A Mixed-Method Approach to Explore the Motivations and Constraints of Kiosks Consumers

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A B S T R A C T

Providing services using kiosks is actively carried out between suppliers and consumers. These service processes have recently begun to play a dominant role in transactions. However, previous self-service technology (SST) studies or kiosks have not fully reflected the changing environment surrounding these different technologies. To cover the updated business environments, we combined qualitative and quantitative research methods. Through qualitative research and a review of previous studies, the variables emphasized as motivations and constraints for kiosks use and those that can be newly illuminated were selected for this study. We then applied the variables to the research model to assess their influence. In terms of the motivations for using kiosks, the results suggest that perceived usefulness and compatibility as service quality, forced use, and perceived service providers' efficiency as provider polices, absorptive capacity, and habit as an individual characteristic and social influence as a subjective norm have a significant effect on the attitude toward kiosks. In terms of constraints, difficult to use and need for interaction predicts the attitude toward kiosks. Attitude toward kiosks, perceived behavioral control, and social influence are directly related to the intention to use kiosks. Lastly, intention to use kiosks plays a significant role as an antecedent of revisit intention. Using these empirical results, we propose both academic and practical implications for future kiosks use.

Keywords: Kiosk, Contactless Technology, Theory of Planned Behavior, Motivations, Constraints, Mixed-method Approach

Ⅰ. Introduction

Many of the roles related to delivering services to customers are now being replaced by self-service technologies for multiple reasons, for example, to reduce labor costs. Contactless technology initially appeared in vending machines, automated teller machines (ATMs), automated information system, etc.,

and then developed into a form of kiosks that was an unmanned information terminal. According to one report, the kiosk's global market size is expected to grow by 270% to 45.7 billion dollars by 2026 when compared to the statistics for 2018 (Fortune Business Insights, 2019). As the utilization of kiosks increases, users' perceptions and experiences are also changing, unlike during initial introduction of kiosks (Oh et al., 2013).

The use of kiosks continues to expand, including those used for food orders, self-check-in services, ticket issue, and civil service processing services. According to a survey, the number of kiosks in restaurants more than tripled in 2019 compared to the prior year (KREI, 2020). The impact of the COVID-19 pandemic and along with the birth of a new term so-called 'untact' which refers to contactless behavior or method, a significant change is taking place in delivery of services (Um et al., 2020).

Since 2000, technology-based self-service has been provided to consumers, and related research on user acceptance, effectiveness, and perception of self-service has been conducted (Meuter et al., 2000). These studies reflect the type of self-service (e.g., kiosks, Internet), situation (Reinders et al., 2008), past experience using self-service (Wang et al., 2012), service type (Kim and Qu, 2014), and individual characteristics of self-service (Lee et al., 2010). However, recent studies have been conducted with a fragmentary point of view, failing to fully reflect the current technology-dominant service environment where self-service is proliferating and indeed replacing many human resources (Blut et al., 2016; Shin and Perdue, 2019). Additionally, in the context of company policy, such as a supplier's pressure to use contactless technology and any limited service provision, the attitude or perception of the user's self-service has been rarely examined (Lee and Lyu, 2016). Although the research

on contactless technology has been conducted over a long period, it is now necessary to grasp the current situation with further research offering a more comprehensive view.

We study the customers' motivations and constraints of contactless technology usage in the current changing environment wherein kiosks can play a dominant role in service delivery. Also, we empirically examine how the motivations and constraints affect kiosks users' perceptions. For the study, we use mixed-method approach. Mixed-method approach is an appropriate method to explore reality by combining rapidly changing environments or phenomena with existing theoretical perspectives (McKim, 2017). Also, this is one of the good ways to integrate various viewpoints such as pros and cons for the same phenomenon (Venkatesh et al., 2013). Thus, mixed-method study is the optimal method for our research purpose.

For mixed-method study, we divide qualitative and quantitative studies into Study 1 and Study 2, respectively. Specifically, our research has three research objectives. First, users' motivations and constraints for using kiosks are extracted from qualitative research using interviews and a close review of the existing literature. Second, we empirically verify how the factors (which came from qualitative research), subjective norms, and perceived behavioral controls (PBC) as derived by applying the theory of planned behavior (TPB) affect the attitude and intention to use a kiosk. Third, we ultimately verify how the intention to use a kiosk will affect the customers' intention to visit store that is operating that kiosks. This study verifies from a comprehensive perspective how the results of exploration using qualitative research can work empirically. Finally, we discuss the results of the verification and present theoretical and practical contributions.

Ⅱ. Research Backgrounds

2.1. Theory of Planned Behavior

As noted above, this study intends to apply Theory of planned behavior (TPB) to understand how the use of motivation and certain constraints affect users' attitudes and behavior. TPB was developed to predict how individuals develop behavioral intentions for specific events (Ajzen, 1991). TPB is developed from theory of reasoned action which is introduced by Fishbein and Ajzen (1977). Both of them argued the belief and intention to behavior will lead to actual action. While, prior scholars emphasized the situation control by individual to predicted the behavior intention and actual behavior more precisely. TPB states that one will develop a behavioral intention based on not only attitude and subjective norms but also PBC. In particular, it has been noted that an individual's motivation to do something can be a significant antecedent of that person's attitude and behavioral intention (Conner and Armitage, 1998).

Recent studies have applied TPB as a framework to explain various people's activities such as purchase intention, use intention, or visit intention. Yang (2012) combined TPB and individual traits to study consumer's shopping activities using mobile. Yang et al. (2017) studied individual's intention to use smart home service by combining TPB with people's trust and risk in technology. Kim and Hwang (2020) combined the characteristics of technology and TPB to investigate people's perceptions of drone-based food delivery services. The constraint factor is the cause of preventing individuals from using kiosks. This can affect individual behavior psychologically or physically (Ye and Potter, 2011). Chen et al. (2007) conducted an empirical analysis by combining constraint factors and TPB to investigate an individual's

negative attitude toward new software. So et al. (2018) studied the motivations and constraints of using Airbnb in the TPB to synthesize people's attitudes toward Airbnb. As such, TPB is a general framework for studying human behavior, and is an appropriate model for empirical research by incorporating the characteristics of a specific service or technology and the users' characteristics.

Thus, we wanted to study users' perceptions by addressing the environment in which kiosks are supplied, user characteristics, personal use, or any unused reasons related to the model presented by TPB. In particular, environmental change factors that surround kiosks are set as subjective norms to establish causality of attitude and behavioral intention toward kiosks. Motivations and constraints were divided to analyze empirically how these variables affect a user's attitude. Finally, we check how PBC will affect the intention of using kiosks.

2.2. Contactless Technology and Kiosk

Service providers, such as hotels, restaurants, and banks, are increasingly using contactless technology to complement or even replace their traditional way of providing services to customers. Service providers can leverage contactless technology to increase productivity and reduce operating costs. Through contactless technology, customers can receive the service more cheaply or quickly by directly engaging in the production activities. In addition, they can control the service delivery process.

Kiosk, a type of contactless technology, has thus become one of the most common forms of transaction across different industries (Chen et al., 2015). Currently kiosks come in various forms, which include information delivery, product service promotion, product delivery, and a guidance role. Different

types of kiosks have different purposes for their existence, so users may also have different attitudes or expectations (Wang and Shih, 2009). For example, Incheon Airport provides guide services to customers in the form of a service robot by combining a kiosk with a mobility function. As such, the degree of innovation can be applied differently depending on the type of kiosks and that difference can cause bias like novelty effect when researching kiosks. Therefore, to minimize this bias, we conducted this research on a transaction kiosk in charge of ordering and trading, a typical kiosk type.

Studies on kiosks and contactless technology have specified in recent years. Kokkinou and Cranage (2015) empirically analyzed how queues affect customer behavioral intention surrounding kiosks and employee services. Rosenbaum and Wong (2015) studied the factors and specific situations that can affect a customer's use of kiosks in hotels and casinos. Fan et al. (2016) studied the effect of machine voice anthropomorphics on customer service conversion intention in an airport kiosks service setting. Another study was also conducted to classify the types of people who use self-service at the airport using interview methods (Kelly et al., 2017). Lee and Cranage (2018) empirically studied the degree of criticism from a client due to the failure of contactless technol-

ogy, an employee, and company policy. Additionally, a study was conducted to examine customers' attitudes and switching intentions toward self-service for environments that try to induce the use of kiosks instead of face-to-face services (Feng et al., 2019). These recent studies have investigated the user's perception of the assumption of specific situations, rather than general situations for contactless technology and kiosks usage. To identify specific situations, the studies were also designed to produce an arbitrary situation or to study kiosks services in specific venues, such as airports and restaurants. In addition, empirical studies have been done to reflect the characteristics of the machine compared to the human. However, these recent studies were still limited in that they do not comprehensively deal with how the variables already treated in the existing literature affect users' attitudes and behavior based on the technology-dominant environment.

