Exploring Customer Relationship Management through Technology-enabled Experience in Virtual Environment: The Era of COVID-19

By

HAN, Seung yeon

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Submitted to

KDI School of Public Policy and Management

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ABSTRACT

Purpose of the study: The purpose of the study is to explore the application of introducing Augmented Reality (AR) technology to interact with customers and to enhance decision making via technology-enabled experience particularly needed in the context of COVID-19. **Fill the gap**: The current research tries to contribute to the extant literature on customer behavior with AR technology by examining not only perceived utilitarian value and perceived hedonic value but also perceived social value and perceived risk on customer satisfaction as well as by investigating potential AR users' customer behavior, which has not been studied much yet. **Research Question**: The study tries to answer the two questions: (1) How do customers' perceived values and perceived risk of AR functions affect customer satisfaction respectively? (2) How does customer satisfaction affect purchase intention and customer loyalty respectively? **Methodology**: The research applies factor analysis and regression analysis to test the hypotheses and employs ANOVA and mediation effect analysis to explore additional findings. **Major findings**: The results of the main regression analyses show that customers react more strongly to benefits of AR technology that are helpful to their functional consumption than to other dimension of benefits. **Implications**: The findings of the study provides managerial and policy implications to develop and advertise the introduction of AR technology with the emphasis on the practical and utilitarian benefits of the technology. The result of this paper will highlight the importance of customer relationship management by providing advanced services to customers through AR technology.

Key Words: Customer Relationship Management (CRM), Experience marketing, E-commerce, M-commerce, Augmented Reality (AR), Virtual Reality (VR), Metaverse, COVID-19, Customer Satisfaction, Purchase Intention, Customer Loyalty

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I. Introduction

Since e-commerce has emerged after the development of information and communication technologies (ICT), firms have implemented multichannel strategies in order to provide benefits of using both offline channel and online channel to customers. Customer could experience products physically through offline channel, while they could enjoy relatively greater amount of information through online channel. In this way, both channels existed together to make customer experience as smooth as possible in customers' decision making processes (Schoenbachler & Gordon, 2002). Extant literature show that multichannel integration strategically important for firms because multichannel customers show higher customer loyalty to the brand compared to customers who shop through single channel (Kumar & Venkatesan, 2005). The recent COVID-19 pandemic has expanded the market size of e-commerce as it has led customers to minimize physical contacts in their purchases. According to Statistics Korea (2020), the online shopping transaction value has increased from 12.4 trillion won to 14.2 trillion won between January 2020 and October 2020.

However, customers' intention to shop online is negatively influenced by their perceived risks of using online channel (Javadi, Dolatabadi, Nourbakhsh, Poursaeedi, & Asadollahi, 2012), so the key of e-commerce marketing in this trend of digital transformation is to maximize customer relationship management by making online customer experiences of the products close to the real-life experiences. Augmented Reality (AR), Virtual Reality (VR), or Mixed Reality (MR) technologies are examples of the most recent applications of advanced technologies that have drawn people's attention to meet customers' desires for experiencing products as vivid as possible in this pandemic era. In fact, researchers in the field of marketing have recently focused on the

important issue of the effect of applying AR technology on customer behavior (Verhagen, T., Vonkeman, Feldberg, & Verhagen, P., 2014; Yim, Chu, & Sauer, 2017; McLean & Wilson, 2019; Smink, Frowijn, van Reijmersdal, van Noort, & Neijens, 2019; Yim & Park, 2019).

Nevertheless, comparatively less attention was given to exploring the effect of customers' perceived social value or perceived risk on customer behavior when AR technology is applied in mobile shopping environment. In addition, a large body of previous studies explore the AR-enabled mobile shopping based on customers' real experience alone. However, in reality, most of the people who have experienced AR technology is more likely to be interested in adopting new technologies and risk-taking, compared to those who have never experienced AR technology yet. Consequently, this study includes research questions regarding the change of customer behavior from the change of customers' perceived social value or perceived risk, with extending the scope of the target group of study to the potential users of AR-enabled mobile shopping.

In the era of COVID-19, AR technology can be one of the most effective ways to provide real-like shopping experience to customers and promote their consumptions. At the same time, it is expected that customers would continue consuming some of their products or services contact-free to customers even after COVID-19 pandemic as they discover that it can be at least as convenient as offline consumption (Sheth, 2020). Therefore, it would be increasingly important to explore the effect of introducing AR-enabled functions on customer behavior in the mobile shopping environment. That is why this study aims to investigate customer relationship management through technology-enabled experience in online environment. The purpose of this study is to explore the effect of technology-enabled services on customer satisfaction, purchase intention, and loyalty to interact with customers better and to improve decision making through

technology-enabled experience such as AR technology, which has become important especially in the context of COVID-19. In order to achieve this goal, this research paper will attempt to answer the following questions: First, to what extent does the perceived utilitarian value of AR-enabled mobile shopping affect customer satisfaction? Second, to what extent does the perceived hedonic value of AR-enabled mobile shopping affect customer satisfaction? Third, to what extent does the perceived social value of AR-enabled mobile shopping affect customer satisfaction? Fourth, to what extent does the perceived risk of AR-enabled mobile shopping affect customer satisfaction? Fifth, to what extent does customer satisfaction affect purchase intention? Sixth, to what extent does customer satisfaction affect customer loyalty?

The remainder of this paper is organized as follows: Section 2 presents a literature review on customer relationship management, experiential marketing, and technology and customer behavior. Section 3 introduces the suggested hypotheses that try to answer research questions. Section 4 explains data and methodology used in this paper. Section 5 examines results of the study, and Section 6 discusses academic and managerial implications of the results as well as limitations of the study.

II. Literature Review

2.1 Customer Relationship Management (CRM)

2.1.1 Definition

The concept of Customer Relationship Management (CRM) emerged in the 1990s, when the information technology was first applied by firms in order to understand better what their

customers want (Galbreath & Rogers, 1999). Some researchers defined CRM as "data-driven marketing" (Kutner & Cripps, 1997) or "information-enabled relationship marketing" (Ryals & Payne, 2001). These definitions highlighted that one of the main drivers of CRM was customer data and the ability to process it. However, as Peppers, Rogers, and Dorf (1999) pointed out, CRM developed from one-to-one marketing or relationship marketing, where customization to each customer based on long-term learning relationship was necessary to successfully implement the marketing strategy. Thus, in their perspective, to form and maintain long-term relationship with customers is the core spirit of CRM. Similarly, trust and commitment from reciprocal information exchange is considered as a key characteristic of CRM (Jayachandran, Sharma, Kaufman, & Raman, 2005).

Other researchers provide more integrated definition of CRM as the new mantra of marketing that emphasizes the importance of keeping the customers who can deliver profits in the long run, in contrast to traditional marketing that focused on acquiring customers (Winer, 2001; Gupta & Lehmann, 2003). Although CRM technologies in early 2000 was effective in large scale management, they could not be very helpful to build mutual trust relationship due to technological limitations at the time (Giannakis-Bompolis & Boutsouki, 2014). As technology has advanced, it has become possible for firms to communicate in real time with customers on social media. Thanks to this change, Woodcock, Green, and Starkey (2011) claim that customers can engage with firms more closely and firms can react to customers in more timely manner, which helped to form mutual trust between buyers and sellers as well as customer loyalty. Woodcock, Green, and Starkey (2011) also call CRM with social media on mobile device as Social CRM, which emphasizes customer engagement and customer experience.

2.1.2 Dimensions

According to Buttle and Maklan (2015), CRM has three dimensions, namely strategic, operational, and analytical: Strategic CRM is related to the development of customer-centered business strategy targeted to customer retention, while operational and analytical CRM is concerned with the automation of processes that interacts with customers directly (e.g. sales or customer services) and the collection and utilization of customer-related data to obtain insights about customers respectively. The three dimensions are closely interrelated (Payne & Frow, 2005), and in fact, multichannel integration strategy is one of the examples that show the connection of the three.

Strategic CRM is the strategy aiming for acquiring and retaining profitable customers by practicing customer orientation, which is defined as the organization culture aspiring to "create superior value for customers and attain sustainable competitive advantage" (Narver & Slater, 1990). Firms' customer-focused approach is composed of two parts: One is to analyze in detail where customer needs are satisfied, and the other is to figure out how they can improve delivering customer benefits (Day & Wensley, 1988). Although customer orientation prioritizes customers' interest, as Deshpandé, Farley, and Webster (1993) points out, it does not necessarily block the benefits for other stakeholders such as owners or managers of firms, so that this strategy can sustain for the long term.

Operational CRM is applied mainly in the form of marketing automation, service automation, and sales force automation (SFA). Marketing automation enables firms to execute marketing activities with significantly reduced labor cost, but it also benefits customers by providing real-time personalized marketing, which is based on customer database. Service

automation such as Chatbot is also helpful to customers through interactive customer services (Chung, Ko, Joung, & Kim, 2020) as well as to companies by satisfying customer needs at the first point of contact. SFA is defined as "adding technology in the form of cellular phones, faxes, portable computers, databases, the Internet, and electronic data interchange systems to the sales processes" (Erffmeyer & Johnson, 2001). Moutot and Bascoul (2008) proposes that it contributes to the improvement of CRM processes through making sales calls and proposals better.

Analytical CRM deals with "capturing, storing, extracting, integrating, processing, interpreting, distributing, using and reporting customer-related data" (Buttle & Maklan, 2015). It is considered as the foundation of the other two dimensions of CRM. In order to offer customized marketing to customers, analytical information about them is essential, so operational CRM depends on analytical CRM. Similarly, strategic CRM is based on analytical CRM because strategies for customer acquisition or retention would struggle to be developed without insights from data on customer. As data processing ability has improved, so-called "big data" has been employed to analyze customer-related data and help firms not only to deliver better personalized products and services to customer but also to make marketing decisions more effectively (Wedel & Kannan, 2016).

2.1.3 Relations to Multichannel Integration Strategy

Many firms managed multiple channels for both distribution of their products and services and communication with their customers after ICT was applied in the business sector, so it was important to achieve multichannel integration in order to maintain the consistency of customer experience across various channels (Stone, Hobbs, & Khaleeli, 2002). Payne and Frow (2005) argues that one of the most important role of CRM is to manage integrated channels and construct

"single unified view of the customer." In fact, multichannel customers take up increasingly significant portions in many industry sectors and are highly valuable to firms (McGoldrick & Collins, 2007). Thus, by taking care of these mainstream shoppers, CRM helps firms improve customer relationships, which leads to better firm performance (Navimipour & Soltani, 2016).

