moody & Pahnla. (2018), Sutanto et al. (2013).
		The security issues surrounding 5G is warned against using a single supplier for a carrier's 5G infrastructure, especially those based outside the European Union. Basin et al. (2018) alerted that 5G technology could open ground for a new era of security threats.	Basin et al. (2018), Husenovici et al. (2018), NIS Cooperation Group. (2018)

## CONCEPTUAL FRAMEWORK AND HYPOTHESES

Figure 1 exhibits our final theoretical framework after adjustments based on interview data. Within this framework, we aimed to test relationships between price, product features, aesthetic values, brand image, social influences, quality of service, and security with purchase intentions. Besides, we also recruited customers' preferences as a mediator.

**FIGURE 1**  
**CONCEPTUAL FRAMEWORK**



### Price

From the consumers' perspective, *price* refers to sacrifices to have products (Zeithaml, 1988) and presents all benefits that having/using products bring to them (Kotler & Armstrong, 2018). However, users also perceive other components, such as the depreciation of price values, free accessories along with purchasing, financial supports (installment policies, promotions) as elements of the selling price. Thus, we conceptualized price as all monetary values about having/using 5G smartphones, including selling price, register/using costs of 5G smartphones, and the fluctuation of the selling price of 5G smartphones.

It is well recognized that smartphone sellers/retailers exert the constant idea of price to advertise a new series of smartphones. Traditionally, long-running smartphone shops often offer financial supports (installment policies, promotion programs, vouchers), physical incentives (free accessory, gifts), or even free delivery. Due to these wise policies, the selling becomes higher and sales are substantially boosted during the very beginning of introductions. A number of studies consistently proved the significant role of price in determining purchase intentions for smartphones (generation Y: Lim et al., 2013; young adults: Osman et al., 2012; Ayodele & Ifeanyichukwu, 2016).

Our reviews revealed that the presence of mobile service in smartphone conceptualization is associated with the changes in the effects of price. Examples include Ayodele & Ifeanyichukwu, (2016), who showed that price is a high predictor of purchase behaviors for handsets, and Osman et al. (2012), who found that the power of price becomes less for mixture smartphones. Furthermore, Lim et al (2013) even suggest that smartphone manufacturers necessitate switching from psychological pricing to serving better features and qualities. Therefore, we retest price by two hypotheses.

**H1.** *There is a relationship between the Price of 5G smartphones on Vietnamese Customers' Preferences.*

*H2. There is a relationship between the Price of 5G smartphones and Vietnamese customers' Purchase Intentions.*

### **Product Features**

Product features are likely to be the factor that makes users buy smartphones. As a component of product attributes, product features show what satisfies consumers' needs and wants through the owning of the product, usage, and utilization for a product (Kotler & Armstrong, 2007, 2018). As found in empirical studies, product features are one of the significant driving factors for both purchase intentions and behaviors (Ayodele & Ifeanyichukwu, 2016; Rahim et al., 2016; Osman et al., 2012). It indicates opportunities for stakeholders to boost their sales by offering more compelling features (Ayodele & Ifeanyichukwu, 2016; Rahim et al., 2016); or reaching best-selling classifications (Osman et al., 2012). By integrating the 5G network, 5G smartphones are more preeminent than common types of smartphones in terms of operating systems, modern bundle applications, and so on. These advantages appear to fit the needs of Vietnamese customers as their main daily uses of smartphones are denoted web-browsing, entertainment activities, and social networking (Appota, 2018). Moreover, 5G smartphones also allow users to experience IoT applications thus potentially motivate their intentions. Based on that, we proposed:

*H3. There is a relationship between the Product Features of 5G smartphones and Vietnamese Customers' Preferences.*

*H4. There is a relationship between the Product Features of 5G smartphones and Vietnamese customers' Purchase Intentions.*

### **Brand Image**

Brand image includes all emotional aspects which companies use as an armament to remind customers of their brands (Kotler & Armstrong, 2007, 2018). It has a powerful impact on consumer buying behaviors (Arora & Stoner, 2009) and most equal to Price (Tjahjono & Rezza, 2016). Actually, the nature of this power is word-of-mouth effects when customers have limited information about products. For such new products, beliefs in brand, which have gained through using previous products of a company, would create positive word-of-mouth effects by happily telling others the advantages of the brand. In turn, customers would recommend the purchases and to rebuy the brand when it launches a new product (Chen et al., 2016). A number of prior research found to prove that Brand Image has a positive and significant impact on the decision of smartphone purchases (Nusrai et al., 2018; Funnisia et al., 2018). At present, the 5G network would be very new for Vietnamese smartphone users. Therefore, the reputation of providers was hypothesized to foster customers' acceptance as follows.

*H5. There is a relationship between the Brand Image and Vietnamese Customers' Preferences for 5G smartphones.*

*H6. There is a relationship between the Brand Image and Vietnamese customers' Purchase Intentions for 5G smartphones.*

### **Social Influences**

As stated by Kotler and Armstrong (2018), consumer behavior is generally influenced by social factors such as group, family, roles, and status, among others, which exert what is called "social influences" on the consumer's decision making. In the literature, social Influences was tested in numerous studies, wherein smartphones were strictly considered handsets. Consistently, the conceptualization of this construct refers to influences caused by friends, family, and surroundings. The findings, however, are mixed. For example, a significant positive correlation was found in a study by Rahim et al. (2015), in which social influence displayed a substantial impact on purchase intention. In contrast, Ayodele & Ifeanyichukwu (2016) and

Lim et al. (2013) found that social influence had no noticeable effect on the smartphone purchasing decision of young adults.

In such a digital era, social media becomes tremendously important as a reliable channel for customers to gain information, which can be useful for them to evaluate among alternatives. Lee & Watkin (2016) suggests that YouTube vloggers' influence can positively affect consumer perceptions and intentions on the luxury brand. Osman et al. (2012) pointed out that 35.6 percent of respondents based on their purchasing preference on community trends. Thus, it is essential to include impacts of these aspects into conceptualization for social influences, and test it for the 5G smartphone purchase intention framework.

**H7.** *There is a relationship between Social Influences on 5G smartphones and Vietnamese Customers' Preferences.*

**H8.** *There is a relationship between Social Influences on 5G smartphones and Vietnamese customers' Purchase Intentions.*

### **Aesthetic Values**

Toufani et al. (2017) draw the concepts of aesthetic values including such facets as harmony, beauty, and order in the material world. However, aesthetic values not only consist of visual properties but also touch and taste (Swilley, 2012), or stimuli (Wang et al., 2013). Given that understanding individuals' favorable aesthetic responses can be utilized to differentiate products, create preferences for products (Landwehr et al., 2013), we define the Aesthetics Values of 5G smartphones as art properties such as shapes, colors, designs.

In the relevant research literature, several prior studies supported that aesthetic values are important to determine users' adoptions (Sonderegger & Sauer, 2010; Cyr et al., 2006), or purchasing behaviors/intentions (Ayodele & Ifeanyichukwu, 2016; Kim et al., 2016). In Vietnam, one of the most common practices to attract new customers as well as anchor current customers in Vietnam is to based on "fashionableness". This strategy created even more pressure for new entrants. In 2018, Vietnamese market is led by giant smartphone brands such as Nokia (25,9%); Samsung (23,3%); Oppo (13,2%); Masstel (6,4%); Apple (4,7%). This indicates an increment in aesthetics in users' perceptions. In this dynamic setting, aesthetic values are promised to be one of the competitive advantage sources (Leelakulthanit & Hongcharu, 2012). Thereby, its impacts are important to test.

**H9.** *There is a relationship between the Aesthetic Values of 5G smartphones and Vietnamese Customers' Preferences.*

**H10.** *There is a relationship between the Aesthetic Values of 5G smartphones and Vietnamese customers' Purchase intentions*

### **Two Emerging Constructs by Interview Data**

#### *Quality of Service*

From heavy users' perspectives, there are main annoying issues related to network and service quality. 3G/4G providers offer unstable-connection services, limited coverage for users. Thereby, these services cannot satisfy them, or even make them unhappy. For those reasons, these types of users appear to be impressed by 5G services as their improvements resolve many existing shortcomings. One of them stated:

*"I am impressed by 5G because it helps me use the Internet more stable. With 5G, I hope I can use the Internet with faster speed and wider bandwidth. When I go to the remote areas, I still can use the smooth, stable, and quick Internet."* (P21)

From managers/salesmen's perspectives, transcendent applications are added values to 5G smartphones, and high-tech applications could urge users to change to 5G services. These applications mainly denote IoT applications (e-payments, e-health, e-transportation).

*"I hope that 5G can solve the problems, which I myself also want. They are a strong level of bandwidth (broadband) and wide range, but not like the 4G generation, which is not different from 3G. In addition, I still want the 5G smartphones to do more like health care, or they can integrate them into auto-driving or online payment and the most important is high security. I also want to be like that." (P13).*

In this study, we aim to investigate customers' intentions to purchase. Thus, the definitions of quality of service from users' satisfaction are more suitable for our research field. Fabricio & Thomas (2009) argued that quality of service in the Telecom industry covers a collection of specific requirements for users to achieve the required application (service) functionality. For a mobile network, quality of service can be measured by technology-based characteristics such as timeliness, bandwidth, and reliability (Chalmers & Sloman, 1999).