Ⅲ. Methodology

Our research uses a mixed-methods approach to qualitatively explore motivations and constraints for using kiosks followed by an empirical analysis conducting to determine factors influencing attitude to-
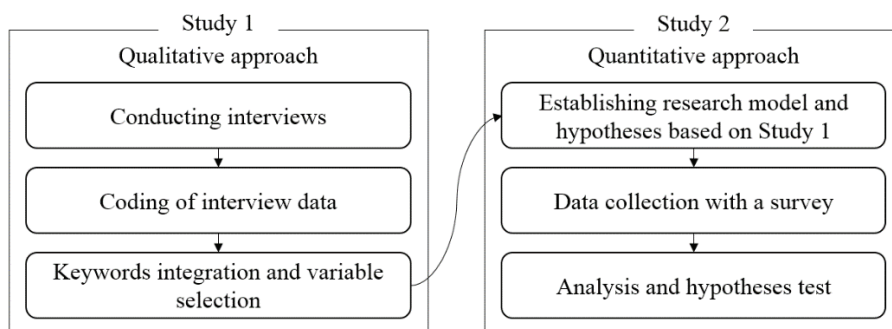
<Figure 1> Research Framework

ward kiosks. Through Study 1, we organize the interviews into keywords and integrate the organized keywords. The integrated keywords are used as research model variables. In this process, Study 1 and 2 are combined. Surveys with validated items were used to test the research model and generalize the findings. Research procedures are shown in <Figure 1>.

3.1. Study 1: Qualitative Research

To obtain qualitative information on the new phenomena that surrounds the kiosks environment that is not already explored in previous research and then confirm the critical factors of using/not using that kiosks circumstance, we used a semi-structured, one-on-one interview process. Criterion sampling was employed to convenience sample. Criterion sampling is a sampling strategy to select the participants who meet pre-determined criteria (Moser and Korstjens, 2018). Fifteen interviewees joined research in March 2020. Eight participants continued to use kiosks, and seven had used kiosks before but not now or had never used kiosks at all. We explored different consumer perceptions by organizing the interviewees using a wide range of ages from the 20s to 60s. All interviewees did have an accurate awareness of kiosks concept (see Appendix A).

One author conducted every interview while taking notes. First, the participants were asked for their age, gender, location where they used kiosks, and method of payment. Afterward, they answered our main question to state their opinion of the key factors that motivated them to use kiosks or the key factors that affected their decisions not to use kiosks.

Main question: Why [do/don't] you use kiosks when you buy or pay for something?

Based on these recorded interviews, two researchers conducted a content analysis, respectively. The keywords from authors to match the interview content were selected based on previous established factors by scholars. Keywords transformation by two authors were discussed with all authors to confirm the final version of our study. We counted the number of final agreed keywords and applied them to the study (Fakis et al., 2014). Keywords that were counted once and situation-related keywords were removed. Afterwards, all keywords and research factors were reviewed by authors to determine the final constructs for the quantitative research. This process helped us unify similar phenomenon keywords that were defined as different terms and derive new factors not examined in the previous studies.

The results of the qualitative research showed that the factors emphasized in previous research, which was related to hedonic values such as 'Enjoyment' and 'Novelty', did not affect the user's decision to use kiosks. Whereas, 'Perceived usefulness', 'Perceived ease of use', and 'Observability' maintained their position. 'Habit' and 'Subjective norm' were re-examined as essential motivators. Meanwhile, 'Forced use' and 'Perceived service providers' efficiency', which were rarely addressed in the previous studies, were here newly found to influence the user kiosks adoption. The keywords, as organized by interview content and the number of times they were mentioned, are summarized in <Table 1> below.

Integrated concepts and any related prior studies for each construct are given below in <Table 2>. In the end, eight motivation factors and three constraints factors are combined with TPB framework to develop a research model for Study 2.

<Table 1> Result of Interview

Motivations		
Keywords	Constructs	#
Convenience (11)*, Ease of communication (4), Ease of payment (4), User-friendly interface (1), Ease of use (1)	Perceived ease of use	21
The only way to order (12), Absence of employee (4)	Forced use	16
Store policy (12)	Perceived service providers' efficiency	12
Time saving (12)	Perceived usefulness	12
Habit (6), No special reason (3)	Habit	9
Accuracy (3), Clarity (2)	Observability	5
Subjective norm (3), Peer pressure (1)	Subjective norm	4
Avoidance of service employee (4)	Avoidance	4
Skilled (3)	Absorptive capacity	3
Perceived crowdedness (1), No waiting line (2)	*Situational factors*	3
Novelty (2)	*Hedonic value*	2
Constraints		
Keywords	Constructs	#
Difficult to use (12), Too complex to use (11), No chance to learn (7), Unable to deliver complex requests (3)	Difficult to use	34
Waiting line behind me (6), Embarrassment (4), Unfamiliarity (4), Time pressure (2), Privacy concerns (1)	Technology anxiety	17
Need for interaction (4), Diversity of payment (2), Poor service quality (2), System error (2), Employee recommendation required (1), Need customization (1), Order size (1), Employee's appearance (1), Inconvenience (1)	Need for interaction	15
Rejection without special reason (2)	-	2

*Note: The number in parentheses means the number of times the keyword is mentioned from two coders.

<Table 2> Similar Concepts of Constructs and Related Studies

Factors	Similar concepts	Literature	Used in our study	Operational definition
Motivations				
Perceived usefulness	Functionality, Performance expectancy, Relative advantages, Time saving	Fisk, Patricio, and Chang (2011) / Demoulin, and Djelassi (2016)	Used	The extent to which customers perceive that kiosks is useful
Perceived ease of use	Effort expectancy, Ease of communication, Convenience, User-friendly interface	Walker, Craig Lees, Hecker, and Francis (2002) / Meuter, Bitner, Ostrom, and Brown (2005)	Used	The extent to which customers perceive that kiosks is easy to use
Compatibility	Fit, Customization	Kim, and Qu (2014) / Demoulin, and Djelassi (2016) / Lee, and Lyu (2019)	Used	The extent to which customers perceived that using kiosks is compatible with their previous way.
Observability	Assurance, Results demonstrability	Meuter, Bitner, Ostrom, and Brown (2005) / Günay, and Erbuğ (2015)	Used	The extent to which the results of kiosk use are clearly visible and observe to users

<Table 2> Similar Concepts of Constructs and Related Studies (Cont.)

Factors	Similar concepts	Literature	Used in our study	Operational definition
Forced use	Threat to freedom, Pressure to use, Voluntariness of use,	Reinders, Dabholkar, and Frambach (2008) / Feng, Tu, Lu, and Zhou (2019)	Used	The extent to which customers perceive that they have felt pressure to use kiosk
Perceived service providers' efficiency	Benefit attribution	Nijssen, Schepers, and Belanche (2016)	Used	The extent to which customers perceive that service provider pursuit work efficiency through kiosks
Absorptive capacity	Self-efficacy, Self-confidence, Control, Autonomy, Ability	Walker, and Johnson (2006) / Lee, Park, Chung, and Blakeney (2012) / Pham, and Ho (2015)	Used	The extent to which customers have ability to treat kiosk or understand of it.
Habit	Familiarity, Past experience, Enslavement	Oh, Jeong, and Baloglu (2013) / Blut, Wang, and Schoefer (2016) /	Used	The extent to which customers use kiosk habitually
Enjoyment	Hedonic value, Fun	Weijters, Rangarajan, Falk, and Schillewaert (2007) / Wang (2012)	Not used	-
Novelty	Hedonic value	Dabholkar, and Bagozzi (2002) / Hsiao, and Tang (2015)	Not used	-
Innovativeness	-	Lin, and Hsieh (2007) / Elliott, Meng, and Hall (2008)	Not used	-
Constraints				
Difficult to use	Poor design	Mavri, and Ioannou (2006)	Used	The extent to which customers perceive that the kiosk is difficult to use
Need for interaction	Inertia, Resistance to change	Meuter, Bitner, Ostrom, and Brown (2005) / Gelderman, Paul, and Van Diemen (2011)	Used	The extent to which customers want to interact with human when they transact
Technology anxiety	Risk, Stress, Discomfort, Insecurity	Lee, Fairhurst, and Cho (2013) / Demoulin, and Djelassi (2016) / Lee, and Lyu (2019)	Used	The extent to which customers hesitate to use technology and are worried that they will not be able to use it well
Subjective norms				
Trend affinity	-	So, Oh, and Min (2018)	Used	The extent to which customers consider kiosks as a trend
Social influence	Image, Culture	Schepers, and Wetzels (2007) / Kaushik, Agrawal, and Rahman (2015)	Used	The extent to which customers have a positive view of the use of kiosks in consideration of the actions, opinions, and relationships of others.
Situational factors				
Crowdedness, Time pressure, Queue length, Type of SST		Gelderman, Paul, and Van Diemen (2011) / Wang, Harris, and Patterson (2012) / Demoulin, and Djelassi (2016)	Not used	-

3.2. Study 2: Quantitative Research

In Study 2, hypotheses development was described to explain the relationships among variables. To design the relationship between independent variables and attitude toward kiosks, we grouped independent variables in four groups based on prior scholars' argument (Cohen and Levinthal, 1990; Cserdi and Kenesei, 2021; Jang et al., 2016). Then we introduced items for constructs. Finally, we described the survey process conducted and presented the general characteristics of the samples used in the analysis.