2.2 Experiential Marketing

2.2.1 Definition

Pine and Gilmore (1998) suggested the concept of experience economy to account for increasing importance of experience as a new type of economic resource in the business sector, where experience is defined as customer's memorable event. An event may be experience to some, while the same event may not be considered as experience to others, so experience is personal economic offering by nature. Because the emergence of this new economic entity could not be embraced by traditional marketing, Schmitt (1999) provides the concept of "experiential marketing" in order to overcome this limitation: the psychologically-based approach that focuses on customer's sensory, affective, cognitive, physical, and social-identity experiences with firm's products and services.

2.2.2 Dimensions

As discussed above, experiential marketing has five dimensions: sensory, affective, cognitive, physical, and social-identity, which Schmitt (1999) called as strategic experiential modules. Sensory marketing leads customer to make brand image in their mind by providing multi-sensory brand-experience (Hultén, 2011). Affective marketing aims to form emotional bonds with customers, so that they react positively to the brand (Mattila, 2001). Cognitive marketing inspires customers positive feeling towards brands by making them learn about the brand through active

participation in experiential offering (Oh, Fiore, & Jeoung, 2007). Physical marketing tries to stimulate customer's motor actions through behavioral experiences (Brakus, Schmitt, & Zarantonello, 2009). Social-identity marketing helps customers construct their social identity and feel sense of belongings by giving them experiences to relate to their reference group (Schmitt, 2003). Below is the table describing the example of experiential marketing for each dimension.

Table 1. Examples of Experiential Marketing by Dimensions

Dimension	Example	Description
Sensory		The logo of Coca-Cola is an example of sensory marketing with the focus of visual stimulation. The current logo of white letters in red background was confirmed in 1965, which has established the brand identity of Coca-Cola. Thanks to the strong logo, customers think of Coca-Cola when they see this color contrast of red and white.
Affective		Southwest Airlines' collaborative project with Nintendo is an example of affective marketing. With making Nintendo its official video game partner in November 2013, Southwest Airlines could provide every single passenger a free Nintendo Wii U console during the holidays, so that they can have fun together with their friends or family.
Cognitive		The slogan of Apple "Think Different" is an example of cognitive marketing. By suggesting this stimulating slogan in the advertisement, Apple is able not only to build its brand image as the one distinct from other brands but also to inspire curiosity about the brand in its potential customers. They end up trying to learn more about the brand.

Physical		The application Nike Run Club is an example of physical marketing. It is connected with Nike's slogan "Just Do It," which has been Nike's slogan encouraging its customers to take action since 1988. This application supports users' running exercises by tracking their runs, providing audio guidance from coaches in Nike.
Social-identity		Harley Owners Group (HOG) is an example of social-identity marketing. Harley-Davidson forms its brand image as the one aspiring adventure and freedom, so those who wants to construct their social identity as adventurous and free character become its enthusiastic and loyal fans and a member of HOG. Currently, HOG has more than one million members.

2.2.3 Relationship with CRM

Experiential marketing was later developed into the management concept called Customer Experience Management (CEM) by Schmitt (2003): "the process of strategically managing customer's entire experience with a product or a company." Some researchers claimed that CEM was an alternative to CRM because it was more customer-oriented than CRM (Schmitt, 2003) or because CEM focused on customer's subjective opinion about goods or services, while CRM analyzed customers' transactional data with firms drily (Meyer & Schwager, 2007). Although customer experience tends to be defined too all-encompassing to be practically helpful for customer experience managers in business sector (Maklan, Antonetti, & Whitty, 2017), using CRM solutions are necessary to successfully implement CEM strategies (Buttle & Maklan, 2015).

Therefore, CEM and CRM complement one another in achieving the same goal, namely, to give customer satisfaction and to secure customers.

2.3 Technology and Customer Behavior

2.3.1 E-Commerce and M-Commerce

Along with the development of ICT, many people started to shop online instead of visiting offline stores for shopping, so researchers studied how customer behavior in e-commerce is different from customer behavior in traditional way of shopping. After the recognition of their needs or desires, customers seek to acquire information to decide what to buy. Thanks to the Internet, online customers can access to thousands of sellers at one site, so they enjoy enhanced convenience (Baty & Lee, 1995) and broader choice (Jarvenpaa & Todd, 1996). In other words, customers perceive usefulness (Chen, Gillenson, & Sherrel, 2002) in online shopping for the availability of information-rich environment. Furthermore, customers can buy goods or services at the website directly, so e-commerce frees customers from visiting physical stores for purchase.

After purchasing and consuming goods or services, customers evaluate their transaction. They often share their opinion about products to their friends, neighbors, and colleagues. Similar to this word-of-mouth communication, Internet users write product reviews on electronic customer forums. According to Gelb and Sundaram (2002), this so-called electronic word-of-mouth (eWOM) is popular among online customers because it broadens their opportunity to exchange their experiences and opinions on products, namely from their own acquaintances to any online shoppers participating in sharing their opinions in the forum. Besides, online customers know that their own post-purchase assessment can be important information for pre-purchase assessment to others through the online customer forums. Therefore, e-commerce customers not only enjoy

greater amount of information for their decision making processes but also satisfy their desires for social interaction and self-enhancement by participating eWOM communication (Hennig-Thurau, Gwinner, Walsh, & Gremler, 2004).

Nonetheless, as Lynch, Kent, and Srinivasan (2001) point out, some customers might hesitate to shop online due to feeling of uncertainty that comes from the physical absence, and this level of perceived risk becomes higher for the products whose quality is hard to judge without physical inspection. They might use virtual stores on the Web solely for information seeking and buy from brick-and-mortar stores (Kau, Tang, & Ghose, 2003). To avoid making wrong decisions when shopping online, customers tend to rely on brands that they trust and are familiar with (Balabanis & Reynolds, 2001).

As smartphones started to be widespread, m-commerce has become one of the significant options available for multichannel strategy. Actually m-commerce shares many characteristics with e-commerce, but at the same time, m-commerce has two main advantages compared to e-commerce. Firstly, along with technological advancement, m-commerce offers better accessibility to high-quality image and video contents in online services. These visual representations of goods or services are employed by online retailers in order to simulate customer experience in physical stores (Kim & Lennon, 2008). M-commerce customers can also include images or videos in their reviews on goods or services and share these post-purchase evaluations through customer online forums or social media. As Lin, Lu, and Wu (2012) finds, eWOM communication with visual information is considered to be more credible and of higher quality than eWOM communication without it. Secondly, m-commerce provides higher portability and mobility in online services, so customers can search for and buy items while in transit (Okazaki & Mendez, 2013) thanks to

wireless internet services supported via smartphones. Hence, m-commerce customers enjoy shopping environment that is not only more comfortable but also has richer information.

2.3.2 Augmented Reality (AR)

2.3.2.1 Definition

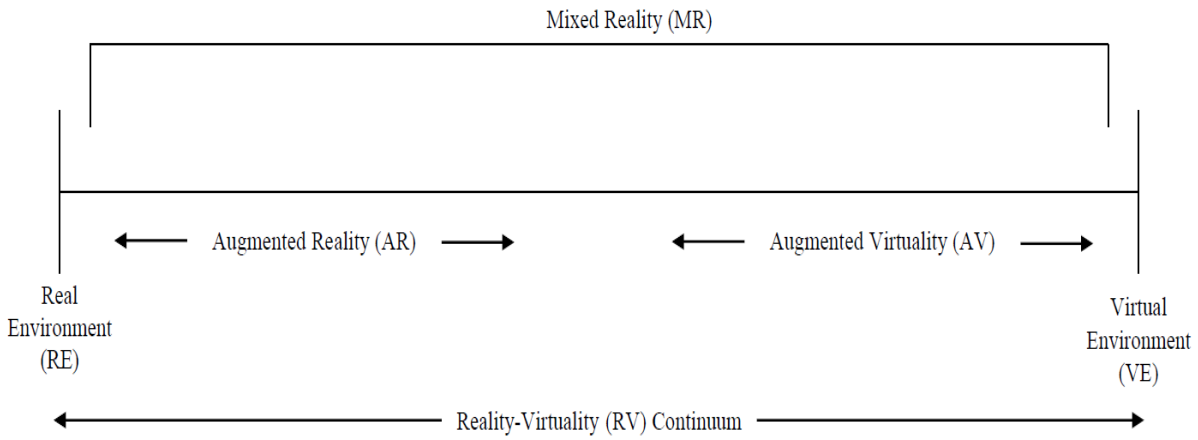
The term "Augmented Reality" was introduced first by researchers in Boeing in order to introduce technology that superimposes virtual images on objects in reality with "heads-up (see-through) display head set" (Caudell & Mizell, 1992). According to Haller, Billinghurst, and Thomas (2007), among various definitions of AR, the one suggested by Azuma, Baillot, Behringer, Feiner, Julier, and MacIntyre (2001) is widely recognized by many researchers: AR system interactively associates virtual objects with real objects based on an actual environment in real time. In other words, people can alter real objects in AR environment by overlaying virtual objects with them. When users can modify objects in the environment that they are in, they feel as if those objects are physically present with them although the objects are virtual and at the remote place (Sheridan, 1992). Thus, AR users feel that as if virtual objects they interact with is real.

2.3.2.2 Comparison with Virtual Reality (VR) and Mixed Reality (MR)

AR is frequently compared with VR and MR. MR is defined as "any display in which both real and virtual images are combined in some way and in some proportion (Milgram and Colquhoun, 1999), while VR is defined as totally simulated reality constructed by computer-generated multimedia contents (Martín-Gutiérrez, Mora, Añorbe-Díaz, & González-Marrero, 2017). These technologies not only enrich user experience but also inspire users to feel as if the environment is real due to high interactivity, but many researchers have specified differences between them. Milgram and Colquhoun (1999) introduced the framework of "the Reality-

Virtuality (RV) Continuum" (Figure 1) in order to distinguish the three concepts: AR lies in the part of the continuum where Real Environment (RE) is combined in greater proportion with Virtual Environment (VE), VR takes one of the extremes of the continuum as VE, and MR refers to any parts of the continuum except for the two extremes of the continuum. Thus, AR combines virtual objects with physical objects and is a subclass of MR, while VR shows computer-generated objects and does not belong to MR.

