



Empirical Research Article

Factors Influencing Post-Adoption Resistance to Self-Order Kiosks at Fast-Food Restaurants: A Focus on the New-Silver Generation

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Abstract

Due to the phenomenon of aging, a new consumer segment known as the “new-silver generation” is emerging. Unlike the previous silver generation, this generation possesses significant economic power and consuming willingness, attracting attention from consumer goods companies. However, both the new-silver generation and the elderly face challenges in adopting contactless or self-service technologies such as self-order kiosks, resulting in negative reactions. Therefore, this study aims to investigate the attitude and response of the new-silver generation towards kiosks, as well as the factors influencing their resistance to such technology. By applying theoretical perspectives from the innovation resistance model, technostress theory, and the value-based model, this study identifies influencing factors for innovation resistance among the new-silver generation when using contactless technologies implemented in fast-food restaurants. The findings indicate that a lower awareness of new technologies and services corresponds to decreased adoption resistance, while a higher perceived value leads to more positive behaviors and attitudes among the new-silver generation utilizing kiosks at fast-food restaurants.

Keywords

self-order kiosk; self-service technology; new-silver generation; post-adoption resistance; technostress; value-based adoption model; innovation resistance model

1. Introduction

We are currently in the era of great digital transformation, and innovation is taking place in all fields of society thanks to the development of digital technologies. As a result, life is becoming more convenient, safer, and more affluent, but at the same time, problems such as alienation and inequality are also occurring in digital society. Amid the tide of changes as such, demand for kiosks, which are unmanned terminals based on information and communications technology (ICT), is increasing due to the necessity to reduce labor costs because of the recent increase in the minimum wage and the increase in consumers who want non-face-to-face contact (Meuter et al., 2000). Kiosks are a solution mediated by the interaction between customers and technology and play an important role in forming the contactless consumption culture. In the food service industry, kiosks are being expanded along with the development of food tech (Food + Technology), which uses information and communication technology to replace face-to-face interactions between consumers and employees (Jeon et al., 2018; Um & Chung, 2022).

The global kiosk market size is estimated to be up to 40 trillion won as of 2021, and this size is expected to expand further to 101 trillion Won by 2032 (Yun, 2022). It is expected that in the future, the transition to unmanned systems will become more apparent in areas where simple tasks are possible. Introducing kiosks is becoming increasingly common in various industries, and finding a sector that has yet to introduce kiosks is becoming difficult. The World Economic Forum (WEF) predicted in its

“Future of Jobs 2018” report published in 2018 that machines would account for 52% of all work by 2025 (Cho, 2018). The use of kiosks is increasing due to various social and economic factors, such as the rise in the minimum wage, increases in corporate profits, and improvements in customer convenience. However, some users with difficulties responding to radical changes may experience digital alienation and react negatively (Min & Park, 2010).

Recently, those born in 1955-1963, the first baby-boom generation, have been changed into older people as they have been incorporated into the elderly population; they became 60 years old in 2015 (National Statistics Office, 2019). Consequently, companies are recognizing the elderly as a new consumer group and paying attention, especially to the lifestyle of the new-silver generation consisting of middle-aged and older adults aged at least 50. The new-silver generation is interested in health, has economic power and consumption volition (Kim et al., 2017), and has open values for information and communication technology. However, products and services for the new-silver generation are insufficient, and to address this issue, it is necessary to understand the characteristics of the new-silver generation. The new-silver generation shows differences in terms of education and economy among the elderly, is positive toward digital media, and has a very strong desire for productive consumption. Customers’ interest in kiosks is increasing thanks to the development of kiosks and the expansion of the targets of their use, but it is emphasized that they can be considered unnecessary services by digitally marginalized groups (Kim & Moon, 2018). Furthermore, even customers with

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favorable characteristics toward new technologies or services may experience resistance to kiosks if they experience crashes or errors when using them (Kim & Moon, 2018). Studies related to kiosks spread rapidly along with the development of information and communication technology, and studies on adoption factors, the intention to use consumers using kiosks, and the design of kiosks were actively conducted. However, there still needs to be more research on kiosk usage and acceptance resistance among the new-silver generation in the face of rapid aging and the information age (Lee, 2019). In addition, according to Song (2019)'s argument that adoption resistance increases with age leading to decreases in the intention to use, an analysis is needed to determine what factors affect the adoption resistance to kiosks of the new-silver generation.