3.2.1. Hypotheses Development

3.2.1.1. Service quality and Attitude

Perceived usefulness is defined as a person's belief that using a particular system will help enhance his/her performance (Davis, 1989). Usefulness is a concept used in technology acceptance model (TAM). It has been demonstrated in multiple studies as an important factor for attitudes and intentions to use technology. While complex factors may also affect users' attitudes toward kiosks in the new environment, as shown in many previous studies and interviews, usefulness as provided by self-service works as a powerful antecedent to a positive attitude toward kiosks use. Therefore, we set up the following hypothesis.

H1: Perceived usefulness from using a kiosk has a positive effect on the attitude toward kiosks.

Ease of use is defined as "the degree to which using a particular system is free of effort" (Karahanna et al., 1999). Kiosk is a representative device that is based on self-service, since its first appearance, so efforts have been made to minimize the difficulty of its use and the complexity of service request procedures for users. Existing studies have demonstrated that perceived ease of use (PEOU) also induces a positive attitude toward using that technology by merely providing convenience of its use. In this study, the following hypothesis was established in the belief that the PEOU of kiosks' use would have a positive effect on users' attitudes toward kiosks as contactless technology evolves.

H2: Perceived ease of use of using a kiosk has a positive effect on the attitude toward kiosks.

Compatibility is the degree to which a person regards using a particular system as being consistent with his/her preexisting work process. Even if a new technology or system is useful and convenient to use, there is no intention to use it if it does not fit the user's work style (Kim et al., 2015). As for the kiosks, ordering food or requesting a service through self-service is not a traditional method. When users feel compatible with such a method, they will have a positive attitude toward kiosks. Therefore, we produced the following hypothesis.

H3: Compatibility of using a kiosk has a positive effect on the attitude toward kiosks.

Observability is the degree to which the results of a new or innovative system are visible and apparent (Rogers, 2003). In self-service, the user directly handles a particular procedure, regardless of whether the technology is applied to the process, so there is little gap in the expected result. Furthermore, in the case of contactless technology being applied such as with kiosks, human-made errors caused by employees can be eliminated. The following were mentioned in the interviews: If a kiosk is used, clear

results appear in the service delivery process, and if there is a failure in the service result, then it is easier to find out where that error occurred. Therefore, observability of a kiosk service can have a positive effect on the attitude toward that kiosks.

H4: Observability of using a kiosk has a positive effect on the attitude toward kiosks.

3.2.1.2. Provider polices and Attitude

Forced use is defined as a forced conditions with no other way for consumers to get desired products or needed services, except for supplier provision (Liu, 2012). Forced use is the most emphasized concept to use for a comparison to the initial introduction of contactless technology in Study 1. This construct induces consumers to use a kiosk forcibly by providing services in accordance with contactless technology in a business environment. Not only franchised fast-food restaurants but also small restaurants and cafes, have used kiosks as one of the leading service delivery channels based on the company's policy. Forced use can lead to consumer use, but it can also threaten freedom of service choice and cause negative perceptions. Reinders et al. (2008) argued that the less consumer choice there is in services, the more negative consumers may feel about self-service and the self-service providers. According to Liu (2012), forced use can cause technical instability and negatively affect confidence in contactless technology. Feng et al. (2019) also argued that forced use evokes negative feelings in consumers, causing them to have a negative attitude toward contactless technology and an intent to switch to different services. Therefore, we offer the following hypothesis based on the results of these empirical studies.

H5: Forced use of using a kiosk has a negative effect on the attitude toward kiosks.

Perceived service providers' efficiency is the degree to which an individual's use of technology is considered to affect the efficiency of the supplier's efforts (Tommasetti et al., 2017). Service providers can thus pursue efficiency of business processes through self-service. Suppliers can focus more on other tasks by assigning the part via contactless technology that consumers will play in that role (Lee and Allaway, 2002). On the other hand, from a consumer's perspective, an individual can use a kiosk to select an ordering method and immediately convey his or her opinion without any waiting. Nijssen et al. (2016) noted that from a consumer's point of view, the cost-related aspect can sometimes be interpreted negatively. However, the benefit is that the concept of work-sharing is applied, which not only increases the efficiency of that service delivery but also improves the overall quality of the service. Therefore, pursuing efficiency of work using a supplier's kiosk will make the consumer have a positive attitude toward kiosks. Thus, the following hypothesis is offered:

H6: Perceived service providers' efficiency by using a kiosk has a positive effect on the attitude toward kiosks.

3.2.1.3. Individual characteristics and Attitude

Absorptive capacity is the ability of individuals to apply new knowledge and methods to their work and activities by using that knowledge (Lee et al., 2012). Suppose we use the initial self-service scope based on the standard, including vending machines and the Internet. In that case, users exposed to that service environment for a long time will feel less burdened in making transactions through kiosks. IT competence also positively affects individual beliefs and attitudes (Bassellier et al., 2001). In the context

of educational studies, students' competence with a web-based system has a significant effect on their learning attitudes (Kuo et al., 2012). In our study, it was determined that if the ability to use a kiosk was excellent, that ability could have a positive effect on the attitudes toward kiosks. Thus, the follow hypothesis was developed:

H7: Absorptive capacity of using a kiosk has a positive effect on the attitude toward kiosks.

Habit is defined as a learned behavior that evolves into repeat behavior without conscious intention (De Guinea and Markus, 2009). Habit is one of the motivating factors' most often mentioned in the interviews. As self-service and kiosks continue to expand their influence as a trading channel, users are naturally accumulating experience by using them. Therefore, in the current technology-dominated environment, the habitual use of kiosks will lead to more familiarity with kiosks and a positive attitude toward using them. In the study by Wang et al. (2017), habit played an important role in the study of consumers' perceptions of self-service, and the moderating effect of habit was also examined. So, therefore, we offer Hypothesis 8 below:

H8: Habit of using a kiosk has a positive effect on the attitude toward kiosks.

3.2.1.4. Constraints and Attitude

Difficult to use is the degree to which an individual studying a particular system is difficult and leads to physical/mental effort (Kim et al., 2007). Difficulty with technology can directly produce a negative attitude toward using technology or refusing to use technology (Lee et al., 2016). Indeed, when implementing service design innovation for smart tourism in

Europe, traditional service processes were also considered for those who may have technical difficulties with them. In the interview conducted in Study 1, several complex reasons were mentioned as motives. However, there was considerable content offered that the difficulty of technology made the users of kiosks reluctant to use constraints. We thus created the following hypothesis by integrating these reasons, such as difficulty in acquiring technology, unfamiliarity, inconvenient use, complexity of service, and problems related to the design quality of kiosks, as potential technical difficulties.

H9: Technical difficulties of using a kiosk has a negative effect on attitude toward kiosks.

Need for interaction is defined as "a need that some individuals feel for interacting with the service employee in a service encounter" (Dabholkar, 1992). An individual's tendency to need face-to-face services has traditionally been studied as one of the crucial constraints for the use of contactless technology (Reinders et al., 2008). If you prefer direct service requests delivered through humans contact rather than contactless technology, you may decide not to use a kiosk, regardless of its advantages or the reason for using it. In this regard, several studies have shown that concepts, such as resistance to change (Blin and Munro, 2008), inertia, or status quo bias, can lead to negative attitudes toward using new types of services or systems. Reacting to these concepts, we set up a hypothesis on the relationship between the need for interaction and examining the attitude toward kiosks as follows.

H10: Need for interaction has a negative effect on attitude toward kiosks.