Figure 1. The Reality-Virtuality (RV) Continuum (Milgram and Colquhoun, 1999)

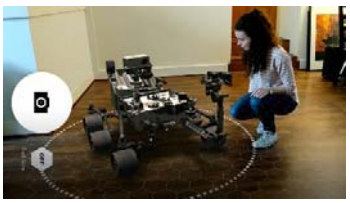


AR supplements real environment, while VR tries to replace it. This difference allows AR users to maintain their sense of presence in the physical environment. Unlike VR, AR can make customers feel as if they experience products in the real world when it is applied on online shopping (Verhagen, T., Vonkeman, Feldberg, & Verhagen, P., 2014). Customers prefer direct experience with products because they can enjoy more experiential contact with products compared with indirect experience (Hamilton & Thompson, 2007). For these reasons, it is generally believed that AR is more advantageous than VR in providing better shopping experience to customers (Yim & Park, 2019).

2.3.2.3 Application

As discussed above, AR has been applied on online shopping in order to improve customer's online shopping experience. Besides e-commerce, AR has been employed in other industries including education, entertainment, and tourism through mobile application (refer to the Table 2 for examples of AR application in those industry sectors).

Table 2. Examples of AR Application in Several Sectors

Industry	Example	Description
E-Commerce		By using IKEA Place, customers can place 3D-modeled virtual furniture that reflects true scale in their house. This helps them check how furniture would fit to their house before they buy. Customers can place furniture in the photo of the room and share it with their friends or family.
Education		Users of Spacecraft 3D (or Spacecraft AR in Android) can place and view 3D spacecraft models in any flat surface. If the space is large enough, users can be models in their actual size. Users can access to in-depth information about spacecrafts as well as space missions they participated in.
Entertainment		The core of Pokémon GO is location tracking, so its players can interact with their surroundings while enjoying the game. Environmental conditions such as habitats or weather affect what types of Pokémon to encounter, which makes players more immersed in the application.

Tourism		The mobile application AR City provides users AR navigation, which overlays arrows indicating directions to the destination, for walking routes of 300 cities. This application also superimposes labels for streets and points of interest in order to help travelers explore the cities.

All these examples show that AR can be a strong technical solution for enhancing online user experience in order to make it closer to real-life experience or delivering immediate information on real environment surrounding the user.

2.4 COVID-19 and Customer Behavior

According to Sheth (2020), COVID-19 pandemic restricts customers' choice of shopping place, so customers prefer online shopping to visiting brick and mortar stores. Sheth (2020) also points out that the pandemic situation would drive customers to catch up with digital transformation more quickly in some industries and that this would be an irreversible change as people would slowly rely on new technologies offering more convenience and better personalization. A research on meal kits, which has been popular during the pandemic to avoid grocery shopping or restaurant dining, argues that when people consume products contact-free, they consider perceived utilitarian value more strongly than perceived hedonic value, and household configuration affects order of priority between quality and diversity (Cho, Bonn, Moon, & Chang, 2020).

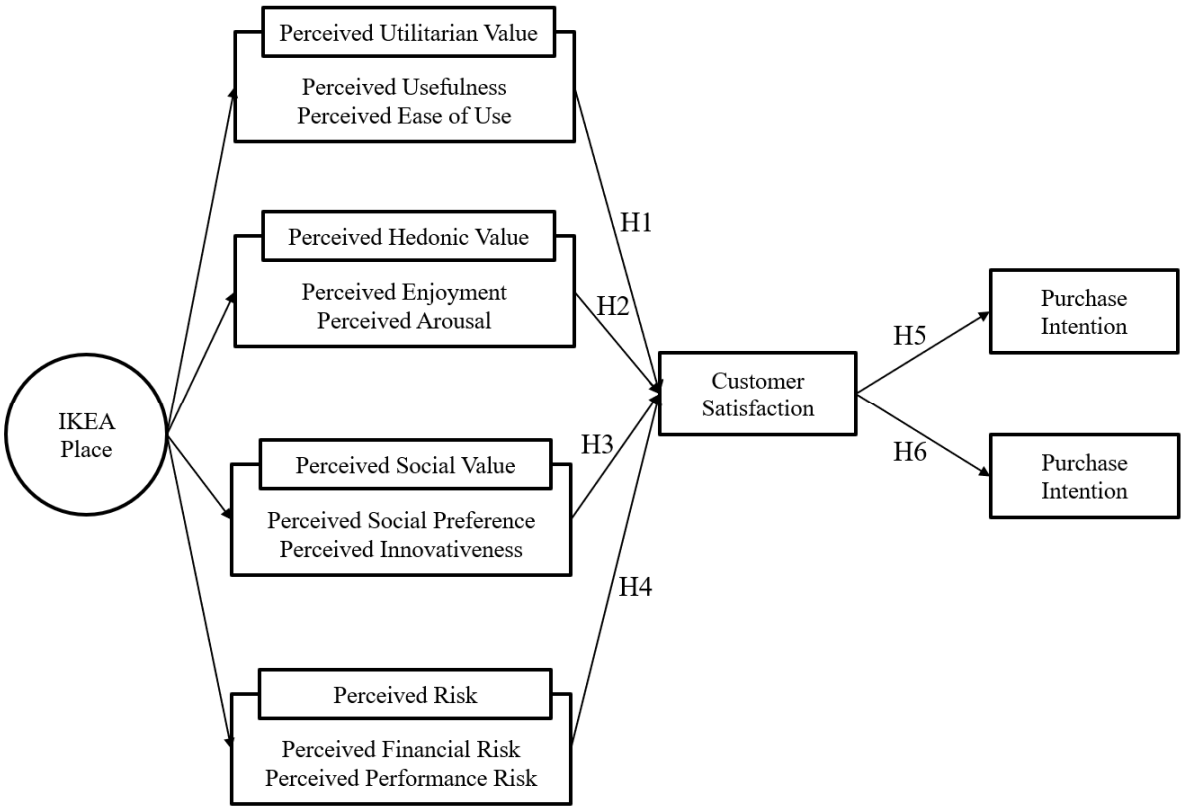
Meanwhile, some researchers focus on the effect of the pandemic on customers' psychological aspects. When people are more exposed to excessive amount of information about

the disease, they can show obsessive online searching behavior out of anxiety about health (Farooq, Laato, & Islam, 2020). According to Laato, Islam, Farooq, and Dhir (2020), people who are overconcerned about their health from fear of COVID-19 are likely to perceive the pandemic situation more severe, so they are also more likely to avoid contacts with others and make unusual purchases such as hoarding necessities in order to prepare for self-isolation. Huang and Sengupta (2020) also focuses on the customers' fear of COVID-19, but they discover that customers' relative preference for typical products decreases and their relative preference for atypical products increases. Huang and Sengupta (2020) find that it is because people implicitly associate the concept of typicality with the image of many people, which they try to avoid to secure their safety from the disease in the first place.

III. Hypotheses Development

The purpose of this study is to examine the effect of four classified factors on customer acquisition and retention. In the research, independent variables such as perceived utilitarian value, perceived hedonic value, perceived social value, perceived risk were used to test hypotheses. The following hypotheses are developed so as to answer research questions (refer to the Figure 2 for the diagram explaining the structure of proposed hypotheses).

Figure 2. The Structure of Proposed Hypotheses



3.1 Effects of Perceived Utilitarian Value on Customer Satisfaction

Perceived utilitarian value is in accordance with cognitive dimension of Schmitt's experiential marketing theory. Cognitive marketing attracts customers by making them perceive the value of goods or services through experience. In fact, cognitive activities are regarded as left-brain activities such as logical or analytical thinking in psychology (Hansen, 1981), so the word "cognitive" has been associated with the words "functional" or "utilitarian" in customer behavior literature (Holbrook & Hirschman, 1982; Park & Young, 1986). Therefore, cognitive marketing is closely related to perceived utilitarian value. Because of traditional economic theory claiming that customers buy goods or services to maximize their utility, the perceived utilitarian benefits has been regarded as one of the main motivations of consumption (Hirschman & Holbrook, 1982).

Babin, Darden, and Griffin (1994) claim that customers perceive utilitarian value when their shopping needs are satisfied without waste of time, so perceived usefulness and perceived ease of use can be considered as two factors of perceived utilitarian value. These two factors are also considered as the two fundamental determinants of user acceptance of information technology in the technology acceptance model (Davis, 1989). McLean and Wilson (2019) finds that the perceived usefulness of AR and the perceived ease of use of AR positively influences customer satisfaction with AR experience. Therefore, these are hypothesized,

H1a: Perceived usefulness positively affects customer satisfaction.

H1b: Perceived ease of use positively affects customer satisfaction.

3.2 Effects of Hedonic Affective Value on Customer Satisfaction

Perceived hedonic value is in accordance with sensory and affective dimension of Schmitt's experiential marketing theory. Sensory marketing provides multisensory experiences to customers in order to implement brand images in customers' minds, while affective marketing inspires customers to feel positively towards good or services through experience. According to Hirschman and Holbrook (1982), hedonic consumption is defined as customer behavior stimulated by multisensorial and emotive aspects of product or service usage experience. Therefore, affective marketing is in accordance with perceived hedonic value. Perceived hedonic benefits has been considered as the other main motivations of consumption along with perceived utilitarian benefits (Okada, 2005).

Watson and Tellegen (1985) suggest that the model with pleasantness-unpleasantness and the degree of arousal as the two dimensions of affection can be firmly established as a consensual model. Perceived enjoyment accounts for emotive aspects of customer experience. Likewise, as

customer's arousal is induced by multisensory stimuli from their environment (Donovan & Rossiter, 1982), perceived arousal accounts for multisensorial aspects of customer experience. Customer is more satisfied with goods or services when they feel more enjoyable and excited in their experience with them (Mummalaneni, 2005), and Smink, Frowijn, van Reijmersdal, van Noort, and Neijens (2019) discovers that AR services are not exceptional to this. Therefore, these are hypothesized,

H2a: Perceived enjoyment positively affects customer satisfaction.