Since humans prefer seeking pleasure and avoiding pain (Liang & Xue, 2009), the quality of services cannot be neglected in examining customers' purchase intentions. Research on online environments has shown that service with high-standard quality probably attracts users (Tapanainen et al., 2018; Chen et al., 2006; Eizan & Omar, 2013). For Internet services, quality of services was proved to enhance customers' satisfaction (Kim et al., 2007) thus it has the potential to raise the intention to purchase related products like smartphones. Owing to those findings, we added quality of service into the proposed research model as a new variable and hypothesized its relevance to other variables as follows.

**H11.** *There is a relationship between the Quality of Service and Vietnamese Customers' preferences towards 5G smartphones.*

**H12.** *There is a relationship between the Quality of Service and Vietnamese customers' Purchase Intentions towards 5G smartphones.*

### *Security*

Interview data report that smartphone users, especially those who have a high income, strictly concern about data security. This is because those types of users prefer smartphones to store some essential information and these pieces of information cannot be shared with others. Once the information outflows, they will face reputational/financial damages. As shared by one of the salesmen:

*"...For businessmen, they can pay for higher 14-17 million VND [\$560-680] price if "their security" is good. This is because they have many important things in the smartphone..." (P11)*

We conceptualized security as the concerns about cyber threats (malicious programs, hackers) as well as the firms' responsibilities in securing users' information privacy (Son & Kim, 2009; Liang & Xue, 2009; Sutanto et al., 2013; Das & Khan, 2015). The impacts of security on customers' purchase intentions are somewhat mixed. Some authors showed that the fears of data theft in conjunction with mistrusts of smartphone applications often lead to users' apprehensions thus indicate a negative relationship between security and purchase intentions (Sujata et al., 2016; Chin et al., 2012). Others showed that users sometimes ignore such IT threats although they are signaled by social media channels about the serious consequences of these incidents (Becher et al., 2011). Due to that complex heterogeneity, security should be noted and its role in customers' perceptions should be disclosed, for a very specific context of 5G smartphones. To close this gap, we exported two following hypotheses.

*H13. There is a relationship between Security and Vietnamese customer's preferences towards 5G smartphones.*

*H14. There is a relationship between Security and Vietnamese customers' Purchase Intentions towards 5G smartphones.*

### **Customers' Preferences as a Mediator**

Marketers need to understand customers' preferences as it causes customers' movements (Zubcsek et al., 2017). In psychology, customers' preferences can be understood as the biased attitude of an individual for a set of objects (Lichtenstein & Slovic, 2006). This tendency typically emerges in the decision-making process. Some other psychologists' distinctive viewpoints define preferences as evaluative judgments (in the sense of likes/dislikes) (Scherer, 2005). However, its definition is expanded to the context of customers by not only including the tendency towards choices among neutral/more valued options but also the willingness to suffer for the undesired status (Fife-Schaw et al., 2007). Moreover, some studies highlight that emotional values are essential in driving customers' preferences (Van der Heijden, 2004; Lee & Kobek, 2010). For smartphone purchasing, a few researchers showed that a more positive user preference/emotion will engender a higher probability to purchase smartphones (Tzou & Lu, 2009; Hsiao, 2013; Toufani et al., 2017). Leveraged by these points of view, we conceptualized customers' preferences within this study as the tendency to prefer a certain type of product and proxied by searching, sharing, liking, or disliking. Based on that, we test:

*H15. There is a relationship between Vietnamese Customers' Preferences and customers' Purchase Intentions towards 5G smartphones.*

## **METHODOLOGY**

### **Philosophical Stance: Critical Realism**

We adopted Critical Realism (CR) as our philosophical stance to guide our research design. Under CR, objects, entities, and structures are "real" but not directly accessible to us. However, these domains of the real can generate the events, which some of them can be observed (Bhaskar, 1998). The entities are assumed to exist prior to the events they cause and, in turn, the events may lead to subsequent changes in the entities (Archer, 1995).

One of the important steps in CR studies is to expose potential mechanisms from the starting-point of the descriptions of reality (Hubbard & Lindsay, 2016). This process is labeled "retroduction". A generative mechanism can be understood as causal structures that create observable events (Bhaskar, 1997; Bhaskar & Lawson, 2013). In this study, we considered functional outcomes as (found by using the PLS-SEM model) as the description of observed events in the empirical domain. These structures of constructs stem from both handset and telecom service facets. The task of researchers, then, is to discover the generative mechanisms that lead to such structured relationships. Within this regard, we make full use of interview data to outline these mechanisms e.g. implicit reasons that lead to such feelings, the tendency for purchase intentions in the context of 5G smartphones. In fact, CR is the most appropriate when applied to research that employs qualitative, case-study methods in acknowledgment of the efficacy of multiple methods (including surveys and statistical analyses) in gaining the fullest extent of information about a "case" (Hubbard & Lindsay, 2013). In social science research, CR is a philosophical approach aiming to impale those contradictions of positivism and quantitative methods with interpretivism with qualitative ones, including the strengths of both relevance and rigors. Therefore, we think CR is an appropriate match for our study.

### **Data**

Data used in this research are primary and include interview and survey responses. During August-October 2018, semi-structured interviews were sequentially conducted among 17 informants including

experts (i.e. smartphone sale personnel and managers) and heavy users (i.e. gamers and businessmen) with different purposes. For experts, we aimed to garner such context-specific knowledge as these individuals have a detailed evaluation and understand their customers then they can share exact the status of them, which helps describe consumer behaviors, factors influence on, and the current market trends. For heavy users, they were assumed to be the first customers to approach 5G smartphones in 2020. They have owned, used smartphones, and understand what they need (that makes for a satisfactory experience) and what issues they often encounter. Thereby, they offer cues regarding how our variables may be developed, as well as insights into how existing services may be improved and how the appropriate groundwork may be established to facilitate the arrival and emergence of 5G smartphones. All interviews from two groups<sup>2</sup> were recorded and verbatim transcribed into 28 pages of documents). All of the interviews lasted approximately 20 minutes, and took place in informal and friendly environments, in Vietnamese to ensure their comfortableness.

A later survey was conducted to test hypotheses. Respondents are those who reside in Ho Chi Minh City, Vietnam. We employed a stratified sampling method including four sub-groups: office workers, students, elderly, and businessmen. Out of 350 copies delivered through traditional and online (via social accounts and forums), we filter 50 low-quality responses, then we have an 86% response rate (300 out of 350). These valid responses were analyzed to evaluate reliability, validity, and appropriateness for hypotheses testing. Table 3 provides the demographics of survey participants. Among the 300 respondents, 38 percent were men, and 62 percent were women. Most participants are under 24 (62%) or 24-40 (33%) years old. Further, all of the respondents were highly educated; more than 80 percent of the respondents had a graduate degree. Most respondents were confirmed as single status (82%), and the remaining were married (16%) or divorced (2%). A majority of the respondents (62%) reported their IT Knowledge at a low level, whereas others had an average (26%) or experts (5%) level.

**TABLE 3**  
**SURVEY DEMOGRAPHICS (N=300)**

<i>Demographic Factors</i>		<b>Frequency</b>	<b>Percentage</b>
<b>Gender</b>	Male	113	38%
	Female	187	62%
<b>Age</b>	Under 24	188	62%
	24-40	98	33%
	Over 40	14	5%
<b>Marital Status</b>	Single (Not Yet Married)	246	82%
	Married	49	16%
	Divorced	5	2%
<b>Educational Background</b>	Post-Graduate	22	7%
	Bachelor	99	33%
	College Students	147	49%
	High School	32	11%
<b>Income Level (Monthly)</b>	Low (less than \$120)	97	32%
	Average (\$120-240)	65	22%
	High (more than \$240)	138	46%
<b>IT Level</b>	Low	207	69%
	Average	79	26%
	Experts of IT	14	5%

### **The Retroductive Analysis**

To analyze data, we followed a retroductive procedure suggested by Zachariadis et al. (2013), including 4 phases.

The first phase involves literature reviews. We reviewed extensive articles and academic papers about customers' purchase intentions and behaviors in the baskets of Financial Times Journals (FT50) and AIS e-library. These works help us to determine data sources that need to be collected (e.g., interviews, surveys), extant theoretical schemes (e.g. Theory of Planned Behaviors), and consider how these can facilitate to shape the existing description of the phenomenon.