Technology anxiety is the fear, worry, and uneasiness that people feel when considering the use of or actually using general technology tools (Meuter et al., 2003). Such concerns about technology can be attributed to the number of risks that any use of technology can bring (Zhou, 2011). In addition, concerns can arise as to whether the user as an individual will be able to fully utilize the technology. Parasuraman (2000) proposed two constructs, namely, discomfort, and insecurity, to identify the negative views on technology when measuring the user's technology readiness. These concepts include concerns about technology that the negative emotions of users can produce. In the current study, we tried to integrate these concerns into an explanation of technology anxiety. Previous studies have suggested that certain concerns may arise, such as whether the kiosks can be handled well or whether the transaction process can be completed smoothly by users (Liljander et al., 2006). In other words, users concerned about technology may have a negative view of kiosks. Thus, the following hypothesis is offered:

H11: Technology anxiety has a negative effect on attitude toward kiosks.

3.2.1.5. Subjective norms and Attitude, Intention

The subjective norm in the TPB is based on certain behavioral criteria, as influenced by external and social interactions. To reflect normative pressures, we included two variables as a subjective norm. First, trend affinity is a consumer's desire to catch up with a trend or want to use progressive and popular products or services (Möhlmann, 2015). Anyone who is active and following trends will positively look at the moment when kiosks are being extended. From a simple transaction type to a new form equipped with cutting-edge technologies, such as voice recog-

nition or mobility, kiosks continues to maintain this trend as it approaches more end users. Aggressive use of kiosks in restaurants or cafes can be viewed as presenting a future business environment to customers as well as similar businesses. Moreover, trend affinity can generate a spirit of challenge and a desire for exploration, leading to more willingness to use newness (Cetto et al., 2015). Therefore, we offer the following two hypotheses:

H12: Trend affinity has a positive effect on the attitude toward kiosks.
H13: Trend affinity has a positive effect on the intention to use kiosks.

Social influence is the degree to which a consumer's valued people (family, friends, colleagues, etc.) believe they should use a product or a service (Venkatesh et al., 2012). Our behavior can be influenced by our interactions with the people around us, and the same is true when we are dining in restaurants or experiencing tourism. Previous studies have tested the importance of social influence on technology adoption (Venkatesh and Morris, 2000). In addition, social influence can have a direct influence on not only individual attitudes and initial acceptance, but also on the intention to proceed with continuous use (Koo and Chung, 2014). Therefore, we offer two more hypotheses as follows:

H14: Social influence has a positive effect on the attitude toward kiosks.
H15: Social influence has a positive effect on the intention to use kiosks.

3.2.1.6. Attitude, PBC and Intention

When an individual has a favorable attitude toward a particular action, the tendency to act becomes great-

er (Fishbein and Ajzen, 1977). The relationship between attitude and behavioral intention has been examined in the literature, and many studies have been conducted to confirm the role of attitudes on action by focusing on an individual's intention to use technology (Legris et al., 2003; Mathieson, 1991). Of these, Davis (1989) confirmed that via TAM an individual's positive attitude toward technology does play an important role in accepting that individual's technology. Curran and Meuter (2005) confirmed the effect of attitudes on intention to use in terms of contactless technology. In this context, a kiosk, which is a representative contactless technology that consumers can use to purchase goods and services, can also be linked to actual use intentions, but only when the consumer's positive attitude has been formed. Indeed, since the intention to use a kiosk will increase as the user positive attitude toward that kiosks increases, the following hypothesis is offered.

H16: Attitude toward kiosks has a positive effect on the intention to use kiosks.

PBC is related to a user's ability to perform something (Ajzen, 1991). Further, PBC reflects certain conditions that contain a person's opportunities or resources. So, PBC can refer to the user's actual behavior directly. In the context of the self-service environment, kiosks has issues related to the using condition constantly. For example, a disabled person or children may have problems when handling a kiosk. Alternatively, an unknown machine error can put a customer in a situation where kiosks cannot be used. Thus, if people have a ability to use a kiosk and possible to use it that individuals can have a intention to use a kiosk.

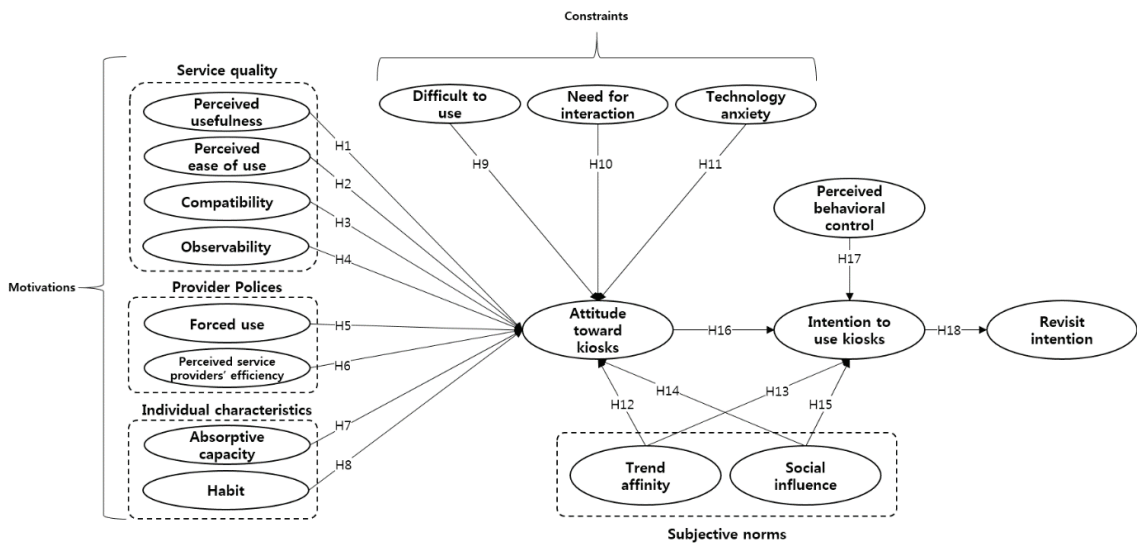*H17: PBC has a positive effect on intention to use kiosks.*

If an individual has the intention to use a technology, that person may also intend to act on additional activities to which the technology is applied. According to Pallud and Straub (2014), having an intention to revisit a website can lead to an intention to visit the museum that operates that website. Chung et al. (2015) argued that if users have a positive reaction to AR that promotes tourist destinations, then they can also have the intention to visit that actual destination. On the other hand, consumers can explore new services using switching behavior even when they feel that a problem has occurred during the service delivery process as well as seeing a core service problem (Keaveney, 1995). Having the intention to use kiosks means that they feel satisfied with the service transaction delivered through that self-service, and that satisfaction can then positively affect their revisit intention (Um and Chung, 2021). Thus, the following hypothesis is offered:

H18: Intention to use kiosks has a positive effect on revisit intention.

Based on the results from Study1 and the offered hypotheses, we suggest <Figure 2> as a research model.

3.2.2. Survey Instrument

Measurement questions are normally constructed based on measurement statements that have already been confirmed for their reliability and validity through existing studies and then modified to fit the particular subject of the current study. In addition, in the case of measuring any questions on constructs that were not shown in previous studies, this study is presented anew, and is referring to variables already being used similarly in other areas of study. We

<Figure 2> A Research Model

used multi-measurement items to cover the various attributes of a construct and avoid measurement errors. All the questions used a 7-point Likert scale (1 point: not very much, 7 points: very much) for full and clear user awareness.

Specifically, the questions presented by Wang (2012) were used to measure the usefulness in service quality of motivational factors. For PEOU, the questions presented by Karahanna et al. (1999) were used. Compatibility and observability items were adopted from Moore and Benbasat (1991). Items for forced use were newly assembled using related studies (Feng et al., 2019; Liu, 2012; Shih et al., 2013). Perceived service providers' efficiency was also developed based on items from Nijssen et al. (2016), Ling-Yee et al. (2017) and Rapp et al. (2006). For consumer characteristics, four items following Lee et al. (2012) were used to measure Absorptive capacity, while the questions asked by Limayem and Hirt (2003) were used to measure Habits. Meanwhile, technical difficulties as one of the constraints were measured by items from Venkatesh et al. (2003). Four items from Meuter

et al. (2005) and Lee et al. (2013) captured the need for interaction. Items on technology anxiety were derived from Lee et al. (2013). Trendy affinity and social influence as the subjective norm were measured using the scale from So et al. (2018). Items on attitude toward kiosks were derived from Feng et al. (2019). The questions noted Lee et al. (2013) were used to measure the PBC. Three items from Chung et al. (2015) were used for intention to use kiosks. Revisit intention items were derived from Khalifa and Liu (2007). All the items are suggested in Appendix B.

3.2.3. Study Design, Procedure, and Participants

To test the proposed research model, we conducted an online survey through Embrain, one of the most popular data collection companies in South Korea. To gather the proper sample for our research purposes, we targeted individuals who had used kiosks to order food or beverages in the past 12 months. A quota sampling method was adopted to meet cer-

tain criteria, such as gender, age, income, and others. We also carried out a pretest to check the face validity. The main survey was conducted for a week in June 2020. To validate the quality of the samples, incomplete responses and aberrant responses were excluded. Thus, a total of 278 answers were used for the research analysis.