H2b: Perceived arousal positively affects customer satisfaction.

3.3 Effects of Perceived Social Value on Customer Satisfaction

Perceived social value is in accordance with social-identity dimension of Schmitt's experiential marketing theory. Social-identity marketing helps customers feel that they belong to their reference group. Customers perceive social value when they feel that their consumption of goods or services are approved by their reference groups including friends and family, and this social influence affects customer satisfaction (Lamberton & Rose, 2012) and customer's willingness to buy (Gardete, 2015). Therefore, it can be expected that as customers perceive that products they use is more socially preferred, they would feel more satisfied with products. In addition, customers are conscious of trends in their shopping in order to enhance their social identity, so they seek to consume innovative or fashionable products (Moeller & Wittkowski, 2010). Yim, Chu, and Sauer (2017) discovers that the more customers perceive AR services to be innovative, the more customers feel satisfied with AR experiences. Hence, we can consider perceived innovativeness as one of determinants of perceived social value affecting customer satisfaction. Therefore, these are hypothesized,

H3a: Perceived social preference positively affects customer satisfaction.

H3b: Perceived innovativeness positively affects customer satisfaction.

3.4 Effects of Perceived Risk on Customer Satisfaction

Perceived risk has been the subject of study in the customer behavior literature for more than half a century because it is believed that customer behavior can be altered by perceived risk. Affected by discussion in economics, researchers first related perceived risk to the concept of uncertainty (e.g. Taylor, 1974), but Peter and Ryan (1976) argue that perceived risk would be better defined as the expected losses or negative utility from purchase rather than calculated uncertainty from multiplicative formulation. As a result, it can be assumed that the higher customers' perceived risk is, the lower customer satisfaction would be.

Existing literature has suggested various dimensions of perceived risk, but Bobbitt and Dabholkar (2001) propose that perceived psychological, financial, and performance risks are more applicable to the study on e-commerce. Bobbitt and Dabholkar (2001) also define perceived psychological risk as anxiety coming from customers' unawareness of the provider of goods or services. However, this study is on the one of the most well-known home furnishing brand IKEA, so this kind of perceived risk would not be relevant to the current study. Perceived financial risk is customers' nervousness when they think that they would experience financial loss including difficulty of refund or lack of warranty from their purchase of products (Horton, 1976), and the higher perceived financial risk is, the less customer feel that products are valuable (Sweeney, Soutar, & Johnson, 1999). Customers perceive performance risk when they worry that good or services they purchase would not be able to meet their needs (Casidy & Wymer, 2016), and it negatively affects customer satisfaction (Sun, 2014). Therefore, these are hypothesized,

H4a: Perceived financial risk affects customer satisfaction.

H4b: Perceived performance risk affects customer satisfaction.

3.5 Effects of Customer Satisfaction on Purchase Intention and Customer Loyalty

Customer satisfaction is defined as "a summary affective response of varying intensity" (Giese & Cote, 2000) reflecting holistic evaluation of products that can be made from pre-purchase to post-consumption. Customer loyalty is defined as "the individual's dispositional basis for repeated purchase, appraisal of the target" (Dick & Basu, 1994). In fact, customer satisfaction has been an important research topic in the marketing research because often leads to customer behavior such as repeated purchases and customer loyalty (Churchill & Suprenant, 1982). Similarly, Bendapudi and Berry (1997) also claim that customer satisfaction is critical factor to establish long-term business relationship based on customers' trust in the brand.

According to Bloemer and Kasper (1995), brand commitment is necessary for customer to be loyal to the brand and be willing to purchase brand products. In the perspective of economics, it is claimed that people's commitment to long-term contract relationship can be understood as their effort to minimize transaction cost (Williamson, 1981). Wah Yap, Ramayah, and Nushazelin (2012) discovers that satisfaction has a positive influence on customer loyalty through trust, which suggests that customers save their time and effort spent in shopping by choosing products or services they are satisfied with and are able to trust. For these reasons, customer satisfaction is one of the most important antecedents of customer loyalty (Osayawe Ehigie, 2006). Therefore, these are hypothesized,

H5: Customer satisfaction positively affects purchase intention.

H6: Customer satisfaction positively affects customer loyalty.

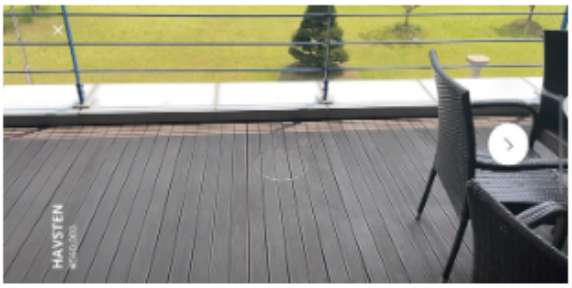
IV. Methodology

4.1 Data Collection

Because the research topic in the current study is the change of customer behavior according to different kinds of customers' perceived value and perceived risk from AR-enabled mobile shopping, survey data was considered to be the most appropriate form of data to conduct the research. Questions in the survey regarding customer perceived values, perceived risk, and customer satisfaction, purchase intention, and customer loyalty was developed in accordance with previous studies (Watson & Tellegen, 1985; Bobbitt & Dabholkar, 2001; Sun, 2014; Verhagen, T., Vonkeman, Feldberg, & Verhagen, P., 2014; Gardete, 2015; Casidy & Wymer, 2016; McLean & Wilson, 2019; Smink, Frowijn, van Reijmersdal, van Noort, and Neijens, 2019). The survey data was collected through online platform Qualtrics between late May and early June, and a total of 217 respondents completed the survey. Considering that perceived values and perceived risk can be formed from customers' expectation for shopping experience, the survey data include the answers of those who have never experienced AR-enabled mobile shopping. In order to help their understandings on AR-enabled mobile shopping experience, screenshots and a short description of the mobile application with AR functions for shopping was provided prior to questions on customer perceived values and perceived risk (refer to the Figure 3 for the screenshots and a short description provided in the survey).

Figure 3. The Screenshots and a Short Description of AR-enabled Mobile Application in the Survey

The chair in the pictures below is not actually placed in the space, but only virtually placed by AR app developed by IKEA.



It is 3D true-to-scale model of the product with 98 percent accuracy, so you can try many different products before you buy them and guess whether they would fit your space or not without measuring them. With the help of AR app, you can also expect how actual products would look into your space among other furnitures. Pleased be noted of these benefits of AR app when you answer the following questions.

The application called IKEA Place is selected to show how AR functions in the mobile application help users to experience products prior to the purchase, and there are three reasons to support this choice. First of all, according to IKEA's official homepage, IKEA Place is regarded as one of the first AR-enabled applications in home furnishing industry. It was launched in 2017, so it has been improved with users' feedbacks for more than three years. Hence, it can be regarded that this application has many functions that users find helpful. Secondly, compared to other AR-enabled mobile applications such as Sephora Virtual Artist or GUCCI, the user experience of

IKEA Place is less sensitive to demographics including gender or income level. Therefore, it would be better to choose products and brands that everyone is familiar with so as to observe the pure effect of AR-enabled application on customer behavior as much as possible. Thirdly, through AR functions, IKEA Place can satisfy one of the most important concerns for customers, which is to check whether the furniture that they consider to buy would fit to their room size. Consequently, it would be assumed that the impact of AR-enabled application on customer behavior can be observed more apparently through IKEA Place.

The survey is written in both Korean and English, so that participants can choose the survey language that they feel more comfortable with. The validity of the equivalence between Korean survey and English survey was verified by back translation. At the beginning of the questionnaire, an explanation was given to the participants in order to let them know of the topic of the study and guarantee that all the survey data are confidential and treated anonymously. The survey applied a 5-point Likert scale from 1 to 5, where 1 represents answers like “Highly Unlikely,” “Strongly Disagree,” or “Strongly Dissatisfied” and 5 represents answers like “High Likely,” “Strongly Agree,” or “Strongly Satisfied.”

4.2 Description of the Survey Data

Four determinants of satisfaction towards AR-enabled mobile shopping are groups of the main variables that the survey tries to measure. These factors are perceived utilitarian value, perceived hedonic value, perceived social value, and perceived risk. Other variables in the survey are customer satisfaction, purchase intention, and customer loyalty. This study conducted Cronbach’s alpha test by using IBM SPSS Statistics 21 in order to check the reliability for each variable, and the result is summarized in the Table 3 below.

Table 3. Results of Cronbach's Alpha Test of Reliability for Each Variable

Factor	Variable	Cronbach's Alpha
Perceived Utilitarian Value	Perceived Usefulness	0.846
	Perceived Ease of Use	0.886
Perceived Hedonic Value	Perceived Enjoyment	0.921
	Perceived Arousal	0.895
Perceived Social Value	Perceived Social Preference	0.905
	Perceived Innovativeness	0.846
Perceived Risk	Perceived Financial Risk	0.856
	Perceived Performance Risk	0.865
Customer Satisfaction		0.881
Purchase Intention		0.897
Customer Loyalty		0.917

4.3 Methodology for Data Analysis

First of all, the research confirmed that scale items were grouped appropriately by the constructs that the items are designed to measure by applying factor analysis. Principal component analysis was used as the method for extraction with maximum iterations for convergence as 25, and factors whose eigenvalue is greater than 1 are extracted. VARIMAX with Kaiser normalization was applied as the rotation method with maximum iterations for convergence as 100. After obtaining factor scores from factor analysis, multiple regression analysis was conducted to

explore how four factors affect customer satisfaction as well as how customer satisfaction influences purchase intention and customer loyalty. Both factor analysis and multiple regression analysis was conducted by using IBM SPSS Statistics 21.