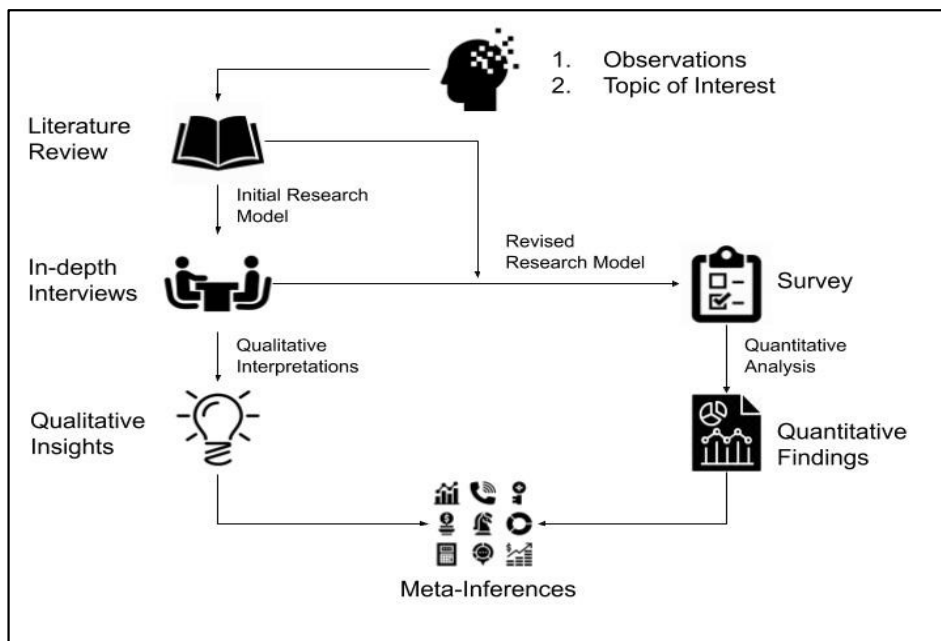
The second phase is the qualitative study. After collected and compiled, the interview responses were coded data by two researchers. We then met to discuss the codes, to ensure we all used the initial labels to mean the same things. First, we analyzed data into several themes based on the available set of constructs in the initial model. The first step is to seek context-specific insights as identified by the informants, in the conceptual language. Our final list includes codes covering a broad set of not only 5 concepts in the initial models but also two new beliefs: security. (e.g. cyber-security and information privacy) and quality of mobile service (e.g. internet connection stability, coverage, and latency).

The next is the quantitative study by survey method. The responses were later analyzed by PLS implemented by SmartPLS 3.0. In the end, we replied to the first research question concerning driving factors of purchase intentions in the domain of 5G smartphones.

The last phase is, that of the actual retroductive analysis of the data, which involves hypothesizing all possible causal mechanisms to explain our quantitative findings. We carried out to combine qualitative and quantitative data, or to produce "meta-inferences". In doing so, we proceeded to recode interview data by classifications theme (Bhattacharjee & Premkumar, 2004), meaning that one code can belong to more than one category. The codes were independently produced by a team of 2 researchers. A code was accepted only if: (1) researchers have the same code with the same meanings/ implications or (2) a consensus was reached if there are any conflicts. Otherwise, we re-coded, and the process was iterated until the final codes were made. We chose the codes based on research questions and constructs under study.

Then, we sought both similar (bridging) and different (bracketing) patterns between qualitative and quantitative strands (Venkatesh et al., 2013). We used convergences between two studies to implement quantitative findings, thus proving that our theoretical foundations are strong and correct (Venkatesh et al., 2016). In contrast, divergence allows us to point out the implicit reasons for hypothesis rejections via proposed causal mechanisms. Figure 2 exhibits our research design.

**FIGURE 2**  
**MIXED-METHOD DESIGN ADOPTED FROM ZACHARIADIS ET AL. (2013)**





## RESEARCH RESULTS

### Quantitative Findings

#### Measurement Model

Convergent validity checks whether “the items for a construct are more correlated with one another than with the items of another construct (Petter et al. 2007).” The criterion of an adequate divergent validity is that Average Variance Extracted (AVE: the ratio of the construct variance to the total variance among items) is greater than 0.5 (Fornell & Larcker, 1981). Table 4 shows that all AVEs reached the minimum threshold, and they ranged from 0.625 to 0.800. This demonstrates adequate divergent validity. Further, the loading values demonstrate a strong correlation between items and their corresponding latent constructs. Moreover, the range of Cronbach’s alpha value is 0.834 to 0.932, which is acceptable (Henseler et al., 2009). Based on Cronbach’s alpha test, we decided to eliminate items such as BI4, BI5 (under Brand Image), SE4 (under Security), and PF4 (under Product Features), which have factor loadings below 0.3 (Field, 2009) and have not used them for further analysis.

**TABLE 4**  
**VALIDITY AND RELIABILITY (N=300)**

Constructs	Loadings	CR	CA	AVE	Constructs	Loadings	CR	CA	AVE
Price		0.906	0.872	0.659	Aesthetic Values		0.924	0.897	0.709
PR1	0.839				AV1	0.809			
PR2	0.812				AV2	0.842			
PR3	0.764				AV3	0.846			
PR4	0.815				AV4	0.870			
PR5	0.827				AV5	0.841			
Product Features		0.898	0.849	0.689	Brand Image		0.905	0.842	0.760
PF1	0.779				BI1	0.872			
PF2	0.893				BI2	0.861			
PF3	0.873				BI3	0.883			
PF5	0.768				Quality of Service		0.949	0.932	0.788
Social Influences		0.893	0.851	0.625	QS1	0.839			
SI1	0.706				QS2	0.931			
SI2	0.834				QS3	0.915			
SI3	0.796				QS4	0.924			
SI4	0.825				QS5	0.823			
SI5	0.786				Security		0.945	0.922	0.811
Purchase Intentions		0.923	0.875	0.800	SE1	0.900			
PI1	0.872				SE2	0.925			
PI2	0.891				SE3	0.897			
PI3	0.920				SE5	0.881			
Customers’ Preferences		0.901	0.834	0.751					
CP1	0.847								
CP2	0.902								
CP3	0.851								

Discriminant validity is defined as the extent to which a construct is distinct from others (Peter et al., 2007). Therefore, a high discriminant validity proves that the construct is unique and captures some phenomenon. Factor loading values between items on other latent constructs are quite low, and all square roots of AVEs are higher than inter-construct correlations. Therefore, all constructs in the research model provided adequate discriminant validity (Fornell & Larcker, 1981). We also verified multi-collinearity by

the variance inflation factor (VIF). In our PLS-SEM model, the VIFs ranged from 1.042 to 2.889. As all VIFs are less than 5 and correlations among variables are less than 0.85. Therefore, there is no multicollinearity problem.

**TABLE 5**  
**AVEs AND CORRELATIONS**

Constructs	1	2	3	4	5	6	7	8	9
1. Aesthetic Values	0.842								
2. Brand Image	0.653	0.872							
3. Customers' Preferences	0.605	0.555	0.867						
4. Product Features	0.422	0.503	0.549	0.830					
5. Purchase Intentions	0.451	0.387	0.699	0.481	0.894				
6. Price	0.610	0.592	0.647	0.504	0.469	0.812			
7. Quality of Service	0.375	0.478	0.476	0.583	0.363	0.489	0.888		
8. Security	0.662	0.661	0.638	0.569	0.369	0.675	0.502	0.901	
9. Social Influences	0.376	0.284	0.368	0.306	0.519	0.441	0.208	0.249	0.791

Notes. The shaded numbers in the diagonal rows are the square roots of AVEs. (n=300)

*Structural Model*

First, we run the controlled models with only demographic variables as independent variables for customers' preferences and purchase intentions (models 1 and 3). Model 1 shows that none of the demographic variables was significant for customers' preferences. However, model 3 shows that marital status and education were significant for purchase intentions. Altogether, these models have a quite low value of R-squared and adjusted R-squared. Then, we entered research constructs, including price, product features, social influences, brand image, quality of services, security, aesthetic values into models 1 & 3 as new independent variables (models 2 and 4). These models offer higher values of R-squared and adjusted R-squared indices. In the next model, we outlined the relationships of all constructs and control variables as the same in figure 1, and base on this model no.5 to test the hypotheses. Within this study, we considered testing both indirect (through customers' preferences) and the direct effects of focal research constructs on purchase intentions.

**TABLE 6**  
**PLS-SEM MODELS RESULTS: STRUCTURAL MODELS (N=300)**

Models	Model 1	Model 2	Model 3	Model 4	Model 5	
Dependent Variables	Customers' Preferences	Customers' Preferences	Purchase Intentions	Purchase Intentions	Customers' Preferences	Purchase Intentions
Control Variables						
Gender	-0.094	0.011	-0.037	0.014	0.009	0.009
Age	0.115	0.090	0.114	0.083	0.089	0.031
Marital Status	0.041	-0.014	0.123*	0.065	-0.017	0.076
Education	0.058	0.030	0.142*	0.099*	0.029	0.083*
Income	-0.079	0.049	-0.041	0.090	0.050	0.058
IT level	0.003	0.030	0.053	0.116*	0.027	0.101**
Independent Variables						
Price		0.245***		0.130	0.243***	-0.020
Product Features		0.146*		0.226**	0.152*	0.136*
Social Influences		0.071		0.351***	0.078	0.304***
Quality of Services		0.078		0.078	0.076	0.028

Security		0.177		-0.112	0.169	-0.209**
Brand Image		0.024		0.010	0.027	-0.007
Aesthetic Values		0.225**		0.208**	0.224**	0.068
Customers' Preferences						0.602***
Models' Comprehensiveness						
R-squared	0.026	0.569	0.048	0.469	0.567	0.620
Adjusted R-squared	0.006	0.549	0.028	0.445	0.547	0.601

\* = p < 0.05; \*\* = p < 0.01; \*\*\* = p < 0.001

In order to assess the significance of proposed relationships, we performed a bootstrapping procedure for model 5 (Tenenhaus et al., 2005). This model explains 60.1% of the variation in purchase intentions. The results show that price (p = 0.797), brand image (p = 0.910), aesthetic values (p = 0.343), and quality of services (p = 0.609) have no significant relationship with purchase intentions because their p-values are all higher than 0.05. Thus, H2, H6, H10, and H12 are rejected. In contrast, product features (p = 0.020), social influences (p = 0.000), and security (p = 0.005) have significant relationships with purchase intentions because their p-values are all less than 0.05. Therefore, corresponding hypotheses such as H4, H8, and H14 are supported. Together, we concluded that factors that have a significant direct relationship with Purchase Intentions encompass product features, social influences, and security.