Therefore, this study is intended to examine what factors affect adoption resistance to the use of kiosks at fast-food restaurants (e.g., McDonald's, Burger King, KFC, Lotteria, etc.) of the new-silver generation (those born between 1955 and 1970) who can change the consumption trend and market paradigm in the aging era in a situation where the information and communication technology environment is rapidly developing. More concretely, using a research model that integrated the technostress theory and the value-based adoption model based on the adoption resistance model with the new-silver generation that has experience using fast-food restaurant kiosks, this study is intended to (1) draw the predisposing factors that affect the adoption resistance to kiosks, and (2) verify whether the perceived risks (risk of time loss, social risk) and perceived benefits (usefulness, pleasure) experienced by the new-silver generation when using kiosks affect the perceived value and verify whether the perceived value has a significant effect on the adoption resistance. In addition, this study is intended to (3) verify how the personal characteristics (innovativeness, IT efficacy) of the new-silver generation and the information and communication technology environment characteristics of kiosks (complexity, forced use) affect technostress and verify whether the verified technostress has a significant effect on the adoption resistance. Through the findings of this study, a strategy to identify

and eliminate or reduce the adoption resistance factors of the new-silver generation at fast-food restaurants that provide kiosks and a plan to activate the use of kiosks will be presented.

2. Theoretical Background

2.1 New-Silver Generation

The "new-silver generation" refers to the generation that continuously experienced information and communication technology through industrialization in the 1970s. Unlike the previous silver generation, this generation has a high level of education and economic power (Kim et al., 2017), is active in social activities, and pursues an independent life (Shin, 2017). The new-silver generation is open to change, responds sensitively to digital and intelligent technology changes, and has high adaptability to new services, products, and technologies (Yun, 2016). As interest in the new-silver generation has increased, studies on the new-silver generation's lifestyles, such as culture (e.g., Han, 2019; Lee & Park, 2020), fashion (e.g., Byun, 2017; Han & Ha, 2017), and dietary life (e.g., Lee, 2018; Song, 2018) are in progress in various fields (see Table 1). The new-silver generation can adapt to new technologies and services (Huh et al., 2012), but as they become older, their adoption of new technologies changes, and they tend to feel psychological anxiety and discomfort (Morris & Horvitz, 2007). Various service industries are preparing businesses targeting the new-silver generation and are actively developing products and services for the convenience of the new-silver generation. In such responses, the characteristics and requirements of the new-silver generation revealed through research are being effectively used in corporate marketing. Therefore, the new-silver generation is regarded as an important group in kiosk adoption, and it is necessary to investigate their attitudes to adopting the new technology termed kiosk and the factors that affect the attitudes.

Table 1. Previous research on the new-silver generation

Category	Key themes	Authors (Year)
Culture	Factors influencing South Koreans' purchase and satisfaction with domestic travel products	Lee and Park (2020)
	A Study of cultural capital and taste among South Korea's new-silver generation	Han (2019)
Fashion	Fashion design development for the launch of a new-silver generation fast fashion brand	Byun (2017)
	New-silver generated women's lifestyles and apparel	Han and Ha (2017)
Eatery	The impact of new-silvers' eating style on dining out choice attributes and satisfaction	Lee (2018)
	A study of HMR purchasing behavior based on the lifestyles of the new-silver generation	Song (2018)

2.2 Self-Order Kiosk as a Self-Service Technology

A kiosk is a self-service machine that enables consumers to order products or services without facing a shop assistant (Kim et al., 2013). Companies are introducing self-service strategies to improve productivity and reduce labor costs (Choi et al., 2009), and due to the development of information and communication technology and changes in the business environment, building an information system through kiosks is recognized as an essential task (Peres et al., 2010). Kiosks provide an environment where time can be saved, and services can be used anytime, anywhere (Song, 2019). Recently, kiosks have appeared in various forms, such as kiosks, smartphone applications, and chatbots, and are used in multiple fields (Um & Chung, 2022), such as restaurant ordering, shopping mall information guidance, and automatic receipt management in hospitals. Many franchise companies have introduced kiosks in the food service industry and use them as a