V. Data Analysis

5.1 Demographics

Out of 217 respondents who completed the survey, 66.7% were Korean and 33.3% were not. More specifically, 89.3% were from Asia, 1.9% were from Europe, another 1.9% were from Africa, 1.4% were from Oceania, 5.1% were from North America, and 0.5% were from South America. In terms of gender, 48.8% were female and 51.2% were male. For marital status, 38.7% were married, 59.5% were single, and 1.8% chose the option "Others." Regarding age groups, 2.8% were 18-20 years old, 45.6% were 21-30 years old, 28.5% were 31-40 years old, 8.8% were 41-50 years old, 11% were 51-60 years old, 2.3% were 61-65 years old, and 1% were over 65 years old. By education level, 18% had high school or less, 13.4% had 2-year associate degree, 37.8% had bachelor's degree, 30.8% had master's degree or beyond. With regard to their annual income, 39.5% answered "Not available," which might be related to the fact that 33.7% were 18-25 years old because people in this age range are generally still students and do not participate in the labor market. For the rest, 8.4% had their annual income $10,000 or less, 9.8% had their annual income between $10,001 and $20,000, 10.2% had their annual income between $20,001 and $30,000, 11.2% had their annual income between $30,001 and $40,000, 4.7% had their annual income between $40,001 and $50,000, 2.8% had their annual income between $50,001 and $60,000, 3.3% had their annual income between $60,001 and $70,000, and 10.1% had their annual income equal to or

greater than $70,001. Below is the table summarizing the demographic characteristics of the survey respondents.

Table 4. Summary of Demographic Characteristics of Survey Respondents

Characteristic	Percent (%)	Characteristic	Percent (%)
Domestic		**Age**	
Korean	66.7	18-20	2.8
Non-Korean	33.3	21-25	30.9
Region		26-30	14.7
Asia	89.3	31-35	13.8
Europe	1.9	36-40	14.7
Africa	1.9	41-45	5.1
Oceania	1.4	46-50	3.7
North America	5.1	51-55	5.5
South America	0.5	56-60	5.5
Gender		61-65	2.3
Female	48.8	Over 65	1
Male	51.2	**Annual Income**	
Marital Status		Not available	39.5
Married	38.7	$10,000 or less	8.4
Single	59.5	$10,001 - $20,000	9.8

Others	1.8	$20,001 - $30,000	10.2
Education Level		$30,001 - $40,000	11.2
High school or below	18	$40,001 - $50,000	4.7
2-year associate degree	13.4	$50,001 - $60,000	2.8
Bachelor's degree	37.8	$60,001 - $70,000	3.3
Master's degree or beyond	30.8	$70,001 or more	10.1

5.2 Hypotheses Testing

As discussed in the Section 4.3 "Methodology for Data Analysis," factor analysis was applied to check the validity of the construct, and the result of the analysis for four determinants of customer satisfaction is summarized in the four tables below respectively.

Table 5. Component Matrix: Perceived Utilitarian Value

Items		**Components**	
Factor	**Scale Items**	**1**	**2**
Perceived Usefulness	I think that using AR app helps me shop through mobile phone more effectively.	0.901	
	I think that using AR app reduces the time I spend in shopping through mobile phone.	0.878	
	Overall, I think that AR app is useful when I shop through mobile phone.	0.824	
	I will be satisfied with using AR app because it is useful when shopping through mobile phone.	0.719	
	I think that AR app is easy to use.		0.900

Perceived Ease of Use	I think that I will become familiar at using AR app easily.		0.878
	I think that my interaction with AR app is clear and understandable.		0.854
	I will be satisfied with using AR app because it is easy to use.		0.823

Table 6. Component Matrix: Perceived Hedonic Value

Items		**Components**	
Factor	**Scale Items**	**1**	**2**
Perceived Enjoyment	I think that using AR app gives me pleasure.	0.927	
	I think that it is interesting to use AR app.	0.905	
	Overall, I think that AR app is enjoyable to use.	0.894	
	I will be satisfied with using AR app because it is fun.	0.876	
Perceived Arousal	I think that using AR app makes me feel excited.		0.895
	I think that using AR app improves my senses.		0.880
	I think that using AR app makes me feel that products presented are like real ones.		0.864
	I will be satisfied with using AR app because it motivates my mobile shopping better.		0.849

Table 7. Component Matrix: Perceived Social Value

Items		**Components**	
Factor	**Scale Items**	**1**	**2**

Perceived Social Preference	I think that many people prefer to use AR app.	0.920	
	I think that many people install the app to use AR feature.	0.918	
	I think that people generally favor to use AR app.	0.868	
	I will be satisfied with using AR app because it is socially preferred.	0.831	
Perceived Innovativeness	I think that the app is one of innovative apps to provide the AR feature for mobile shopping.		0.890
	I think that mobile shopping with AR app is advanced way of shopping.		0.881
	I will be satisfied with using AR app because of its advanced technology.		0.864

Table 8. Component Matrix: Perceived Risk

Items		**Components**	
Factor	**Scale Items**	**1**	**2**
Perceived Financial Risk	I think that using AR app can reduce the chance of refund or exchange.	0.933	
	I think that using AR app is convenient because I can save costs by choosing right products.	0.920	
	I will be satisfied with using AR app because I can save unnecessary costs.	0.805	
Perceived Performance Risk	I think that using AR app can help me evaluate product quality as shown in mobile.		0.876
	I think that using AR app can increase the chance of getting products that fit to my expectation.		0.857
	Overall, I feel confident about the product performance I choose based on AR app.		0.844
	I will be satisfied with using AR app because it relieves concerns about product quality.		0.822

Customers' perceived utilitarian value, perceived hedonic value, perceived social value, perceived risk are related to customer satisfaction, which is also the determinant of purchase intention and customer loyalty respectively. Hence, the three constructs' validity was checked by applying factor analysis as well, and the results are summarized in the below three tables respectively.

Table 9. Component Matrix: Customer Satisfaction

Items		**Components**
Factor	**Scale Items**	**1**
Customer Satisfaction	I will be satisfied with using AR app because it is functional when shopping through mobile.	0.886
	I will be satisfied with using AR app because it gives me positive feelings.	0.828
	I will be satisfied with using AR app because it makes me feel trendy.	0.819
	I will be satisfied with using AR app because it reduces risks of mobile shopping.	0.815
	I will be satisfied with using AR app because it improves mobile shopping condition during the COVID-19.	0.793

Table 10. Component Matrix: Purchase Intention

Items		**Components**
Factor	**Scale Items**	**1**
Purchase Intention	I am willing to purchase products that are presented through AR app.	0.941
	I am willing to purchase products if I experience them with AR app.	0.922

	I am willing to purchase products more through AR app due to COVID-19.	0.874

Table 11. Component Matrix: Customer Loyalty

Items		**Components**
Factor	**Scale Items**	**1**
Customer Loyalty	I am willing to recommend to use the app to my family members or friends.	0.916
	I am willing to use AR app when I shop through mobile later.	0.893
	I am more willing to purchase products that look better on AR app.	0.888
	I am willing to recommend AR app to people who prefers mobile shopping because of COVID-19.	0.883

With factors scores obtained from factor analysis, multiple regression analysis was employed in order to test the hypotheses developed in the previous section. First of all, the study conducted multiple regression analysis for customer perceived values and perceived risk on customer satisfaction (refer to the Table 12 for the summary of the result). Overall, the ANOVA analysis showed that the models were significant at 0.000 level with F = 110.332 (*r-square* = 0.814). As all variables have their VIF values smaller than 10, so this regression result is free from the issue of multicollinearity. Based on the result, all the hypotheses (H1a, H2b, H3a, H3b, H4a, H4b) are accepted except for hypothesis H1b and hypothesis H2a. This result suggests that customers' perceived usefulness, perceived arousal, perceived social preference, perceived innovativeness, perceived financial risk, and perceived performance risk have statistically significant effect on customer satisfaction.

Table 12. Effects of Customers' Perceived Values and Perceived Risk on Customer Satisfaction

Variable (Independent → dependent)	Standardized Coefficient (t-value-Sig)	VIF
Perceived usefulness → Customer Satisfaction (H1a)	0.140 (2.660***)	3.013
Perceived ease of use → Customer Satisfaction (H1b)	0.016 (0.306)	2.855
Perceived enjoyment → Customer Satisfaction (H2a)	0.034 (0.544)	4.294
Perceived arousal → Customer Satisfaction (H2b)	0.201 (2.842***)	5.419
Perceived social preference → Customer Satisfaction (H3a)	0.087 (1.861*)	2.351
Perceived innovativeness → Customer Satisfaction (H3b)	0.095 (1.768*)	3.121
Perceived financial risk → Customer Satisfaction (H4a)	0.102 (1.881*)	3.157
Perceived performance risk → Customer Satisfaction (H4b)	0.363 (7.388***)	2.613

*** Significant at 0.01 level, ** Significant at 0.05 level, * Significant at 0.1 level

After then, the study applied simple regression analysis for customer satisfaction on purchase intention (refer to the Table 13 for the summary of the result). Overall, the ANOVA analysis showed that the models were significant at 0.000 level with F = 327.835 (*r-square* = 0.605). According to the result, hypothesis H5 is accepted.

Table 13. Effects of Customer Satisfaction on Purchase Intention

Variable (Independent → dependent)	Standardized Coefficient (t-value-Sig)
Customer Satisfaction → Purchase Intention (H5)	0.778 (18.106***)

*** Significant at 0.01 level, ** Significant at 0.05 level, * Significant at 0.1 level

Lastly, the study applied simple regression analysis for customer satisfaction on customer loyalty (refer to the Table 14 for the summary of the result). Overall, the ANOVA analysis showed that

the models were significant at 0.000 level with $F = 356.365$ (*r-square* = 0.626). According to the result, hypothesis H6 is accepted.

Table 14. Effects of Customer Satisfaction on Customer Loyalty

Variable (Independent → dependent)	Standardized Coefficient (t-value-Sig)
Customer Satisfaction → Customer Loyalty (H6)	0.791 (18.878***)

*** Significant at 0.01 level, ** Significant at 0.05 level, * Significant at 0.1 level

In conclusion, the result of hypothesis testing of customers' perceived values and perceived risk on customer satisfaction is summarized in the table below.

Table 15. Summary of Effects of Customers' Perceived Values and Perceived Risk on Customer Satisfaction

Determinant	Hypothesis Testing	Result
Perceived Utilitarian Value	Perceived usefulness → Customer Satisfaction (H1a)	Accepted
	Perceived ease of use → Customer Satisfaction (H1b)	Rejected
Perceived Hedonic Value	Perceived enjoyment → Customer Satisfaction (H2a)	Rejected
	Perceived arousal → Customer Satisfaction (H2b)	Accepted
Perceived Social Value	Perceived social preference → Customer Satisfaction (H3a)	Accepted
	Perceived innovativeness → Customer Satisfaction (H3b)	Accepted
Perceived Risk	Perceived financial risk → Customer Satisfaction (H4a)	Accepted
	Perceived performance risk → Customer Satisfaction (H4b)	Accepted

Similarly, the result of hypothesis testing of customer satisfaction on purchase intention and customer loyalty is summarized in the table below.