Similarly, for hypotheses on customers' preferences, we found such results as price (p = 0.000), product features (p = 0.029), brand image (p = 0.693), social influences (p = 0.091), aesthetic values (p = 0.002), quality of services (p = 0.266), and security (p = 0.169). Therefore, corresponding hypotheses such as H1, H3, and H9 are supported while others such as H5, H7, H11, and H13 are rejected. In addition, we also found a significant relationship between customers' preferences (p = 0.000) and purchase intentions. Therefore, factors that have a significant indirect relationship with purchase intentions encompass price, product features, and aesthetic values.

The second research question is to rate the importance of significant factors. We proposed the ranking list based on the total effects of each variable. Specifically, we used path coefficients of relationships between independent variables and purchase intentions as direct effects. Besides, the path coefficients of relationships between independent variables and customers' preferences (mediator) as indirect effects. Then, we combined these effects to generate total effects. The factors with higher absolute values of total effects are placed at higher positions. In addition, insignificant relationships are considered to have a zero effect. As detailed in table 7, social influences, product features, security, price, and aesthetic values were noted with respective descending ranks. We did not rate brand image and quality of service because these constructs do not have any significant effects on purchase intentions or customers' preferences.

**TABLE 7**  
**HYPOTHESES CHECKING, EFFECTS AND RANKING (MODEL 5)**

No	Relationships		P-values	$\beta$	Results	Direct Effect	Indirect Effects	Total Effects	Ranks
H1	PR	→ CP	0.000	0.243	Supported	0	0.146	0.146	4th
H2		→ PI	0.797	-0.020	Rejected				
H3	PF	→ CP	0.029	0.152	Supported	0.136	0.092	0.228	2nd
H4		→ PI	0.020	0.136	Supported				
H5	BI	→ CP	0.693	0.027	Rejected	0	0	0	None
H6		→ PI	0.910	-0.007	Rejected				
H7	SI	→ CP	0.091	0.078	Rejected	0.304	0	0.304	1st
H8		→ PI	0.000	0.304	Supported				

H9	AV	→	CP	0.002	0.224	Supported	0	0.135	0.135	5th
H10		→	PI	0.343	0.068	Rejected				
H11	QS	→	CP	0.266	0.076	Rejected	0	0	0	None
H12		→	PI	0.609	0.028	Rejected				
H13	SE	→	CP	0.108	0.169	Rejected	-0.209	0	-0.209	3rd
H14		→	PI	0.005	-0.209	Supported				
H15	CP	→	PI	0.000	0.602	Supported	0.613	None	None	None

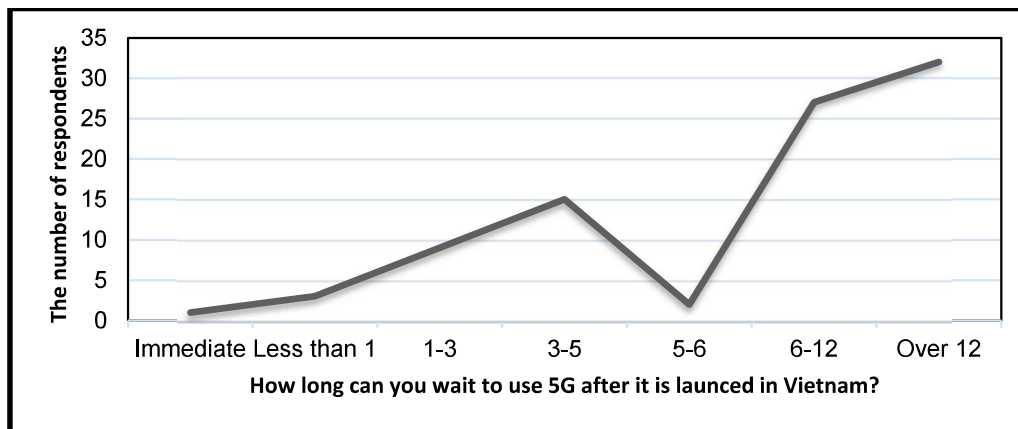
AV = Aesthetic Values, BI = Brand Image, CP = Customers' Preferences, PF = Product Features, PI = Purchase Intentions, PR = Price, QS = Quality of Service, SE = Security, SI = Social Influences; IV = Independent Variables; DV = Dependent Variables.

Anecdotal evidence (n=89) (from open-ended questions in the survey) also provides the required amount of time that smartphone users need to wait to adopt when 5G is officially launched in the market. Overall, most respondents said that they need at least 6 months to accept and update to use 5G services (figure 3). As shared by some survey respondents:

*“Yes [accepted to wait for 5G services to be launched], because the 4.0 technology era make me always desire the new technology trials to update my knowledge about the technology market in Vietnam”*

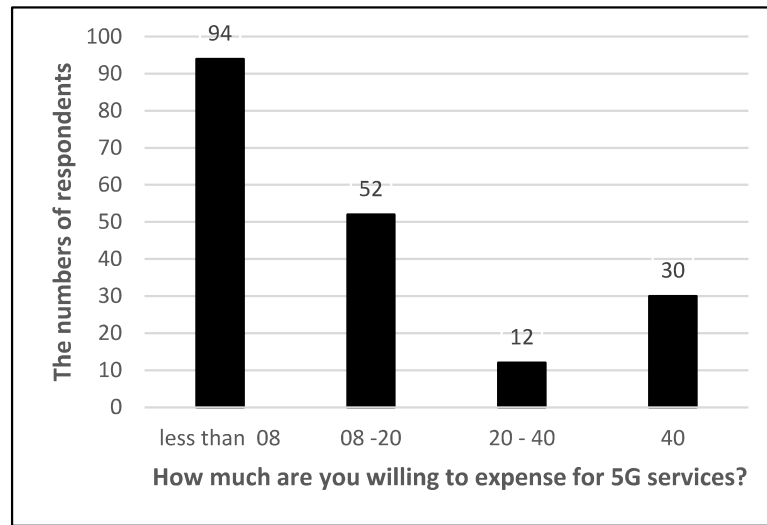
*“No [refused to wait for 5G services to be launched], because it will have lots of error connections or quality services in the early days. I will wait until getting its stability”*

**FIGURE 3**  
**THE REQUIRED WAITING TIME TO USE 5G SERVICES WHEN 5G IS OFFICIAL LAUNCHED (IN MONTHS) (N=89)**



Our survey data also report the adorable monthly using fees of 5G (n = 188). Overall, most participants prefer “less than \$20”.

**FIGURE 4**  
**THE PERCEIVED MONTHLY USING FEES OF 5G SERVICES (IN \$) (N=189)**



**Meta-Inferences: Generative Mechanisms**

The previous section shows the structural relationships between research constructs. Based on the critical realist stance, we considered these quantitative findings as “observed” events in the empirical domain. The next task is to connect them with underlying generative mechanisms in the domain of “real”. In doing so, we looked at interview data again to point out contexts, and generative mechanisms that play as the “implicit reasons” for such quantitative results.

*From Customer Level*

First, we observed that financial restrictions should be one of the generative mechanisms for price-purchase intentions relationships. In Vietnam, general customers’ income is at medium. Estimated by The General Statistics Office of Vietnam, the monthly income for one person in 2018 is approximately \$160, while relevant costs to update to 5G smartphones (e.g. selling price of 5G smartphones, subscription fees of 5G service plans) account for around 10 percent of this amount. This imbalance makes price a major consideration for customers to purchase 5G smartphones.

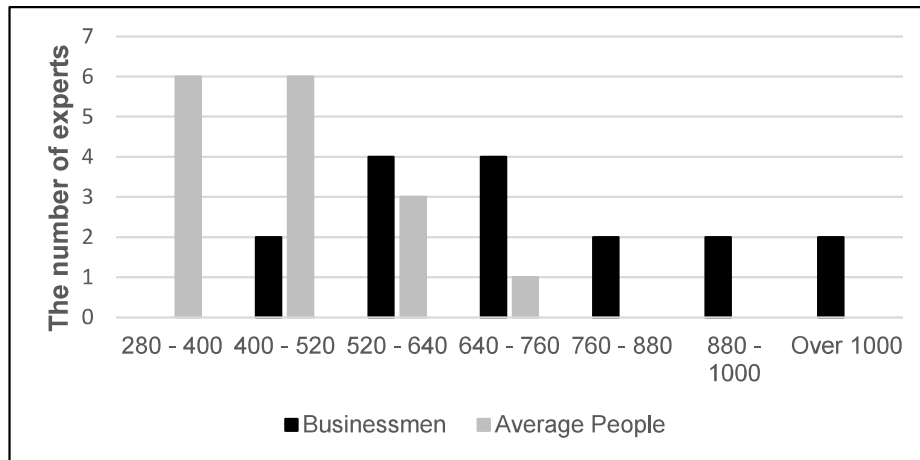
As stated by experts, the price to purchase a 5G smartphone will range from \$280. This amount fits the segmentations for business people only. This adds new challenges for stakeholders in order for their customers to be supported. During our interviews, experts shared that some of the customers usually have to save money or ask for financial supports (e.g. bank loans, promotions, free accessories, vouchers).