A total of 278 respondents participated. The sample consisted of more females (62.9%) than males (37.1%). 25.5% of all respondents were under 20, 23.4% were between ages 20~29, 12.2% between ages 30~49, and 38.9% were more than 50. More details on the characteristics of the sample is shown in <Table 3>.

IV. Data Analysis and Results

4.1. Non-response Bias

To check potential non-response bias, we confirmed whether there were any differences between early and late respondents for the demographic variables and the individual measurement items (Armstrong and Overton, 1977). These results did not show any significant differences between the early 10% and the late 10% of respondents for their socio-demographic characteristics. Further, there was no significantly difference (p > .10) in all the measured items between early and late respondents. Thus, we verified that non-response bias did not appear to be a major issue in this study.

4.2. PLS Modeling

Partial Least Squares (PLS) Path Modeling was used to determine the predictive power of motivation and the constraints on kiosks use. Unlike covariance-based structural equation modeling, which tests and confirms theory (Hair Jr et al., 2016), PLS-PM aims to identify key predictors by fully explaining the residual variance of latent variables (Hair et al., 2013). This study investigated the effects of motivation and constraints on consumer attitudes and behavioral intentions in a new kiosk environment. Thus, the goal was not to reconfirm the theory or motivation/constraints already ex-

<Table 3> Demographics of Participants

Profile Category		Frequency	Percentage
Gender	Male	103	37.1
	Female	175	62.9
Age	Under 20	71	25.5
	20-29	65	23.4
	30-39	17	6.1
	40-49	17	6.1
	50-59	53	19.1
	Over 60	55	19.8
Education	High school	45	16.2
	University/college	57	20.5
	University/college	147	52.9
	Graduate school	29	10.4
Marital	Married	131	47.1
	Single	147	52.9
Monthly income	Less than 1 m won*	77	27.7
	1-2 m won	28	10.1
	2-3 m won	64	23
	3-4 m won	33	11.9
	4-5 m won	22	7.9
	Over 5 m won	54	19.4
Occupation	Student	86	30.9
	Office worker	81	29.1
	Services	13	4.7
	Mechanic	8	2.9
	Specialist	17	6.1
	Business	16	5.8
	Homemaker	30	10.8
	other	27	9.7
Total		278	100%

*Note: m won = million Korean Won

plained, but rather evaluate the new model offered using newly extracted predictors (Chin and Newsted, 1999; Sarstedt et al., 2014). In addition, because a proven existing theory which reliably reflects the new kiosk environment and explains the newly extracted predictors lacks, PLS-PM was selected as the most appropriate method for data analysis in this study. To this end, the analysis was carried out in two stages through SPSS 25 and SmartPLS 3.0: (1) a measurement model analysis and (2) a structural model analysis (Hair et al., 2013).

4.3. Measurement Model

Measurement model analysis involves evaluating validity and reliability, so we first conducted a con-

firmatory factor analysis to verify the convergent validity and reliability of the construct measures. After reviewing the low loading value based on the first analysis results, any items that hindered convergent validity and reliability were deleted. After a re-estimate, it was confirmed that the loading of all items exceeded 0.7. As shown in <Table 4>, Cronbach's alpha for all the measures was greater than 0.7, and the composite reliabilities for inner validity in our study were also greater than 0.7 (Hair et al., 2011). Therefore, all measures were strong in terms of reliability. Finally all AVEs used for confirming convergent validity were also higher than 0.5 (Fornell and Larcker, 1981). All of these results presented strong evidence for convergent validity and also reliability of all measurement variables.

<Table 4> The Measurement Model Statistics

Construct	Item	Loadings	α [a]	rho_A	CR [b]	AVE [c]
Perceived usefulness	Useful1	0.902	0.946	0.948	0.961	0.861
	Useful2	0.942				
	Useful3	0.937				
	Useful4	0.930				
Perceived ease of use	PEOU1	0.905	0.931	0.945	0.951	0.830
	PEOU2	0.943				
	PEOU3	0.851				
	PEOU4	0.943				
Compatibility	Compati1	0.896	0.913	0.928	0.939	0.793
	Compati2	0.924				
	Compati3	0.810				
	Compati4	0.927				
Observability	Obser1	0.921	0.949	0.951	0.963	0.867
	Obser2	0.944				
	Obser3	0.944				
	Obser4	0.915				
Forced use	Only1	- [d]	0.908	0.913	0.935	0.784
	Only2	0.908				
	Only3	0.916				
	Only4	0.852				
	Only5	0.864				
Perceived service providers' efficiency	Att_work1	0.770	0.832	0.894	0.897	0.744
	Att_work2	0.904				
	Att_work3	0.906				

<Table 4> The Measurement Model Statistics (Cont.)

Construct	Item	Loadings	α [a]	rho_A	CR [b]	AVE [c]
Absorptive capacity	Absor1	0.930	0.923	0.933	0.951	0.865
	Absor2	0.943				
	Absor3	0.917				
	Absor4	- [d]				
Habit	Habit1	0.921	0.914	0.918	0.946	0.853
	Habit2	- [d]				
	Habit3	0.914				
	Habit4	0.936				
Difficult to use	Diffi1	0.936	0.965	0.969	0.973	0.878
	Diffi2	0.945				
	Diffi3	0.914				
	Diffi4	0.949				
	Diffi5	0.940				
Need for interaction	Need1	0.922	0.937	0.952	0.955	0.841
	Need2	0.884				
	Need3	0.929				
	Need4	0.932				
technology anxiety	Anxi1	0.940	0.959	0.966	0.970	0.891
	Anxi2	0.936				
	Anxi3	0.934				
	Anxi4	0.965				
Trend affinity	Trend1	- [d]	0.933	0.946	0.958	0.883
	Trend2	0.948				
	Trend3	0.961				
	Trend4	0.909				
Social influence	So_influ1	0.890	0.771	1.073	0.825	0.613
	So_influ2	- [d]				
	So_influ3	0.734				
	So_influ4	0.714				
Perceived behavioral controls	P_b_c1	- [d]	0.926	0.927	0.953	0.871
	P_b_c2	0.926				
	P_b_c3	0.936				
	P_b_c4	0.937				
Attitude toward kiosks	Att_kio1	- [d]	0.924	0.924	0.952	0.868
	Att_kio2	0.923				
	Att_kio3	0.945				
	Att_kio4	0.927				
Intention to use kiosks	Int_kio1	0.979	0.957	0.957	0.979	0.959
	Int_kio2	0.980				
	Int_kio3	- [d]				
Revisit intention	Revi1	- [d]	0.921	0.927	0.950	0.863
	Revi2	0.923				
	Revi3	0.939				
	Revi4	0.924				

Note: [a] Cronbach's alpha, [b] Composite reliability, [c] Average variance extracted, [d] Items were removed after confirmatory factor analysis

<Table 5> Construct Correlations and Discriminant Validity

	Absor	Anxi	Compati	Diffi	Att_work	Habit	Att_kio	Int_kio	Need	Obser	Only	PEOU	P_b_c	Revi	So_influ	Trend	Useful
Absor	*0.930*																
Anxi	-.502**	*0.944*															
Compati	.515**	-.344**	*0.890*														
Diffi	-.414**	.633**	-.370**	*0.937*													
Att_work	.420**	-.298**	.365**	-.344**	*0.862*												
Habit	.547**	-.370**	.664**	-.443**	.517**	*0.924*											
Att_kio	.546**	-.365**	.628**	-.537**	.568**	.664**	*0.932*										
Int_kio	.623**	-.425**	.642**	-.516**	.567**	.701**	.839**	*0.979*									
Need	-0.101	.232**	-.254**	.193*	-0.011	-.123*	-.199**	-.201**	*0.917*								
Obser	.629**	-.465**	.613**	-.458**	.490**	.601**	.563**	.610**	-.125*	*0.931*							
Only	-.155**	.338**	-.232**	.378**	-0.055	-.118*	-.241**	-.234**	.214**	-.258**	*0.885*						
PEOU	.511**	-.487**	.580**	-.637**	.394**	.572**	.533**	.556**	-0.096	.660**	-.363**	*0.911*					
P_b_c	.759**	-.459**	.528**	-.462**	.429**	.660**	.600**	.659**	-0.073	.666**	-.180**	.529**	*0.933*				
Revi	.480**	-.283**	.543**	-.405**	.419**	.577**	.693**	.762**	-0.028	.508**	-.148**	.465**	.585**	*0.929*			
So_influ	.265**	0.046	.252**	-.165**	.403**	.334**	.409**	.386**	.262**	.256**	.135*	.223**	.334**	.507**	*0.783*		
Trend	0.081	.170*	.154*	-0.066	.273**	.201**	.275**	.217**	.289**	0.084	0.1	0.114	.153*	.409**	.646**	*0.939*	
Useful	.551**	-.277**	.683**	-.402**	.513**	.688**	.677**	.700**	-0.077	.638**	-.186**	.565**	.621**	.634**	.384**	.328**	*0.928*