Table 16. Summary of Effects of Customer Satisfaction on Purchase Intention and Customer Loyalty

Group	Hypothesis Testing	Result
Purchase Intention	Customer Satisfaction → Purchase Intention (H5)	Accepted
Customer Loyalty	Customer Satisfaction → Customer Loyalty (H6)	Accepted

VI. Conclusion

6.1 Findings

This study explored the effect of customers' perceived utilitarian value, perceived hedonic value, perceived social value, and perceived risk on customer satisfaction as well as the effect of customer satisfaction on purchase intention and customer loyalty. The four factors of customer satisfaction are selected based on extant literature whose topic was customers' perceived values and perceived risk on customer satisfaction.

As a result of the study, the hypotheses H1a, H2b, H3a, H3b, H4a, and H4b were accepted, but hypothesis H1b and hypothesis H2a were not accepted, which implies that perceived ease of use and perceived enjoyment does not have statistically significant influence on customer satisfaction in AR-enabled mobile shopping environment. As the two rejected hypotheses were established according to previous studies, it is necessary to try to suggest possible reasons that explain why perceived ease of use and perceived enjoyment do not affect customer satisfaction. In

fact, it would be hard for customers to appreciate these two values without actually using AR functions in the mobile application. However, 59.4% of the current study's respondents have no experience of AR technology prior to answering the survey, so it can be considered that the lack of actual experience of AR-enabled mobile shopping environment makes people hard to associate perceived ease of use and perceived enjoyment with customer satisfaction.

In addition, the factors with top two greatest standardized coefficient values in customer perceived values are perceived performance risk and perceived arousal. The scale items used to measure perceived arousal (e.g. I think that using AR app makes me feel that products presented are like real ones.) center around perceived arousal caused by receiving more sensory information from AR functions in the mobile application. Similarly, the scale items for how much perceived performance risk would reduce by using AR technology (e.g. I think that using AR app can increase the chance of getting products that fit to my expectation.) focus on customer benefits from AR presentation of products that is close to the actual product display. Hence, the result is quite meaningful because it verifies that one of the most attractive features of AR technology in the perspective of customers is to deliver richer information about the target object by real-time interaction between the real world and the virtual world. Given that the factor with the third greatest standardized coefficient value is perceived usefulness, it can be conceived that customers also find this benefit from AR feature useful in their mobile shopping, which is in accordance with previous studies (McLean & Wilson, 2019; Yim, Chu, & Sauer, 2017).

On the contrary, perceived social values, namely innovativeness and perceived social preference, have marginally significant effect on customer satisfaction. This result implies that although customers do not completely ignore the advantage of using AR feature in constructing

better social identity, they pay more attention to functional advantages of AR technology in mobile shopping environment. Furthermore, perceived financial risk also have marginally significant effect on customer satisfaction, while perceived performance risk have the greatest effect size and is strongly significant at 1% level. One possible explanation for this result is that online customers tend to worry less about issues in exchange or refund nowadays compared to the past thanks to strong impact of eWoM. According to Chevalier and Mayzlin (2006), the impact of eWoM containing negative evaluation of products or services is greater than the impact of positive eWoM. This can encourage online sellers to provide smooth exchange or refund experiences to customers in order to avoid negative feedbacks, which results in the improvement of average quality of exchange and refund policy. As a result, it can be regarded that customers are inclined to be less concerned about perceived financial risk and more concerned about perceived performance risk.

6.2 Relations to COVID-19

As discussed in the previous section, COVID-19 affects customer behavior significantly. Because the survey data used in this research was collected in the era of COVID-19, it would be worthwhile to consider the effect of COVID-19 on customer behavior in the discussion of the result of data analysis. From the growth rate of confirmed cases and the number of deceased shows, people have been aware that COVID-19 is dangerous enough to risk their lives. In order to practice social distancing, there has been consensus in the society to stop social activities for hedonic motivation like dinner parties. Even though enjoyment is one of the major drives of consumption, pleasure-oriented consumption is often labeled “frivolous” and brings feelings of guilt to customers (Strahilevitz & Myers, 1998). Consequently, it can be conceived that customers in the

pandemic tend to avoid pursuing perceived enjoyment to be free from feelings of guilt as well as to deal with social pressure.

In contrast, in the risky situation, when people think that their knowledge level is insufficient to handle the situation, they become obsessed with gathering information regarding the disease and ways to guarantee their safety (ter Huurne, Griffin, & Gutteling, 2009). As consumption is not the exception, consumers in the COVID-19 pandemic try to seek for more information and judge whether products or services would be useful to protect themselves against the infection. As utilitarian consumption is emphasized greatly in the hazardous situation, it can be considered that customers pay significant attention to functional values such as perceived performance risk, perceived arousal, and perceived usefulness in the era of COVID-19. Moreover, provided that customers hoard necessities in the pandemic, customers seem to sacrifice economic costs for the sake of self-protection. Therefore, it can be suggested that customers give comparatively less consideration for perceived financial risk in the risky situation.

Besides, the context of COVID-19 can be helpful to explain the reason that perceived social preference and perceived innovativeness have marginally significant effect on customer satisfaction. Customers are inclined to avoid products or services that they expect to be preferred by many people in the pandemic, so that they can minimize contacts with others. However, at the same time, people's fear of missing out, which is related to the desire for obtaining and maintaining social recognition from their reference group (Przybylski, Murayama, DeHaan, & Gladwell, 2013), drives people to choose for products or services that are socially preferred (Laato, Islam, & Laine, 2020). Thus, it can be regarded that these ambivalent sentiments in customer minds leads perceived

social preference and perceived innovativeness to affect customer satisfaction at the marginally significant level.

6.3 Additional Findings

6.3.1 Differences in Customer Satisfaction by Customers' Individual Factors

The current study applied analysis of variance (ANOVA) to find out whether customer satisfaction varies according to customers' individual factors. Firstly, two sets of ANOVA were conducted to test whether customer satisfaction varies by acquisition of prior experience of mobile shopping and AR technology. The result of former ANOVA had F-value as 0.137 and significance level as 0.712, indicating that there is no difference in customer satisfaction by whether customer purchased products from mobile shopping before. From Levene's test of equality of error variances, F-value was 0.058 and significance level was 0.810, so the validity of ANOVA was confirmed. The result of latter ANOVA had F-value as 0.009 and significance level as 0.923, which means that customer satisfaction does not vary by whether individual experienced AR technology prior to the survey. From Levene's test of equality of error variances, F-value was 0.028 and significance level was 0.868, so the validity of ANOVA was confirmed.

Additionally, a two-way ANOVA with full factorial model was conducted to test whether customer satisfaction changes by geography and gender, and the result reports that customer satisfaction differs by geography but not by gender and that there is no interaction effect between the two variables (refer to the Table 17 for the summary of the result). According to Levene's test of equality of error variances, F-value was 1.487 and significance level was 0.146, so the validity of ANOVA was confirmed.

Table 17. Summary of ANOVA Result: Difference of Customer Satisfaction by Geography and Gender

Variable	F-value (Sig)	Result
Geography	1.976 (0.084*)	Significant at 10% level
Gender	0.837 (0.389)	Not Significant
Geography* Gender	2.288 (0.326)	Not Significant

*** Significant at 0.01 level, ** Significant at 0.05 level, * Significant at 0.1 level

Lastly, the study conducted a factorial ANOVA with customized model including age, education level, annual income, and the interaction term between age and annual income. The result suggests that customer satisfaction differs by annual income but not by age or education level and that interaction effect exists between age and annual income (refer to the Table 18 for the summary of the result). From Levene's test of equality of error variances, F-value was 0.984 and significance level was 0.531, so the validity of ANOVA was confirmed.

Table 18. Summary of ANOVA Result: Difference of Customer Satisfaction by Age, Education, and Income

Variable	F-value (Sig)	Result
Age	0.459 (0.914)	Not Significant
Education Level	0.966 (0.411)	Not Significant
Annual Income	2.191 (0.031**)	Significant at 5% level
Age*Annual Income	1.422 (0.065*)	Significant at 10% level

*** Significant at 0.01 level, ** Significant at 0.05 level, * Significant at 0.1 level

6.3.2 Effect of Perceived Ease of Use on Customer Satisfaction

Although the hypothesis H1b is based on technology acceptance model, at the same time, Davis (1989) also implies that it is possible to regard perceived ease of use as an antecedent to

perceived usefulness instead of a direct determinant. In other words, the model that treats perceived usefulness as a mediating variable linking perceived ease of use to customer satisfaction can be considered. To test this alternative model, the current study followed the methodology developed by Baron and Kenny (1986) and conducted regression analyses by using IBM SPSS Statistics 21.

For the first stage, the simple regression analysis with independent variable as perceived ease of use and dependent variable as customer satisfaction was conducted. Overall, the ANOVA analysis showed that the models were significant at 0.000 level with F = 217.799 (*r-square* = 0.506), so perceived ease of use has a statistically significant effect on customer satisfaction. For the second stage, the study conducted the simple regression analysis with independent variable as perceived ease of use and dependent variable as perceived usefulness, which is also the mediating variable in the alternative model. Overall, the ANOVA analysis showed that the models were significant at 0.000 level with F = 260.087 (*r-square* = 0.549), which indicates that perceived ease of use affects perceived usefulness significantly. For the third stage, the simple regression model with independent variable as perceived usefulness and dependent variable as customer satisfaction was analyzed. Overall, the ANOVA analysis showed that the models were significant at 0.000 level with F = 281.985 (*r-square* = 0.567), meaning that perceived usefulness influences customer satisfaction significantly. For the last stage, the study compared the simple regression model in the first step and the multiple regression model with independent variables as perceived ease of use and perceived usefulness and dependent variable as customer satisfaction (refer to the Table 19 for the summary of the result).