*“The price for average people is 7-10 million VND [\$280 – 400] because most of their income is not very high, enough to save and buy a new phone if it is attractive enough for them or the price may be 10 – 13 million VND [\$400-520] with available supports from banks. And the price for business people is from 16-19million VND [\$640-760] because if a smartphone meets such demand for both work and life, it is normal for them” (P15)*

*“...If such a smartphone has too many features as in clip, then I think the price is also high. It will become a smartphone segmentation for business persons, for example....” (P12)”*

The following figure displays the selling price provided by experts for 5G smartphones.

**FIGURE 5**  
**ADORABLE PRICE OF 5G SMARTPHONES (IN \$)**



Second, another issue that emerged from the testimonies of our interview informants is that customers were not satisfied with the current services (3G/4G). These services, for them, include several shortcomings regarding its quality, such as low speed, unstable Internet connections, and limited coverage ability. Over time, getting used to these unqualified service plans establishes customers' incorrect perceptions towards high-tech mobile networks. These incorrect conceptions are even further reinforced by the lack of IT profound understanding of these customers. As a result, they were easy to consider 5G as the same. This is illustrated as:

*“I am not satisfied with two things. Firstly, when I travel to remote areas like the highland or mountainous, I cannot catch the 3G or 4G or only catch with very weak and slow 3G, 4G. Therefore, I cannot update the news, surfing the Internet, watch the movies as I like when traveling...” (P21)*

*“I hope that 5G can solve the problems, which I also want, that is the strong level of bandwidth (broadband) and wide range, but not like the 4G generation, which is not different from 3G.” (P13)*

*“5G is still strange and too knowledgeable for most of the people. It needs the government to invest much time, money, resources in education, and training the engineers and staff for the 5G revolution. Users also need to upgrade their knowledge about high technology to adapt and use 5G.” (P22)*

Third, Vietnamese customers have a common habit before purchasing or accepting technological innovation. That is, they prefer to experience that innovation as a trial. From that, they build their trust. However, 5G smartphones were yet available in the market. Thereby, customers were not certain about the 5G network performance.

*“... To be ready to spend a large amount of money on a new smartphone generation, they must perceive enough trust in its performance, because, in fact, they need to experience it to accept it...” (P13)*

Fourth, social factors are determined to be one of the mechanisms influencing the making-decision process. Smartphone users stated that their purchasing power is sometimes controlled by financial supports

from family. In return, they need to respect or even follow the preferences of their family to purchase smartphones or subscribe to a mobile service plan.

*“Now my mother is the person who has the most influence on my smartphone purchasing decision because she gave him the money to buy the smartphone. I don’t earn the money by myself now.” (P23)*

Other heavy users, who are considered financially independent, claimed that they purchase smartphones just because of their motives, and nobody can govern their decisions. However, they need to refer to reliable sources as their IT knowledge is not sufficient to evaluate whether a smartphone is good and fashionable. For instance:

*“Now, that is me who influence my decision. I can purchase by my-self. And I am influenced by advertising and only it. But, coming to smartphone shops, I consider the novelty, configuration, and strength level of smartphones. Because I understand technology not very well, so if the salesmen introduce the smartphone as having a lot of features, I will be attracted. Novelty means it is beautiful, new, and strong.” (P25)*

*“No one influences my decision, it depends on the demands... Yes. It was TinhTe forum. I read online news and got the information on the forum. The forum always tests the products before commenting and writing a paper” (P26)*

It is worthy to note that seeking the information process of heavy users also affected by social factors. In fact, they frequently refer to reviews of previous smartphone users from technology websites, social networking sites (e.g. Facebook, Youtube), or blogs for innovative information. From that, they gather essential information about smartphones thus resulting in an impact on their preferences. For instance:

*“I like the advertisement on Facebook and Youtube because it allows me to see many comments from current and experienced smartphone users about many kinds of smartphones. Their judgments and advice are beneficial to me. Based on them, I can know which brands, kinds of smartphones are good, which one is the best, and decide whether to buy the smartphones.” (P22)*

*“In the future when I have the job and earn money by myself, the technology communities will have the most influences on my purchasing smartphone decision because I can see the opinions, advises judgments and comments on brands, kinds of smartphone from the review of users, bloggers as my preference in making a purchasing decision.” (P23)*

Fifth, the Vietnamese loves to synchronize their smartphones with their daily routines. Apparently, available smartphone series are unable to meet this desire. However, 5G-enabled smartphones are expected to meet this demand as 5G specifications allow them to run modern bundle applications, such as e-health analysis, self-driving, IoT applications, e-banking systems, etc. For experts, these technical benefits increase customers’ impressions or even play as a pulse to turn them into first movers. This explains causal paths between product features with customers’ preferences and purchase intentions. As shared:

*“...After the clip, I found that the most attractive service for the Vietnamese market is the high speed of downloading movies. Vietnamese people use smartphones for entertainment a lot, but 4G does meet that demand.” (P15)*

*“For me, the service that attracts customers the most here is that the access speed of 5G is faster than the fiber cable, the 5G's coverage is wide across the regions. In addition, I*

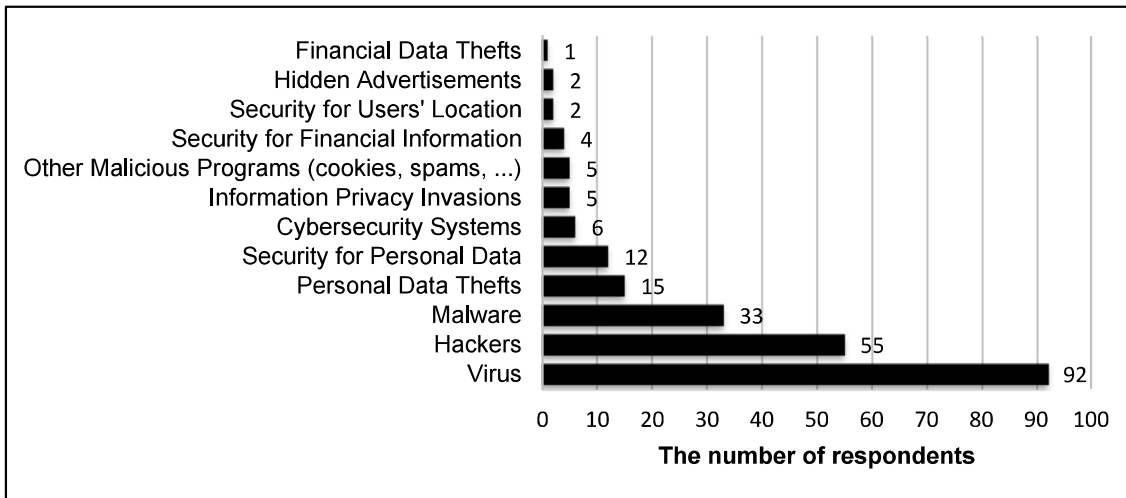
*think the service which attracts the customer is that they can pay through a distinct app for smartphone 5G, in which cash is not required. This is quite convenient and I myself also like this. Moreover, the integration of users' health analysis is quite fascinating.” (P12)*

Sixth, customers generally face an important dilemma between enjoying the benefits of digital technology and being concerned about the privacy of their personal information. As mentioned earlier, this general paradox has also emerged from our interview data. Experts stated that most of their customers love to experience new high-tech applications. However, some of these individuals, especially business persons, frequently store personal and sensitive private data locally by their smartphones. Once these types of information outflows with malicious purposes, these customers must face financial and reputational losses. Hereby, the fear of this data-leaking creates their sensitivity to IT threats for all kinds of digital devices, not only smartphones. For them, money is not a big deal as long as their private data to be ensured. For instance, they are willing to expend more in order for software (e.g. anti-virus applications, passwords, etc.) in order for their privacy to be protected. Therefore, cyber-security for users' information privacy emerged as prime challenges for purchasing 5G smartphones because the 5G network can rise such threats. One of the experts regarded this as:

*“... I think generations of smartphones need to implement security because most customers are business people. Therefore they need to secure data. Thus, a smartphone that meets that criteria can be perfect for encouraging them to be willing to spend much money.” (P13)*

The following figure exhibits the security concerns of our survey participants.