Note: *Italic* font of the diagonal elements mean the square root of AVE, Absor=Absorptive capacity, Anxi=Technology anxiety, Compati=Compatibility, Diffi=Difficult to use, Att_work= Perceived service providers' efficiency, Att_kio=Attitude toward kiosks, Int_kio=Intention to use kiosks, Need=Need for interaction, Obser=Observability, Only=Forced use, PEOU=Perceived ease of use, P_b_c=Perceived behavior controls, Revi=Revisit intention, So_influ=Social influence, Trend=Trend affinity, Useful=Perceived usefulness, * p<0.05, ** p<0.01

To assess discriminant validity, we adopted two separate analyses. First, we checked whether the square root of a construct's average variance extracted (AVE) was higher than the inter-construct correlation, following the criterion proposed by Fornell and Larcker (1981). It was further verified that each square root of AVE was higher than the correlations between it and other constructs. The results, as shown in <Table 5>, present clear evidence of discriminant validity. Secondly, we examined whether the factor loading of an item was greater than the item cross-loadings of the indicators (Hair et al., 2011). These results, as presented in <Table 5>, suggest that all items loaded on their own construct were higher than another construct.

4.4. Hypothesis Test

The adjusted R square for attitude toward kiosks, intention to use kiosks, and revisit intention were 0.665, 0.746, and 0.589, respectively. H1 ~ H4 presents the structural relationships for service quality and attitude. The hypotheses for usefulness ($\beta = 0.169$, $p < 0.01$) and compatibility ($\beta = 0.155$, $p < 0.01$) were statistically significant contributors for attitude toward kiosks and support H1 and H3. However, PEOU ($\beta = -0.062$, n.s.) and observability ($\beta = -0.031$, n.s.) did not significantly contribute to attitude toward kiosks. The relationship between the only channel corresponding to the provider policy ($\beta = -0.087$, $p < 0.05$) and the attitude toward kiosks of employee attitude ($\beta = 0.172$, $p < 0.01$) was established in hypotheses 5 and 6, and both of these hypotheses were adopted. Both absorptive capacity ($\beta = 0.095$, $p < 0.1$) and habit ($\beta = 0.157$, $p < 0.01$) corresponding to consumer characteristics were found to have a statistically significant positive effect on attitude toward kiosks. Therefore, Hypothesis 7 and Hypothesis 8 were also adopted.

The results for Hypotheses 9, 10, and 11 confirm how the three concepts corresponding to constraints affecting attitude toward kiosks accordingly. Both technical difficulties ($\beta = -0.214$, $p < 0.01$) and Need for interaction ($\beta = -0.115$, $p < 0.01$) were found to have significant negative effects, and Hypotheses 9 and 10 were adopted. However, t technology anxiety ($\beta = 0.067$, n.s.) was not significant, so Hypothesis 11 was rejected.
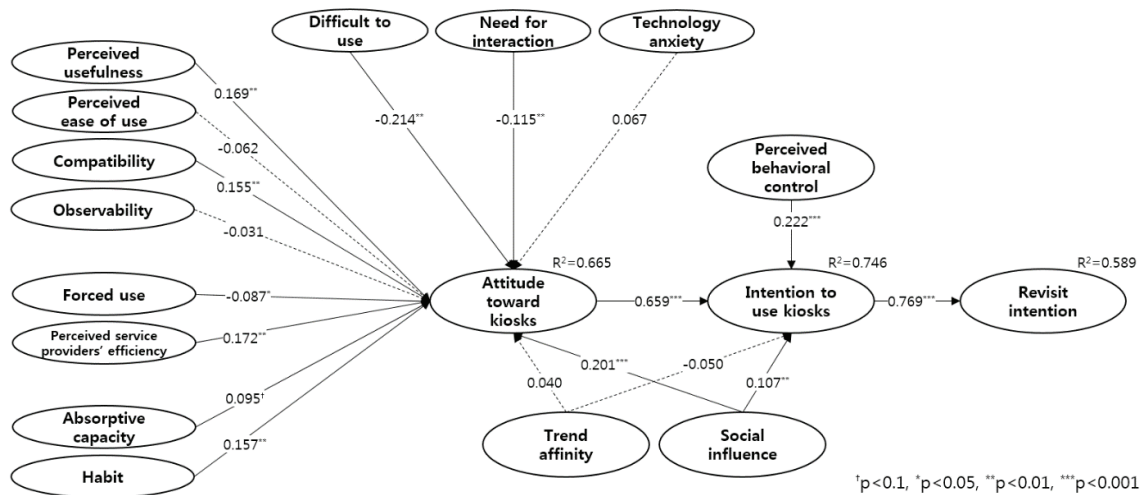
The two concepts corresponding to subjective norm and the hypothesis on user response were verified. Social influence was found to have a positive effect on all pathways that corresponded to attitude toward kiosks ($\beta = 0.201$, $p < 0.001$) and intention to use kiosks ($\beta = 0.107$, $p < 0.01$). However, for trendy affinity, neither route showed statistically significant values. When taken together, Hypotheses 12 and 13 were rejected, and Hypotheses 14 and 15 were both adopted.

Both attitudes toward kiosks ($\beta = 0.659$, $p < 0.001$) and PBC ($\beta = 0.222$, $p < 0.001$) for intention to use kiosks were found to have statistically significant effects, so Hypotheses 16 and 17 were adopted. Finally, Hypothesis 18 for the intention to use kiosks having a revisit intention was also adopted ($\beta = 0.769$, $p < 0.001$). <Figure 3> and <Table 6> show the results for the research model.

Ⅴ. Discussion and Conclusion

5.1. Discussion and Findings

Several critical findings were generated from our study for contactless technology future research. First, we reconciled the findings from previous studies and achieved new insights based on using a qualitative

<Figure 3> Results of the Structural Model

<Table 6> Hypotheses Results

Hypotheses	Paths			Estimates	t-value	Results
H1	Perceived usefulness	→	Attitude toward kiosks	2.372	0.169	Supported
H2	Perceived ease of use	→	Attitude toward kiosks	0.999	-0.062	Not supported
H3	Compatibility	→	Attitude toward kiosks	2.416	0.155	Supported
H4	Observability	→	Attitude toward kiosks	0.491	-0.031	Not supported
H5	Forced use	→	Attitude toward kiosks	1.982	-0.087	Supported
H6	Perceived service providers' efficiency	→	Attitude toward kiosks	3.195	0.172	Supported
H7	Absorptive capacity	→	Attitude toward kiosks	1.758	0.095	Supported
H8	Habit	→	Attitude toward kiosks	2.631	0.157	Supported
H9	Difficult to use	→	Attitude toward kiosks	3.239	-0.214	Supported
H10	Need for interaction	→	Attitude toward kiosks	2.549	-0.115	Supported
H11	Technology anxiety	→	Attitude toward kiosks	1.229	0.067	Not supported
H12	Trend affinity	→	Attitude toward kiosks	0.833	0.040	Not supported
H13	Trend affinity	→	Intention to use kiosks	1.392	-0.05	Not supported
H14	Social influence	→	Attitude toward kiosks	3.611	0.201	Supported
H15	Social influence	→	Intention to use kiosks	2.237	0.107	Supported
H16	Attitude toward kiosks	→	Intention to use kiosks	15.376	0.659	Supported
H17	Perceived behavior control	→	Intention to use kiosks	6.039	0.222	Supported
H18	Intention to use kiosks	→	Revisit intention	33.269	0.769	Supported

approach. Hedonic benefit-related factors like enjoyment, novelty, or technology- related attitudes like optimism and innovativeness were reported to be significant, but not highlighted as a motivation to use kiosks of our study. Provider policies and consumer characteristics like habit or familiarity were newly found to be essential factors. Subsequently, we suggested a research model that scrutinized motivations and the constraints of using kiosks simultaneously and examined how these constructs affected and thus help determine both attitudinal and behavioral intentions.

The empirical analysis of the TPB-based research model rediscovered consumers' perceptions of kiosks using a comprehensive perspective, as it had not been sufficiently covered before, especially using hypothesis testing with multiple variables. To integrate the relevant and scattered concepts already treated in the previous literature, our research model (a) reflected an updated business environment and consumer transaction patterns by utilizing a qualitative study, (b) simultaneously tested a comprehensive set of motivations and constraints, and (c) enhanced the practical implications of this current study by adding a variable that could explore consumers' clear intention to visit a store.