Table 19. Summary of Mediation Effect Analysis: Perceived Usefulness as Mediating Variable

Step	Variable (Independent → dependent)	Standardized Coefficient (t-value-Sig)

1	Perceived ease of use → Customer Satisfaction	0.711 (14.758***)
2	Perceived ease of use → Perceived usefulness	0.741 (16.127***)
3	Perceived usefulness → Customer Satisfaction	0.754 (16.792***)
4	Perceived ease of use → Customer Satisfaction	0.339 (5.402***)
	Perceived usefulness → Customer Satisfaction	0.503 (8.012***)

*** Significant at 0.01 level, ** Significant at 0.05 level, * Significant at 0.1 level

Compared to the value of standardized coefficient of perceived ease of use in the simple regression model in the first step, the value of standardized coefficient of perceived ease of use in the multiple regression model in the last step is smaller but still statistically significant.

Therefore, based on the result of mediation effect analysis, the alternative model with perceived usefulness as the mediating variable that links perceived ease of use to customer satisfaction is verified to be valid. Actually this result is consistent with previous studies where perceived ease of use has a statistically significant indirect effect on customer satisfaction (Sheikhshoaei & Oloumi, 2011; Yoon, 2016; Rafique, Almagrabi, Shamim, Anwar, & Bashir, 2020). In short, although perceived ease of use has no direct effect on customer satisfaction, it can be considered that it still has some degree of indirect effect on customer satisfaction.

6.3.3 Difference in Purchase Intention by Customers' Gender in the Context of COVID-19

The current study explored whether purchase intention varies according to gender by conducting independent-samples t-test in the COVID-19, where the test variable is the scale item related to COVID-19 (I am willing to purchase products more through AR app due to COVID-19.)

and grouping variable is gender. The result of the t-test had t-value as 1.224 and significance level as 0.222, suggesting that customer purchase intention does not vary by gender.

6.3.4 Robustness Check in the Context of COVID-19

By taking advantage of COVID-19 related scale items measuring customer satisfaction, purchase intention, and customer loyalty, this study tested hypotheses again to find out whether the result of hypotheses testing is consistent in the context of COVID-19. First of all, multiple regression analysis was employed to test all hypotheses except for the hypothesis H5 and the hypothesis H6. Dependent variable was the COVID-19 related scale item measuring customer satisfaction (I will be satisfied with using AR app because it improves mobile shopping condition during the COVID-19.) and the scale items measuring satisfaction in perceived customer values and perceived risk (e.g. I will be satisfied with using AR app because it is useful when shopping through mobile phone.) were used as independent variables (refer to the Table 20 for the summary of the result). Overall, the ANOVA analysis showed that the models were significant at 0.000 level with $F = 36.135$ (*r-square* = 0.586). As all variables have their VIF values smaller than 10, so this regression result does not have the issue of multicollinearity. Based on the result, the hypotheses (H1a, H2b, H3b, H4b) are accepted while the hypotheses (H1b, H2a, H3a, H3b, H4a) are rejected. This result suggests that customers' perceived usefulness, perceived arousal, perceived innovativeness, and perceived performance risk have statistically significant effect on customer satisfaction in the context of COVID-19.

Table 20. Effects of Customers' Perceived Values and Risk on Customer Satisfaction Regarding COVID-19

Variable (Independent → dependent)	Standardized Coefficient (t-value-Sig)	VIF

Perceived usefulness → Customer Satisfaction (H1a)	0.199 (2.922***)	2.287
Perceived ease of use → Customer Satisfaction (H1b)	-0.070 (-1.051)	2.198
Perceived enjoyment → Customer Satisfaction (H2a)	0.054 (0.796)	2.276
Perceived arousal → Customer Satisfaction (H2b)	0.300 (3.551***)	3.522
Perceived social preference → Customer Satisfaction (H3a)	0.058 (0.911)	1.978
Perceived innovativeness → Customer Satisfaction (H3b)	0.165 (2.210**)	2.736
Perceived financial risk → Customer Satisfaction (H4a)	0.051 (0.715)	2.539
Perceived performance risk → Customer Satisfaction (H4b)	0.153 (2.633***)	1.674

*** Significant at 0.01 level, ** Significant at 0.05 level, * Significant at 0.1 level

Then two simple regression analyses were conducted to test whether statistically significant effect of customer satisfaction on purchase intention and on customer loyalty still hold when the scale items used for the regression analyses are restricted to the ones relevant to COVID-19. For the simple regression analysis for the effect of customer satisfaction on purchase intention (refer to the Table 21 for the summary of the result), the ANOVA analysis showed that the models were significant at 0.000 level with $F = 221.002$ ($r\text{-}square = 0.508$), so hypothesis H5 is accepted again. This result indicates that the relationship between customer satisfaction and purchase intention is consistent in the context of COVID-19.

Table 21. Effects of Customer Satisfaction on Purchase Intention with Scale Items Regarding COVID-19

Variable (Independent → dependent)	**Standardized Coefficient (t-value-Sig)**
Customer Satisfaction → Purchase Intention (H5)	0.713 (14.866***)

*** Significant at 0.01 level, ** Significant at 0.05 level, * Significant at 0.1 level

Likewise, the study applied simple regression analysis for customer satisfaction on customer loyalty (refer to the Table 22 for the summary of the result). Overall, the ANOVA analysis showed that the models were significant at 0.000 level with $F = 186.626$ (*r-square* = 0.466). According to the result, hypothesis H6 is again accepted, meaning that the effect of customer satisfaction on customer loyalty is still statistically significant in the era of COVID-19.

Table 22. Effects of Customer Satisfaction on Customer Loyalty with Scale Items Regarding COVID-19

Variable (Independent → dependent)	Standardized Coefficient (t-value-Sig)
Customer Satisfaction → Customer Loyalty (H6)	0.713 (14.866***)

*** Significant at 0.01 level, ** Significant at 0.05 level, * Significant at 0.1 level

The result summarized in the Table 20 is especially interesting for three reasons when it is compared with the result of the main multiple regression result, which is summarized in the Table 12. First of all, all the factors that are statistically significant at 1% level in the main regression analysis maintain their status at the same significance level in the context of COVID-19, confirming the validity of the result that these three factors are significant determinants of customer satisfaction. Secondly, perceived innovativeness becomes statistically significant at 5% level in the current multiple regression, while it is marginally significant at 10% in the main multiple regression. The scale item used for perceived innovativeness (I will be satisfied with using AR app because of its advanced technology.) addresses customer benefits that they can enjoy only from AR-enabled mobile shopping but not from traditional mobile shopping with photo and text. Therefore, as discussed above, it can be suggested that customers' great emphasis on functional aspects of consumption in the pandemic situation explains this result. Furthermore, other factors that are marginally significant at 10% level in the main regression analysis, namely perceived

social preference and perceived financial risk, lose their status in the context of COVID-19. This result might be interpreted also by the idea that customers are comparatively less concerned about perceived social value or economic costs when they are in the risky situation.

In short, it can be concluded that results of robustness check by means of testing hypotheses again in the context of COVID-19 is not substantially different from the main regression results. Consequently, this consistency between two hypotheses testing confirm the validity of main results of the study.

6.4 Managerial and Policy Implications

AR technology is one of the most widespread technologies of the fourth industrial revolution along with artificial intelligence technology. In the era of COVID-19, AR technology has become particularly important as customers can from presenting product or service as if people are really experiencing and has been employed in lots of occasions. BTS performed online concert by using AR technology last October, Changdeokgung Palace launched mobile application to allow people to virtually enjoy the place without physical visit, and Estée Lauder Companies employed AR technology to provide customers Virtual Try On services for their cosmetic products.

Moreover, combined with VR technology, the concept of Metaverse has recently emerged. Many people expect that it would be the next revolution after M-commerce, so many companies try to adapt themselves to this new trend. As the current study finds out, customers find AR functions most satisfying when they perceived that the functions helped them correctly expect the quality of product or service by virtually experiencing it and judge whether it would be actually useful to them. Therefore, for companies that consider employing AR technology, it would be a good strategy to focus on developing AR functions that can be helpful to customers' utilitarian

consumption. Similarly, for companies that already provide AR services, it would work better to emphasize how virtual experience of products can be useful to their shopping than to emphasize other characteristics of their AR functions.

In fact, it is also possible for government to enjoy benefits of the metaverse in providing better services to citizens. Shan, Panagiotopoulos, Regan, De Brún, Barnett, Wall, and McConnon (2015) find out that interactive two-way communication can be effective for public organizations to build relationships with the public. Seoul City Hall opened Smart Seoul Exhibition last year to help citizens virtually experience the expected outcomes of the smart city policies by employing AR technology. Gyeonggi province also declared a new policy to encourage AR technology to be introduced further in public sector last month, so government is certainly interested in taking advantage of AR technology for the public use. Hence, it would be possible to recommend government to pay attention to deliver practical benefits from the policy when they advertise policies through AR technology, like the case of Smart Seoul Exhibition. Furthermore, as metaverse is expected to be the next game changer in many sectors of the industry, institutional support is necessary to encourage companies to invest in Research and Development (R&D) for AR and VR technology, so that they can survive in the metaverse world.

6.5 Theoretical and Practical Contribution

The current study makes theoretical contribution in five aspects. First of all, the study contributes to technology-enabled CRM literature by providing the empirical result to verify the assumption that AR technology can be an effective tool of firms' CRM strategy. Secondly, even though there has been lots of previous studies on AR technology, majority of them has highlighted the technology in the perspective of either CRM or experience marketing. However, this research

embraces both CRM related aspects and experience marketing related aspects of AR technology, so it provides more integrated viewpoint to consider AR technology. Thirdly, the study contributes to the extant literature on the change of customer behavior in the COVID-19 pandemic by confirming the main findings with COVID-19 related scale items of the survey. Fourthly, although perceived social value and perceived risk has been comparatively ignored previously in the customer behavior literature on AR technology, the current research contributes to the literature by including the two variables as the additional determinants of customer satisfaction. Fifthly, this study also contributes to the existing literature on customer behavior with AR technology by extending the scope of the target group to potential users of AR technology, which has been also relatively disregarded in previous literature.

Adding to the five theoretical contributions discussed above, this research can be expected to have practical contribution to managers of the firms and policymakers as reference materials for designing marketing or public relations strategies that employ AR technology or for establishing policies to support firms' R&D investment for AR and VR technologies.