**FIGURE 6**  
**SECURITY CONCERNS (n=174)**



The final underlying mechanism is confirmed by experts. They stated that some of their customers purchase smartphones as gifts for e.g. girlfriend, children, etc. thus aesthetics of smartphones is something important for them. Others buy smartphones just to follow a “hot” trend (i.e. a contemporarily popular trend) within society or their communities. And, these trends are often tied with specific aesthetic characteristics such as colors, shapes, designs. Altogether, these facilitate aesthetic values to remain significant for customers' preferences. For instances:



*“The price for average customers is 7-10 million VND [\$280-400] because most of them have income at medium level and moreover, their needs for changing phones is mostly due to HOT, not because they want to experience technology....” (P12)*

#### *Organizational Level*

The core issue places at services offered by current Telecom firms. They offered poor-quality services for subscribers. This practice directly damages their reputations thus image. This is why we found that brand image is not a significant driver of either customers’ preferences or purchase intentions.

Deploying 5G networks, for experts, are crucial for the national economy but it may take a long time and require both the human resources of engineers and staff. The data intensity of the 5G requires a high-capacity and powerful telecom infrastructure. Yet, the current Vietnamese telecom infrastructure is not technically powerful enough to run this 5G network. From these technology limitations in terms of both necessary knowledge and infrastructure, Quality of Service becomes insignificant although it is expected to be significant by experts. For instance:

*“To manufacture, control and run 5G systems, it requires the engineers and staff who are experts at high technology and have great knowledge about telecommunication because now most of us only use 3G and 4G in the world.” (P22)*

*“Internet infrastructure will be very important, but it is also hard to synchronize because once the technology changing happens, there will be a very harsh and long run.” (P26)*

Table 8 summarizes the relations of contexts and underlying mechanisms in order to create quantitative findings.

**TABLE 8  
CONTEXTS, MECHANISMS, AND EMPIRICAL FINDINGS**

<b>Mechanisms</b>	<b>Empirical Findings</b>	<b>Contexts</b>
Preferences of social influencers will encourage customers to purchase smartphones	Social Influences have a direct effect on Purchase Intentions: $\beta_1=0.304^{***}$ ; $\beta_2=0.065$ Social Influences place at the first rank: total effect = 0.304	Customers often seek advice from previous users through technology websites, blogs, social networking sites (e.g. Facebook, Youtube). Family sometimes controls customers' purchasing powers through financial supports. Advice from salesmen is sometimes useful as customers understand IT not very well. Some customers purchase smartphones with their interests. However, they seek information via reliable individuals.
Meeting users' needs could improve users' impressions or plays as an impulse to turn them into “first movers”.	Product Features have both direct and indirect effects on Purchase Intentions: $\beta_1=0.136^*$ ; $\beta_2=0.152^*$ Product Features place at the second rank: total effect = 0.228	Current smartphones failed to meet customers' needs to synchronize their smartphones with daily life thus create a technology desire. 5G smartphones with modern bundle applications can satisfy this need.

Fears of related losses due to important and personal data leakage will discourage users to purchase smartphones.	Security has a direct impact on Purchase Intentions, but it takes a negative effect: $\beta_1 = -0.209^{**}$ ; $\beta_2 = 0.169$ Security places at the third rank: total effect = -0.209	Vietnamese, especially business persons, frequently store vital information in smartphones. Once these types of information outflows with malicious purposes, these customers must face financial and reputational losses.
The price-goodness paradox will significantly affect customers' decision-making.	Price has an indirect impact on Purchase Intentions: $\beta_1 = -0.020$ ; $\beta_2 = 0.243^{***}$ Price places at the penultimate rank: total effect = 0.146	The imbalance between income level and selling price of smartphones or subscription fees for service plans constrain customers to the expense.
Social trends are often linked to some aesthetic characteristics.	Aesthetic Values have an indirect impact on Purchase Intentions: $\beta_1 = 0.068$ ; $\beta_2 = 0.224^{**}$ Aesthetic Values place at the last rank: total effect = 0.135	Customers purchase smartphones due to novelty, "hot" level, following current social trends. Besides purchasing for themselves, customers also use smartphones as gifts. Thus, aesthetic aspects (e.g. colors, designs, shapes) were the customers' concerns about their smartphones.
The consequences of offering poor services make users unsatisfied thus break their trust in the brand.	Brand Image has an insignificant impact on customers' Purchase Intentions.	Current telecom firms provide poor services for users (e.g. low speed, limited coverage, unstable Internet connection).
Negative prejudice towards 5G will restrain customers to update 5G.	Quality of Services have an insignificant impact on customers' Purchase Intentions	Offering poor services associated with the lack of IT profound knowledge of the general customers creates a wrong perception of the high-tech mobile network for users. As a result, they consider 5G as the same.
Using experiences are essential to make customers trust in network performance.		5G has yet to be launched in Vietnam. Thus, customers cannot experience before purchasing.
Note. (*) = $p < 0.05$ ; (**) = $p < 0.01$ ; (***) = $p < 0.001$ ; $\beta_1$ , $\beta_2$ are the coefficients between research constructs, and Purchase Intentions and Customers' Preferences, respectively.		

### Enhanced Research Model

After conducting a deeper analysis of contradictions and similarities between two research strands (qualitative versus quantitative), we obtained two new constructs (e.g. perceived usefulness and perceived ease-of-use) which should be added to the purchase intention model.

#### *Perceived Usefulness*

In qualitative research, experts stated that their customers need a smartphone that is suitable for their works. Customers prefer innovations that can integrate daily life and works. As one expert stated:

*“The price for average people is 8-11 million because their income is at this level and they look forward to getting closer to modern technology life. For businessmen, it is about 14-*

*19 million because they need to combine the works, and if the smartphone meets that.”*  
(P13)

Furthermore, one businessman shared that using a smartphone and mobile services mainly devote to working requirements such as communications with clients. One heavy user, as a businessman, mentioned:

*“I am using the Internet to connect with customers for their demand immediately because I am working on real estate, so it is essential when the customer can see a house right at that time. They will be more convinced and feel more reliable. I have bought smartphones so far without any influence from anyone. It depends on my demand.”* (P26)

Situating our analysis within the IT adoption literature, we found out that this mainly relates to one construct, namely Perceived Usefulness in many IT adoption models (Davis, 1989; Venkatesh, 2000; Venkatesh & Bala, 2008; Venkatesh et al., 2003; Venkatesh et al., 2012). Specifically, Perceived Usefulness refers to how applying innovations can help enhance working performance. Also, some prior authors have employed perceived usefulness to investigate user adoptions of 4G (Rawashdeh, 2015; Aziati et al., 2016). Therefore, we posit that perceived usefulness is a construct that necessitates adding to the proposed research model.

#### *Perceived Ease-of-Use*

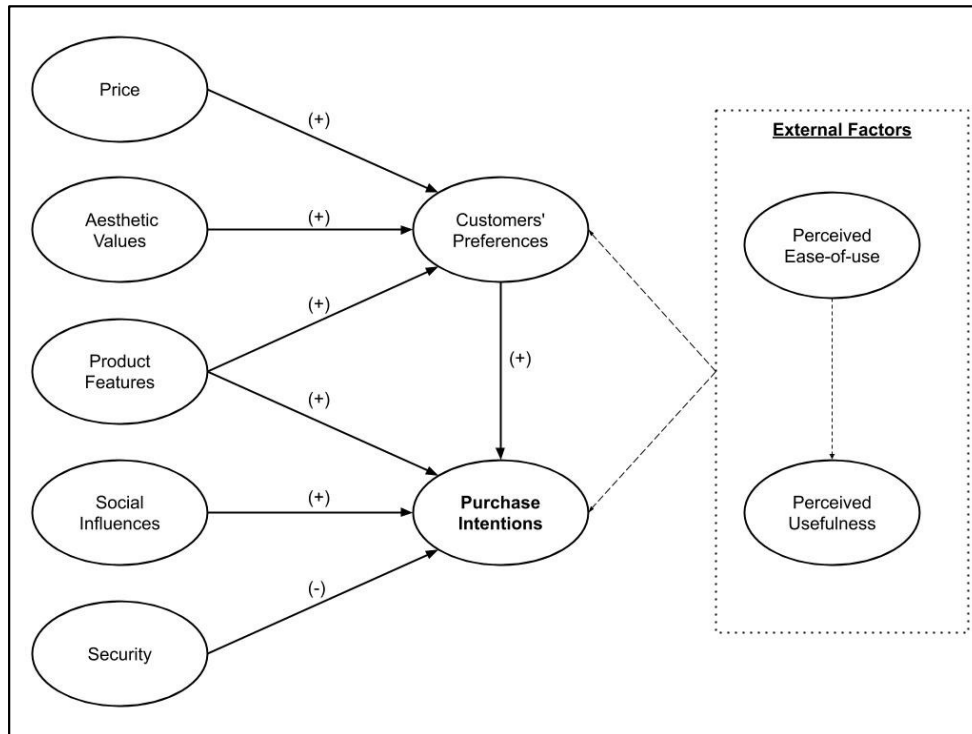
Another construct was emerged by qualitative interpretations is Perceived Ease-of-Use. As stated by experts, users will purchase such smartphones with an understandable interface that makes them comfortable. As one expert concerned:

*“Whether their innovations are straightforward to do or apply in real life. Moreover, whether the interface makes the users being comfortable...”* (P16)

Along with perceived usefulness, perceived ease-of-use is also one of the classic technology use characteristics described in IT adoption models (Davis, 1989; Venkatesh, 2000; Venkatesh & Bala, 2008; Venkatesh et al., 2003; Venkatesh et al., 2012). In those IT adoption models, Perceived Ease-of-Use is a construct that implies to which extent using technology requires fewer mental efforts. Recent works have also used perceived ease-of-use to examine 4G services (Rawashdeh, 2015; Aziati et al., 2016; Ong et al., 2008). In the case of Vietnamese users, the 5G networks are still strange and complicated. So, we argue that Perceived Ease-of-Use is also another indicator of Purchase Intentions.