Our research model proposed a comprehensive view to try and grasp the factors that are composed of motivation, constraints, and subjective norms for using kiosks. Specifically, the motivations for using kiosks were again divided into more granular groups (Service quality, provider policies, and consumer characteristics). In the case of service quality, the results showed that perceived usefulness and compatibility significantly impact the attitude toward kiosks. This result is consistent with the results of many other contactless technology studies using TAM wherein customers will have a positive attitude to-

ward self-service if they feel that the specific kiosks is useful (Blut et al., 2016). The result for compatibility is the same as the previous study wherein if an individual's value is consistent with the use of technology, then that individual will have a positive attitude toward hotel self-service kiosks, and their user satisfaction will increases (Kim and Qu, 2014).

While PEOU and observability have no significant impact on attitudes toward kiosks, this is the same result as the research done by Lien et al. (2019) and Wessels and Drennan (2010). The above completed studies argue that PEOU does not significantly affect attitudes toward contactless technology because self-service and mobile banking services at airports are already familiar to users, and users are already at a certain level of technology utilization ability. Our study identified updated user perceptions of the general trading form of kiosks. As the use of kiosks in the service area has become more settled over a long time, mechanical refinement has increased due to the development of user-friendly displays or payment services. Thus, the ease of use of kiosks in and of itself no longer seems to be an important factor for most users to be able to elicit a positive attitude toward that particular kiosks.

In the case of observability, this concept was highlighted in the interviews. However, it was not important as a key factor that positively affected attitude toward kiosks. This is the same result as found in previous studies, which says that observability is not a factor that directly affects a consumer's intention to use contactless technology (Tahamtan et al., 2017). It can also be noted that consumers feel there are clear results seen in the transactions completed using technology. However, we would like to interpret that observability as being one of the different features that self-service should have, and therefore, that aspect did not work as a factor in this study for triggering

positive feelings in users.

As both Hypotheses 5 and 6 are supported, forced use and difficult to use have a significant impact on the attitude toward kiosks, respectively. In the previous study, the supplier's strategy of forcing consumers to use self-service could lead to negative perceptions by depriving these consumers of their freedom to choose another type of service delivery. Forced use in our research also have a negative effect on attitudes toward kiosks. However, if the contactless technology transaction environment continues to spread and service activities like AI increase, negative perceptions could decrease naturally as well. The relationship between perceived service providers' efficiency and attitude toward kiosks can be seen as producing the same result as that in the previous research. According to the previous studies, contactless technology can enhance work efficiency by eliminating the burden of simple and routine tasks for a provider's service delivery process and increase service quality through putting more concentration on core tasks (Al-Hawari et al., 2005; Lee and Allaway, 2002).

Both absorptive capacity and habit, which are individual characteristics, were found to affect attitude toward kiosks significantly. The adoption result for H7 can be seen as a result similar to the previous research in that self-efficacy of self-service users can stimulate hedonic value (Lee and Lyu, 2016). It is also a similar result to the previous study wherein the competency of the members of an organization should be prioritized at the system introduction stage (Kim and Grant, 2010).In the current contactless technology study, it is argued that the role of habit plays an important role for continued intention (Leung and Matanda, 2013; Wang et al., 2013). However, our study also revealed that the habit itself also positively influences the attitude toward kiosks,

based on a sufficiently mature business environment and the highlights already noted in Study 1.

In terms of people's attitudes toward kiosks and constraints, it was found that difficult to use and the need for interaction had significant negative effects; however, technology anxiety had no significant impact relationship. The negative influence of difficult to use when forming a positive attitude can also be considered in connection with the rejection here of Hypothesis 2. It has been a long time since the kiosks has been regularly used as a service method. We discussed earlier that convenience of use did not have a significant positive effect due to the sophistication of technology and the improvement in people's ability to use that technology. In other words, if there is difficulty in use, that issue can lead to a critical negative view. In the case of any need for interaction, that need can be explained as a preference or tendency to receive the service in some form. Consumers may also show a negative attitude toward a new method if they tend to want to adhere to the existing service method even when the range of use of kiosks is broadened (Um et al., 2020). In the case of technology anxiety, it can still act as a strongly negative factor for attitude or intention to use self-service (Larson, 2019). However, since our study deals with services for the most common types of kiosks, issues such as concern or risk does not have a relatively significant impact. Therefore, it is necessary to consider the influence of this variable using another perspective and thus deal with various types of kiosks services in future studies.

As for the subjective norms, H12 and H13 were rejected, indicating no significant relationship between trend affinity and kiosks use. It is true that kiosks are more used in recent years, but since a long time has passed since they were first used for services, it can be interpreted that the trait of pursuing

the latest trends does not play an important role. On the other hand, social influence was found to have a positive effect on both attitudes toward kiosks and the intention to use them. This finding is seen as a result of reflecting on the overall social atmosphere in which technology-based services are activated socially, unlike trend affinity. This result is also consistent with a study by Joe et al. (2020) that indicated that social influence can have a positive effect on the intention to use kiosks. It is also a similar result to the study by Singh et al. (2020) where individuals who are satisfied with technology, that view reinforces their future behavioral intentions under the impact of social influence.

Both Hypothesis 16 and 17 were adopted and based on TPB. It was found that attitudes and PBC can influence intention to use. This is the same result as previous studies in that the situation at the time of use and an individual's attitude are important when choosing to use kiosks (Kazancoglu and Yarimoglu, 2018; Kim et al., 2021). On the other hand, Hypothesis 18 was also adopted, indicating that the intention to use technology can contribute to a certain extent to the intention to visit a store. Such results can be seen as being similar to the previous research results where the influence of technology did affect the final stage, such as visit intention (Lee et al., 2020). Specifically, this results can be said to be a unified result of existing studies that state that self-service can elicit positive emotions toward restaurants and maintain those relationships (Ahn and Seo, 2018).

To sum up the results of this current analysis and its discussion, we drew on variables that should be newly emphasized and, at the same time, have representation in any qualitative research and review of related research. The relationship between the service quality, provider policies, and individual charac-

teristics that corresponds to kiosks usage motives and the attitude toward kiosks, respectively, presented either the same or different results from the previous studies. Constraints also presented the same or different results from previous studies, while the subjective norms remained the same. Most of the routes set with TPB were found to be significant, and it was confirmed that this aspect can have a significant effect on ultimately individuals' revisiting kiosk-using stores.

Our research has several academic contributions. First, we derived some factors that needed to be re-examined and emphasized by using interview technique in a qualitative research method that can draw out in-depth discussions about the motivations and constraints of using kiosks in the technology-dominated environment. Factors such as forced use, perceived service providers' efficiency were newly found to be significant factors. Based on the result, we proposed the new framework with the variables that require further empirical analysis to explain consumer's use of kiosks in the changing environment. This framework provides important implications for the understanding of varied consumer's attitude toward kiosk in the technology-dominated post-COVID-19 era.

Our model also integrated the existing literature by constructing the motivations of service quality, supplier policy, user characteristics, and by testing constraints simultaneously. This is a deployment considering both supplier and the consumer aspects as well as the technical aspects of the kiosk itself that can affect consumer's attitude toward kiosks. This multidimensional framework contributes to explaining the consumer's attitude more precisely than a single-dimensional model.

More importantly, the proposed model suggests that the relationship between the variables in terms

of user attitude and intention to use kiosk by applying the TPB model. The areas of attitude, subjective norm, and perceived behavior control suggested by TPB have an indirectly relationship with kiosks itself. Thus, our model contributes to the academic expansion of contactless technology literature by comprehensively dealing with both aspects that are directly (motivations, constraints) and indirectly (TPB) related to the kiosk that can have an influence on consumer's attitude.

Practically, one of the critical implications of our study is its comprehensive exploration that properly integrates the majority of related studies on how consumers choose or do not choose a way of self-service order. Through using the mixed-method approach, our empirical examination provided a collective result of the role of each factor that affects consumer's attitude toward kiosks. Of course, service providers should be concerned about all the factors already highlighted in previous studies. But our descriptive and analytic outcome suggests more appropriate direction for consumer-friendly self-service design by deriving more (or less) important factors. Through this suggestion, service providers can confirm what factors have traditionally appeared that can affect a consumer's attitude of contactless technology and what factors are now attracting new attention, moreover they can modify the way of their self-service delivery.