6.6 Limitations and Opportunities for Future Research

However, this research also has some limitations. First of all, sample size of the study is comparatively small, so increasing the sample size for the future study would make the findings of the research be more capable of generalization. Secondly, most respondents of the survey answered that they were from Asia. To collect answers from more diverse regions in future research would be also helpful to yield more generalized results. Thirdly, the study analyzed customer behavior on one category of product alone, but it would be interesting to include wider range of categories of product and compare the analysis result by product groups in different

categories. Fourthly, this research employs two-way ANOVA, factorial ANOVA, and mediation effect analysis to try to capture factors that indirectly affect customer satisfaction such as interaction effects between variables, but there are still limitations in this methodology. To deal with this issue, future studies can consider to apply structural equation model to pinpoint all possible indirect effects in the model. Lastly, it would be interesting to conduct the similar study in the post COVID-19 era, so that it would be possible to compare between the findings of the two studies would be possible.

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Appendix

Questionnaire:
Exploring Customer Relationship Management through Technology-enabled Experience in Virtual Environment: The Era of COVID-19

Please take 10 minutes to answer the following questions. Your responses to this survey are strictly confidential and will not be revealed to anyone other than researchers. Participation in this survey must be voluntary. All data will also be kept anonymously. The intent of this work is academic research purposes only. No individual or organization will be identified in any analyses or reports connected to the survey data. Your contribution is very important to provide better service in the e-business and improve online customer relationship management practices. Thank you!

Part 1. General (Warm-up question)

1. Have you ever purchased products from mobile shopping? ( ) Yes ( ) No → Please go to Question 5.
2. How often do you order products from mobile shopping?
   Highly Unlikely 1-----2-----3-----4-----5 Highly Likely
3. Do you think that you order products from mobile shopping more frequently during the COVID-19?
Strongly Disagree 1-----2-----3-----4-----5 Strongly Agree
4. Overall, how much are you satisfied with your mobile shopping experience?
   Strongly Dissatisfied 1-----2-----3-----4-----5 Strongly Satisfied
5. Have you ever experienced Augmented Reality (AR) technology? ( ) Yes ( ) No → Please go to Part 2.
6. Did you experience AR technology with mobile phone application (app) ? ( ) Yes ( ) No
7. How much were you satisfied with AR technology experience?
   Strongly Dissatisfied 1-----2-----3-----4-----5 Strongly Satisfied
8. Have you ever shopped through mobile phone with using the AR app during the COVID-19? ( ) Yes ( ) No → Please go to Part 2.
9. How much were you satisfied with AR-enabled mobile shopping experience?
   Strongly Dissatisfied 1-----2-----3-----4-----5 Strongly Satisfied

The chair in the pictures below is not actually placed in the space, but only virtually placed by AR app developed by IKEA.

It is 3D true-to-scale model of the product with 98 percent accuracy, so you can try many different products before you buy them and guess whether they would fit your space or not without measuring them. With the help of AR app, you can also expect how actual products would look into your space among other furnitures. Pleased be noted of these benefits of AR app when you answer the following questions.

Part 2. Perceived Utilitarian Value

10. Please rate (v) your overall opinions about perceived usefulness of AR-enabled mobile shopping based on what you read in previous page.

Strongly Disagree — Strongly Agree

(Perceived Usefulness)

a. I think that using AR app helps me shop through mobile phone more effectively. 1-----2-----3-----4-----5

b. I think that using AR app reduces the time I spend in shopping through mobile phone. 1-----2-----3-----4-----5

c. Overall, I think that AR app is useful when I shop through mobile phone. 1-----2-----3-----4-----5

d. I will be satisfied with using AR app because it is useful when shopping through mobile phone. 1-----2-----3-----4-----5

11. Please rate (v) your overall opinions about perceived ease of use of AR-enabled mobile shopping based on what you read in previous page.

Strongly Disagree — Strongly Agree

(Perceived Ease of Use)

a. I think that AR app is easy to use. 1-----2-----3-----4-----5

b. I think that I will become familiar at using AR app easily. 1-----2-----3-----4-----5

c. I think that my interaction with AR app is clear and understandable. 1-----2-----3-----4-----5

d. I will be satisfied with using AR app because it is easy to use. 1-----2-----3-----4-----5

Part 3. Perceived Hedonic Value

12. Please rate (v) your overall opinions about perceived enjoyment of AR-enabled mobile shopping based on what you read in previous page.

Strongly Disagree — Strongly Agree

(Perceived Enjoyment)

a. I think that using AR app gives me pleasure. 1-----2-----3-----4-----5
b. I think that it is interesting to use AR app. 1-----2-----3-----4-----5
c. Overall, I think that AR app is enjoyable to use. 1-----2-----3-----4-----5
d. I will be satisfied with using AR app because it is fun. 1-----2-----3-----4-----5

13. Please rate (v) your overall opinions about perceived arousal of AR-enabled mobile shopping based on what you read in previous page.

Strongly Disagree — Strongly Agree

(Perceived Arousal)

a. I think that using AR app makes me feel excited. 1-----2-----3-----4-----5
b. I think that using AR app improves my senses. 1-----2-----3-----4-----5
c. I think that using AR app makes me feel that products presented are like real ones. 1-----2-----3-----4-----5
d. I will be satisfied with using AR app because it motivates my mobile shopping better. 1-----2-----3-----4-----5

Part 4. Perceived Social Value

14. Please rate (v) your overall opinions about perceived social preference of AR-enabled mobile shopping based on what you read in previous page.

Strongly Disagree — Strongly Agree

(Perceived Social Preference)

a. I think that many people prefer to use AR app. 1-----2-----3-----4-----5
b. I think that many people install the app to use AR feature. 1-----2-----3-----4-----5
c. I think that people generally favor to use AR app. 1-----2-----3-----4-----5
d. I will be satisfied with using AR app because it is socially preferred. 1-----2-----3-----4-----5

15. Please rate (v) your overall opinions about perceived innovativeness of AR-enabled mobile shopping based on what you read in previous page.

Strongly Disagree — Strongly Agree

(Perceived Innovativeness)

a. I think that the app is one of innovative apps to provide the AR feature for mobile shopping. 1-----2-----3-----4-----5
b. I think that mobile shopping with AR app is advanced way of shopping. 1-----2-----3-----4-----5
c. I will be satisfied with using AR app because of its advanced technology. 1-----2-----3-----4-----5

Part 5. Perceived Risk

16. Please rate (v) your overall opinions about perceived financial risk of AR-enabled mobile shopping based on what you read in previous page.

Strongly Disagree Strongly Agree

(Perceived Financial Risk)

a. I think that using AR app can reduce the chance of refund or exchange. 1-----2-----3-----4-----5

b. I think that using AR app is convenient because I can save costs by choosing right products. 1-----2-----3-----4-----5

c. I will be satisfied with using AR app because I can save unnecessary costs. 1-----2-----3-----4-----5

17. Please rate (v) your overall opinions about perceived performance risk of AR-enabled mobile shopping based on what you read in previous page.

Strongly Disagree Strongly Agree

(Perceived Performance Risk)

a. I think that using AR app can help me evaluate product quality as shown in mobile. 1-----2-----3-----4-----5

b. I think that using AR app can increase the chance of getting products that fit to my expectation. 1-----2-----3-----4-----5

c. Overall, I feel confident about the product performance I choose based on AR app. 1-----2-----3-----4-----5

d. I will be satisfied with using AR app because it relieves concerns about product quality. 1-----2-----3-----4-----5

Part 6. Customer Satisfaction

18. Please rate (v) your overall opinions about customer satisfaction with AR-enabled mobile shopping based on what you read in previous page.

Strongly Disagree Strongly Agree

a. I will be satisfied with using AR app because it is functional when shopping through mobile. 1-----2-----3-----4-----5

b. I will be satisfied with using AR app because it gives me positive feelings. 1-----2-----3-----4-----5

c. I will be satisfied with using AR app because it makes me feel trendy. 1-----2-----3-----4-----5

d. I will be satisfied with using AR app because it reduces risks of mobile shopping. 1-----2-----3-----4-----5

e. I will be satisfied with using AR app because it improves mobile shopping condition during the COVID-19. 1-----2-----3-----4-----5

Part 7. Purchase Intention

19. Please rate (v) your overall opinions about purchase intention with AR-enabled mobile shopping based on what you read in previous page.

Strongly Disagree Strongly Agree

a. I am willing to purchase products that are presented through AR app. 1-----2-----3-----4-----5

b. I am willing to purchase products if I experience them with AR app. 1-----2-----3-----4-----5

c. I am willing to purchase products more through AR app due to COVID-19. 1-----2-----3-----4-----5

Part 8. Customer Loyalty

20. Please rate (v) your overall opinions about customer loyalty with AR-enabled mobile shopping based on what you read in previous page.

	Strongly Disagree				Strongly Agree
a. I am willing to recommend to use the app to my family members or friends.	1	2	3	4	5
b. I am willing to use AR app when I shop through mobile later.	1	2	3	4	5
c. I am more willing to purchase products that looks better on AR app.	1	2	3	4	5
d. I am willing to recommend AR app to people who prefers mobile shopping because of COVID-19.	1	2	3	4	5

Part 9. Demographic Information (Please select the closest answer for each question.)

21. Are you Korean? ( ) Yes ( ) No
22. Where are you from? ( ) Asia ( ) Europe ( ) Africa ( ) Oceania ( ) North America ( ) South America
23. Gender? ( ) Female ( ) Male
24. Martial Status? Married ( ) Single ( ) others ( )
25. How old are you?

( ) 18 – 20 ( ) 21 – 25 ( ) 26 – 30 ( ) 31 –35 ( ) 36 – 40

( ) 41 – 45 ( ) 46 – 50 ( ) 51 ~55 ( ) 56 –60 ( ) 61 – 64

( ) 65+

26. Your Education?

( ) High School or below
( ) Associate degree (finished 2 years of college)
( ) Bachelor degree (finished 4 years of college)
( ) Master degree or higher

27. Your annual income?

( ) Not available ( ) $10,000 or less ( ) $10,001 - $20,000 ( ) $20,001 - $30,000 ( ) $30,001 - $40,000

( ) $40,001 - $50,000 ( ) $50,001 - $60,000 ( ) $60,001 - $70,000 ( ) $70,001 or more

Thank you!