All in all, we extensively outlined the paradigm of purchase intentions for 5G smartphones as follows (figure 7)<sup>3</sup>

**FIGURE 7**  
**ENHANCED MODEL OF PURCHASE INTENTIONS FOR 5G SMARTPHONES**



**DISCUSSION**

**Theoretical Implications**

There are three main theoretical implications for this research. First, this research showed that four common motivational factors, including social influences, price, aesthetic values, and product features, were significant drivers of purchase intentions for 5G smartphones. This is in line with prior studies (Rahim et al., 2016; Kiseol & Judith, 2013; Seonget al., 2016; Lim et al., 2013; Mohd Suki, 2013; Ayodele & Ifeanyichukwu, 2016; Osman et al., 2012; Leelakulthanit & Hongcharu, 2012; Toufani et al., 2017; Kim et al., 2016). However, these results reflect a deeper understanding as the conceptualization of these constructs was adjusted to cover both handset and telecom service characteristics. This bridged the gap in current literature, while handset and telecom services are inclined to be kept separately.

However, we fail to predict the causal relationships of brand image. Although this finding differs from the prior studies on purchase decisions (Nusrai et al., 2018; Funnisia et al., 2018), it is consistent with the studies on smartphone purchase intentions in developing countries whose socio-economic conditions are similar to Vietnam (general customers: Haba et al., 2017; young customers: Alrwashdehet al., 2019; Kaushal & Kumar., 2016). This can be explained by the generative mechanisms. That is, users are extremely unsatisfied and untrusted in any Telecom services (3G/4G) offered by current Vietnamese telecom firms.

Second, we submit a new construct, thus bringing a fresh perspective of how cyber threats can inhibit purchase intentions, to smartphone purchasing literature. Starting from experts' experiences, we conceptualized this construct by adapting the concepts of cyber risks (Das & Khan, 2015) to account for users' psychological concerns regarding potential threats for users' information privacy in the context of 5G smartphones. However, we also leveraged the firms' actions to protect their customers' privacy into their conceptualization. Thence, we found that security was proved to negatively and significantly influence customers' intentions. This aligns with the work done by Chin et al. (2012), Sujata et al. (2016); Bringula et al. (2018); Alsaleh et al. (2017). This is because users tend to be uncomfortable if the physical or tangible

boundaries for safeguarding their information is threaten (Stanton, 2002; Stanton & Weiss, 2000, 2003). Also, we delved into this empirical finding by uncovering the interplay between underlying mechanisms (e.g. the apprehension of cyber threats) and contextual conditions (e.g. habits of storing important information by smartphones).

Unfortunately, quality of services was found as insignificant for both customers' preferences ( $\beta = 0.076$ ,  $p > 0.05$ ) and purchase intentions ( $\beta = 0.028$ ,  $p > 0.05$ ). This is in contrast to previous studies (Eizan & Omar, 2013; Tapanainen et al., 2018). By context-specific insights from interview data, we can explain this finding by offering poor services from current providers in the Vietnamese market (showed in our meta-inferences). However, these findings do not necessarily reflect that quality of services is not important for customers as data are collected in not *experiencing* but *viewing* settings. Teh et al. (2014) found that direct experiences appear to remove users' sense of complexity, which expert informants considered as a major barrier to adoption. Within our study, survey participants built their understandings of 5G via open sources such as new papers, search engines, social relationships, and so on. These sources afford users' viewing but not experiencing. Also, the percentage of those who are conversant with IT innovations in Vietnam is not very high, so it implies that these participants possibly have false perceptions towards such a high-tech mobile network as 5G. Therefore, the opposite results are possible to be found in future studies for 5G with similar contexts.

Third, we bring in the Critical Realism paradigm, a philosophical stance from recent IS studies, to consumer behavior literature. Hence, we go beyond the traditional views in the literature by not only pointing out the structural relationships but also delving into the underlying mechanisms, contextual conditions that cause such relationships. Hinging on interview data, we consider implicit reasons as mechanisms that do not directly determine the outcomes (as described in Table 7). These mechanisms perform their powers to cause structural relationships as they interact with other entities (contextual conditions). Further research can use these mechanisms in other similar contexts. We intentionally view this paper as one empirical evidence for the essence of the CR approach, which is geared towards mixed-method research projects (Zachariadis et al., 2013).

### **Practical Implications**

Our results pose many practical implications for practitioners. From the marketing perspective, while Martins et al. (2019) explored what should and should not deliver to customers, we complement their ideas by suggesting that social influencers can be a possible channel to advertise smartphones. These individuals include friends, family members, and influential persons. By increasing their preferences, customers' purchase intentions can be directly increased. This idea is partially geared towards influencer marketing, which is widely applied in businesses.

From customers' perspectives, we augmented Malc et al. (2016) by showing what can reduce the negative effects of price fairness. As burdened by customers' low income, firms may resort to low pricing strategies for 5G smartphones, such as cheaper using fees, discounts, free accessories, installment plans. Simultaneously, qualified smartphone features and aesthetic designs are needed to offer. However, firms should provide customers with material supports, such as information-intensive instructions for use, user-friendly interfaces, to avoid "ease-of-use" problems.

Additionally, stakeholders also need to reduce customers' psychological emotions (fears or stress). One of the possible solutions to mitigate these apprehensions is to utilize users' perceptions of such threats (e.g. hackers, personal information leaking and appropriating, malicious software such as viruses or malware, etc.). In particular, the clarity of these threats will reduce customers' worries (Liang & Xue, 2009). For Government, it may take efforts to educate people about 5G networks to increase users' self-efficacy. The syllabus of these programs should include the serious consequences of cybersecurity threats, and how to prevent them from occurring. The dosage of their educational programs should be taken into account to ensure that they lead to appropriate levels of threat perceptions in Vietnamese citizens. For business stakeholders (e.g. smartphone makers/sellers, telecom providers), it may need to provide safeguarding measures (e.g. anti-virus software, security patches) associated with a new series of smartphones.

Also, our study shows that only product features, security, and social influences have direct effects on purchase intentions, while price and aesthetic values do not, and more importantly, fall to the bottom of the ranking list. These findings, therefore, indicate that firms could weigh social influences, security, and product features more than price or aesthetic values in order to effectively maximize customers' purchase intentions. This is essential for such firms with limited internal resources, which constrains them to focus on all the five motivational factors above, in ascertaining what to sacrifice and what to keep.

### **Limitations and Future Directions**

Our research has a few limitations. First, we used purchase intentions to predict purchase behaviors. This theoretical link is, however, not very good as intentions are time-variant (Benbasat & Barki, 2007; Bagozzi, 2007; Ajzen, 1991; Brehm, 1956; Sharot et al., 2009; Coppin et al., 2010). Second, we conducted our study in Vietnam, thus hardly overcoming cultural and economic disparities. Future studies are recommended to complement and compare the findings. Third, we succeeded to disclose generative mechanisms but failed to filter them. Future works are suggested to assess our mechanisms (Hubbard & Lindsay, 2013). Finally, we hope future works refine our model by adding new variables (such as perceived usefulness, perceived ease-of-use, experiences, trusts, etc.) or new relationships between constructs. In this regard, we strongly recommend the use of the Technology Acceptance Model (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology 2 (Venkatesh et al., 2012).

### **CONCLUSION**

The purpose of the paper is to explore what will induce customers to purchase 5G smartphones in the future. To achieve this end, we carried out mixed-method research under the critical realism paradigm. Through a sample of 300 Vietnamese respondents, we empirically found five significant factors that contribute to the purchase intentions of 5G smartphones: Social Influences, Product Features, Security, Price, and Aesthetic Values with the descending respective ranking. The interviews of 17 informants offer cues including implicit reasons leading to the significance of these factors. Our PLS-SEM results report that social influences, security directly affect customers' intentions to purchase 5G smartphones. Meanwhile, price and aesthetic values only influence their preferences thus resulting in an indirect effect on their intentions. And, product features were found to have both direct and indirect effects. Only Security negatively affects customers' purchase intentions; the other constructs were found as positive indicators. Altogether, the findings revealed that customers will prioritize positive judgments from others, and the advanced features rather than price and aesthetics when it comes to such high-tech products as 5G smartphones. Besides, customers are not willing to risk their information privacy. These are essential guidelines for stakeholders in justifying their focuses.

### **ACKNOWLEDGEMENT**

This work was granted by the Ministry of Science and Technology (MOST), no108-2410-H-130-047. An earlier version of this paper was presented in 2019 The Seventh Taiwan Summer Workshop on Information Management (TSWIM 2019).