Specifically, our research can be used as a basic guideline for practitioners to identify the aspects that can lead to satisfactory service delivery with kiosks and to know the different factors that may either negatively or positively affect their consumers' attitudes toward kiosks. Our research emphasizes that not only practitioners have to manage the technical quality of the kiosk itself, but also they have to allocate their energy to the quality of service delivered in

another situation that consumer can encounter like dissatisfaction due to the absence of employees or mechanical failure. Rather than trying to completely transfer the way of service delivery to kiosk service and eliminate the inconvenience that consumers can suffer through the kiosk itself, providers should introduce kiosk designed for the consumer who has difficulty using technology and gives some time for consumers adapting to the new technology. Thus, rather than providing an extreme contactless technology environment, the traditional transaction method should be delivered simultaneously, so that consumers who need to interact with people also can receive a high-quality service continuously.

5.2. Implications and Limitations

Service delivery using kiosks is being actively carried out for suppliers and consumers, and this service process is today playing a dominant role in many transactions. Accordingly, research on contactless technology has been conducted numerous times; however, studies that reflect the new paradigm surrounding the kiosks environment remain insufficient. This study is an initial attempt to understand the new phenomena surrounding the kiosks environment in the post-COVID-19 era. The findings of this study offer important implications for both ongoing researchers and current practitioners. Our comprehensive approach to the people's perception towards the kiosk as a representative of SST, it could be an academic guidance in technology-dominant phenomenon of service environment. Specifically, future study can empirically adopt our research model or concepts to study people's attitude towards the technology.

Nevertheless, this study has several limitations, and these should be recognized. First, since this study

focused on transactional kiosks, there was not enough consideration of the various kiosks types. Therefore, in future research, it will be necessary to deal with the different types of kiosks, including not only transactional kiosks, but also their use in the hospitality industry or when combined with AI. Second, this study discovered additional factors that reflect the new phenomenon surrounding the kiosks. Still, certain other concepts were not included in the offered research model. Thus, if it is possible to add variables that were not explored in this study, we can discover more in-depth implications that reflect the new kiosk environment in still more useful ways.

Acknowledgement

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<Appendix A> Demographics of Interviewees

No	Gender	Age	Mainly used type of kiosks	Payments
1	Female	24	Cafés, Restaurants, ATMs	Credit card, Mobile app
2	Female	25	Fast-food restaurants, Cafés	Credit card
3	Male	30	Fast-food restaurants, Restaurants, Food courts	Credit card
4	Female	27	Cafés, Restaurants	Credit card, Mobile app
5	Female	31	Cafés, Restaurants	Credit card
6	Male	31	Fast-food restaurants	Credit card
7	Female	25	Fast-food restaurants, Cafés, Theaters, ATMs,	Credit card, Mobile app
8	Female	46	Fast-food restaurants, Cafés, Restaurants, Theaters	Credit card, Mobile app
9	Male	49	Fast-food restaurants	Credit card
10	Female	42	Fast-food restaurants, Restaurants, Airports, ATMs	Credit card, Mobile app, Cash
11	Female	32	Fast-food restaurants, Cafés	Credit card, Mobile app
12	Male	56	Fast-food restaurants, Cafés, Restaurants,	Credit card, Cash
13	Male	60	Restaurants	Credit card, Cash
14	Female	52	Fast-food restaurants	Credit card
15	Female	48	Fast-food restaurants	Credit card

<Appendix B> Survey Items

Instrument		Item	Mean	S.D.
Perceived usefulness	Useful1	Using the kiosk allows me to improve my transactions ability.	5.035	1.272
	Useful2	Using the kiosk enhances my effectiveness in my service transactions.		
	Useful3	Using the kiosk is useful in handing my service transactions.		
	Useful4	Using the kiosk increases my productivity of handling my service transactions.		
Perceived ease of use	PEOU1	Learning how to use the kiosk is easy for me.	5.228	1.315
	PEOU2	I think the kiosk is clear and understandable.		
	PEOU3	Using the kiosk does not require a lot of mental effort.		
	PEOU4	I find the kiosk easy to use.		
Compatibility	Compati1	Using the kiosk fits well with my life style.	4.844	1.276
	Compati2	Using the kiosk is one of my favorite transaction methods.		
	Compati3	Using the kiosk doesn't deviate from the transaction behavior I've been doing before.		
	Compati4	Using a kiosk meets my current needs for transaction.		
Observability	Obser1	I would have no difficulty telling others about the results of using the kiosk.	5.600	1.019
	Obser2	I believe I could communicate to others the outcomes of using the kiosk.		
	Obser3	The results of using the kiosk are apparent to me.		
	Obser4	The results of using the kiosk are clear.		

<Appendix B> Survey Items (Cont.)

Instrument		Item	Mean	S.D.
Forced use	Only1[d]	When I need service at hotel/airport/restaurant/store, only the kiosks are available.	3.775	1.429
	Only2	The store I visit imposes using the kiosk on me.		
	Only3	The store I visit threaten my freedom to choose the way order service is delivered.		
	Only4	I have less freedom to choose the way order services is delivered.		
	Only5	I am difficult to find alternatives order way to substitute for the kiosk.		
Perceived service providers' efficiency	Att_work1	I think the service provider introduce the kiosk to let customer do the work.	5.301	0.914
	Att_work2	Throughout the kiosk service process, the service delivered is more efficient because of my involvement in it.		
	Att_work3	I think the service provider makes works more efficient by letting me do order through the kiosk.		
Absorptive capacity	Absor1	I have the technical competence to absorb technology like the kiosk.	5.368	1.064
	Absor2	I have the necessary knowledge to understand the kiosk.		
	Absor3	I have clear understanding of the goals, tasks, and responsibilities of the kiosk.		
	Absor4 [d]	I know well the new technology applied to the kiosk like touch screen, QR code, payment using application.		
Habit	Habit1	The use of kiosk has become a habit for me.	4.749	1.351
	Habit2 [d]	I must use the kiosk.		
	Habit3	I don't even think twice before using the kiosk.		
	Habit4	Using the kiosk has become natural to me.		
Difficult to use	Diffi1	Using the kiosk is difficult.	2.924	1.368
	Diffi2	It's hard to get used to the kiosk.		
	Diffi3	Much effort is required when using the kiosk.		
	Diffi4	Skillful use of kiosk is difficult.		
	Diffi5	It takes a long time to learn how to use the kiosk.		
Need for interaction	Need1	Personal contact with an employee makes ordering enjoyable for me.	3.995	1.241
	Need2	Personal attention by a customer service employee is important to me.		
	Need3	I like interaction with the person who provides the service.		
	Need4	Human contact in providing services makes the process enjoyable for me.		
Technology anxiety	Anxi1	I have avoided technology because it is unfamiliar to me.	2.632	1.312
	Anxi2	I have difficulty understanding most technological matters.		
	Anxi3	I hesitate to use technology for fear of making mistakes I cannot correct.		
	Anxi4	I feel apprehensive about using technology.		
Trend affinity	Trend1 [d]	Transaction through the kiosk is a new fad I feel I should use.	4.098	1.330
	Trend2	People will see me as trendy if I use the kiosk.		
	Trend3	Using the kiosk will present me as contemporary.		
	Trend4	Using the kiosk is one way of showing that I follow the current trend.		

<Appendix B> Survey Items (Cont.)

Instrument	Item	Mean	S.D.	
Social influence	So_influ1	People like me would use the kiosk.	4.386	1.181
	So_influ2 [d]	Using the kiosk would improve my image among my friends and peers.		
	So_influ3	People who are important to me probably think that I should use the kiosk.		
	So_influ4	My friends and peers would expect me to use the kiosk.		
Perceived behavioral controls	P_b_c1 [d]	The kiosk allows me to select any services I need.	5.135	1.197
	P_b_c2	I feel free to use the kiosk I like to.		
	P_b_c3	Using the kiosk is entirely within my control.		
	P_b_c4	I have necessary means and resources to use the kiosk.		
Attitude toward kiosks	Att_kio1 [d]	When I need to service, using the kiosk is helpful.	5.024	1.226
	Att_kio2	Using the kiosk is a more convenient way to order.		
	Att_kio3	Using the kiosk is a good way to order.		
	Att_kio4	I have a favorable attitude toward the kiosk.		
Intention to use kiosks	Int_kio1	I will use the kiosk on a regular basis in the future.	5.353	1.199
	Int_kio2	I will frequently use the kiosk in the future.		
	Int_kio3 [d]	I will strongly recommend others to use the kiosk.		
Revisit intention	Revi1 [d]	It is good thinking that revisit the store introducing the kiosk.	4.719	1.242
	Revi2	It is likely that I will revisit the store introduced the kiosk in the near future.		
	Revi3	I will regularly revisit the same store introducing the kiosk.		
	Revi4	I expect to revisit the store applying the kiosk in the near future.		

Note: [d] Items were removed after confirmatory factor analysis

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