### **ENDNOTES**

1. Exceptions include DeMatos et al., (2014) in discussing the effect of peer influence in the diffusion of the iPhone 3G over a large social network.
2. All heavy users agreed to be video-recorded. However, some experts denied it but they still agreed for the researcher to take notes.
3. Dash arrows implicate the constructs/relationships that need to be statistically tested.

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**APPENDIX**

**APPENDIX A  
INTERVIEWEES' PROFILES**

Exper Group: Smartphone Salesclerks and Managers						
No	Age	Gender	Workplaces	Position	Experiences	Interview Date
P11	29	Male	1. The Gioi Di Dong 2. Vien Thong A 3. Hnam Mobile	Sales Manager	4 years	Aug 04, 2018
P12	28	Male	1. The Gioi Di Dong 2. Hnam Mobile	Sales Staff	3 years	Aug 04, 2018
P13	32	Male	Hnam Mobile	Sales Manager	2.5 years	Aug 06, 2018
P14	28	Male	1. The Gioi Di Dong 2. Cellphone S	Staff	Over 1.5 years	Aug 09, 2018
P15	30	Male	The Gioi Di Dong	Branch Manager	2.5 years	Aug 09, 2018
P16	28	Female	The Gioi Di Dong	Sales Manager	2 years	Aug 21, 2018
P17	26	Female	The Gioi Di Dong	Staff	2 years	Aug 21, 2018
P18	26	Male	The Gioi Di Dong	Sales Manager	1.5 years	Aug 25, 2018
P19	31	Male	1. The Gioi Di Dong 2. Cellphone S	Sales Manager	Over 2 years	Aug 26, 2018
Heavy User Group: Students and Businessman						
No	Age	Gender	Job	Channels	Spending	Interview Date
P21	22	Male	Student/ Gamer	Sound call	300 or 12,77	Sep 20, 2018
P22	21	Male	Student/ Gamer	Sound call	335 or 15,19	Sep 20, 2018
P23	21	Male	Student/ Gamer	Sound call	357 or 15,19	Sep 21, 2018
P24	21	Male	Student/ Gamer	Sound call	480 - 957 or 20,43 - 40,72	Sep 21, 2018
P25	20	Male	Student/ Gamer	Face-to-face	96,5 or 4,11	Oct 03, 2018
P26	34	Male	Businessman	Sound call	650 or 27,66	Sep 23, 2018
P27	22	Male	Student/ Gamer	Sound call	400 or 17,02	Sep 24, 2018
P28	21	Male	Student/ Gamer	Face-to-face	300 - 350 or 12,77 - 14,89	Sep 24, 2018
<ol style="list-style-type: none"> <li>1. Spending stands for “Monthly Internet Spending”, and is presented as “1000 VND or \$1”.</li> <li>2. For Informants P25, he willing to spend much money on updating new software although his monthly spending is quite low.</li> </ol>						

**APPENDIX B  
VALIDITY TYPES IN QUALITATIVE STUDY**

Validity Type	Descriptions	How we ensure
Design Validity	How qualitative research is designed and administered so that the research can ensure transferability and credibility (Venkatesh et al., 2013)	In this study, we ensure the design validity by careful selection of participants (two groups of informants, see Appendix A) from two distinct aspects (business versus users) and giving them the freedom to share their thoughts.
Analytical Validity	Analytical validity includes all criteria to defend data when they are challenged and encompasses theoretical validity and plausibility, dependability, and consistency (Venkatesh et al., 2013; Venkatesh et al., 2016).	In the qualitative study, we ensured analytical validity by rigorous application of methods and data interpretation. Therefore, we collected high-quality data and our data analysis, as well as reporting, was rigorous (Guba & Lincoln 2005; Ridenour & Newman 2008; Venkatesh et al. 2013).
Inferential Validity	Inferential validity refers to “the quality of interpretation that reflects how well the findings can be confirmed or corroborated by others (Venkatesh et al., 2013).”	Information from qualitative data helps us to refine the theoretical model, supplement quantitative findings, and propose implicit reasons for quantitative structural relationships.

**APPENDIX C  
ITEMS USED IN QUESTIONNAIRE**

Variables	Items	Statements in the Questionnaire	References
Price	PR1	Selling price is a major concern when I purchase 5G smartphones.	Cheong & Park, 2005.
	PR2	The fluctuation of the 5G smartphones’ selling price is also my concern when purchasing it.	Cheong & Park, 2005.
	PR3	The difference between the selling price of the 5G smartphone and other non-5G smartphones is one of my concerns when I purchase a 5G smartphone.	Grewal et al, 1998
	PR4	Price policies (promotion, free accessories, purchase on credit with 0% interest rate, free SIM card) is one of my concerns when I purchase a 5G smartphone.	Self-developed
	PR5	Additional cost policies (service fee, maintenance, fixation) are one of my concerns when I purchase a 5G smartphone	Self-developed
Product Features	PF1	The groundbreaking features of 5G smartphones (durability, stability, unlimited Internet connection, power-saving supply) have influenced my decision to buy them.	Chow et al., 2012
	PF2	The groundbreaking 5G applications (E-health, online paying, Self-driving cars, E-Agriculture, Industrial IoT and smart factories, Smart city, Sensor network, Tactile internet) in my life influenced my decision to start using 5G.	Self-developed
	PF3	IoT applications that come with 5G services make me want to switch to 5G smartphones.	Self-developed
	PF4*	The disadvantage of being easily compromised and attacked	Self-developed

		by cyber threats (virus, malware, hackers, etc.) is the factor that I care about when buying 5G smartphones.	
	PF5	The operating system of a 5G smartphone is what I most consider when buying it.	Chow et al., 2012
Quality of service	QS1	Superb high speed of 5G drives me to buy 5G.	Kim et al., 2007
	QS2	Internet connection stability of 5G services drives me to buy 5G smartphones.	Khan & Afsheen, 2012.
	QS3	The broader bandwidth of the 5G mobile network drives me to buy 5G smartphones.	Khan & Afsheen, 2012.
	QS4	Unlimited coverage of 5G service drives me to 5G smartphones.	Khan & Afsheen, 2012.
	QS5	Extremely low latency drives me to buy 5G smartphones.	Warren & Dewar, 2014
Social influence	SI1	Advice from surrounding people (families, friends, etc.) will affect my decisions to purchase 5G smartphones	Pedersen, 2005.
	SI2	Having a 5G service from colleagues, friends, etc. affects my buying decision regarding purchasing 5G smartphones.	Pedersen, 2005.
	SI3	My family is the most influential people that affect my buying behavior on 5G smartphones.	Pedersen, 2005.
	SI4	My community's trend influences	Self-developed
	SI5	Celebrities' attitude toward 5G smartphone (singers, models, actress, etc)	Self-developed
Security	SE1	I like to choose and use the service with a high level of cybersecurity.	Chin et al., 2012.
	SE2	I care about the responsibility of service providers to ensure safety and cybersecurity for users.	Self-developed
	SE3	Measures to protect and ensure the safety of customers' personal information are very important to me when deciding to buy and use 5G smartphones.	Das & Khan, 2015.
	SE4*	Problems pertaining to the safety and security of personal information prevent me from buying and trying 5G smartphones.	Das & Khan, 2015.
	SE5	The actions from the 5G smartphone makers to prevent the spread of leaked customer information is also a plus when choosing to buy and use 5G phones.	Self-developed
Brand Image	BI1	I prefer to purchase 5G smartphones from famous and prestigious firms.	Chow et al., 2012
	BI2	I always trust in well-reliable brands when I buy a smartphone, and 5G smartphones are not an exception.	Chow et al., 2012
	BI3	The reputation of 5G smartphone manufacturers is valuable for me to purchase a 5G smartphone.	Self-developed
	BI4*	Owning a 5G smartphone and service from a well-known telecom firm will upgrade my social status, thus it increases my interest.	Self-developed
	BI5*	The brand of 5G smartphones manufacturer reflects its quality.	Grewal et al, 1998
Aesthetic Values	AV1	The colors of a 5G smartphone affect my buying intentions.	Toufani et al, 2017.
	AV2	The shape of a 5G smartphone is something that I truly care about when buying it.	Toufani et al, 2017.

	AV3	The texture is vital for me when buying a 5G smartphone.	Toufani et al, 2017.
	AV4	The design of a 5G smartphone stimulates me to buy it.	Toufani et al, 2017.
	AV5	The beauty of a 5G smartphone has a proportional influence on my use and need.	Toufani et al, 2017.
Customers' Preferences	CP1	5G breakthrough functionalities impress me a lot.	Self-developed
	CP2	Purchasing of 5G smartphones and services is beneficial for my daily life.	Venkatesh et al., 2012
	CP3	I will talk about 5G smartphones and services with my friends because of their fantastic functionality	Hyuk Jun & Margaret, 2008
Purchase Intention	PI1	I will look for more information about 5G and look forward to seeing the release of 5G in the market this year.	Celuch et al., 2007.
	PI2	I will definitely purchase 5G smartphones and services once it is released.	Toufani et al, 2017.
	PI3	I will suggest friends/ family upgrade 5G smartphones and services after the infrastructure is launched.	Self-developed.
(*) Items that were deleted after Cronbach's Alpha Test.			