service improvement and differentiation strategy. The domestic kiosk market started at 10 billion won in 1999 and grew to about 350 billion won in 2020, and its average annual growth rate reached 13.9% (Kim, 2021). McDonald's, a central Korean fast-food restaurant, introduced kiosks in 2015 and operates 922 units in 320 out of 400 stores nationwide (Chang, 2023), while Lotteria has installed kiosks in 1,012 out of 1,350 stores, accounting for 75% of its stores (Jeon et al., 2020). The adoption of kiosks is expected to be centered on the franchise industry, as they provide customers with quick, convenient service and a consistent experience. Additionally, adopting kiosks is expected to prevent employees from performing repetitive tasks, increase the efficiency of other tasks, and improve the promotional effect and profitability of companies and organizations. In this study, we aim to understand how the personal characteristics of the new-silver generation and the ICT environment characteristics of kiosks affect their resistance to kiosk adoption. To this end, we selected

the most common kiosks owned by fast-food organizations and examined the factors contributing to resistance to kiosk adoption among new-silvers, who tend to consume more fast food and embrace technology.

2.3 Technostress

Stress has been theorized in disciplines with complex and diverse views. The term stress was first introduced by Selye (1956) and was conceptualized as a general physical response to changes. Cox and MacKay (1982) defined stress as a perceptual action that causes differences between an individual's needs and the act of managing those needs and viewed stress as a response to all activities that expect adaptation. Stress is regarded as an unstable and dynamic phenomenon of the environment and individuals and varies among individuals according to the degree of adoption and magnitude of response. Therefore, the interaction process between humans and the external environment that causes stress can represent the response to stress as behaviors or attitudes (Nho et al., 2015).

Technostress is a term first mentioned by Brod (1984) and refers to a state of the mental burden caused by the maladaptation of individuals and the information and communication technology environment. Due to the 4th industrial revolution, information and communication technology is developing rapidly, and amidst the changes, individuals may experience various problems and suffer psychological pain, called technostress (Ayyagari et al., 2011). Technostress is a negative psychological state that occurs when the demand or supply of the information and communication technology environment is unsuitable for an individual's ability or expectation and arises from the relationship between strain and stressors. Therefore, in this study, the predisposing factors for technostress perceived by the new-silver generation when they use a fast-food restaurant kiosk were composed of items to measure innovativeness and IT efficacy, which are individual's characteristics of the new-silver generation, and complexity and forced use, which are characteristics of information and communication technology environments.

2.3.1 Innovation

Innovation means the ability to change existing markets or create new markets by developing new technologies, processes, or products, and innovativeness refers to the inclination of individuals to accept innovation earlier than others in the social system (Rogers, 1995). Consumers with high innovativeness will have a relatively low resistance to innovative products or services. Innovativeness has been used as a representative variable of personal characteristics that explain the intention to use systems and services in information and communication technology (Jo et al., 2015). When the new-silver generation's attitude towards adopting technology is examined, their attitude to embrace new things and take responsibility for their life stands out, and it stems from the will to enjoy life (Huh et al., 2012) actively. This is to adapt to the environment with a positive attitude, and the new-silver generation desires to start new things that they have not tried before if the opportunity is given and will try to adapt well to new technologies such as kiosks.

2.3.2 IT Efficacy

Bandura (1986) argued that self-efficacy is an individual's belief that he or she can organize and resolve appropriate courses of action necessary to perform a certain level of task in a particular situation. This is related to what an individual judge that one can do and is separate from the individual's skills (Jung et al., 2013). Bloom and Hautaluoma (1990) viewed computer ability and experience as major factors for computer-related technostress.

Computer self-efficacy is the expectation of an individual that they can use a computer well, and the lack of self-efficacy in computer literacy causes immaturity in computer-using tasks. They will cause anxiety about using the information system and, consequently, technostress (Nho et al., 2015).

While the existing silver generation may have difficulties in an intelligent environment where the Internet or mobile devices are used, the new-silver generation is sensitive to and adapts to digital technology and changes in new technologies and actively accepts new services, products, and technologies (Yun, 2016). The attitude as such shows the characteristics of the new-silver generation that can reduce vague fear of new technologies and services and get closer to digital culture. Therefore, it can be expected that the higher the IT efficacy of the new-silver generation, the lower the level of recognizing technostress, which will significantly affect adoption resistance.

2.3.3 Complexity

Complexity can be defined as the degree to which an individual perceives a new ICT as challenging to use or understand (Moore & Benbasat, 1991). The lower the complexity, the less the adoption resistance through individual psychological characteristics (Ram, 1987), and the higher the understanding of how to use innovative technology, the faster the user's technology adoption rate. An individual's attitude affects the adoption of information and communication technology, and complexity is expressed as ease of use (Venkatesh et al., 2012). It was suggested that consumers form negative feelings when they perceive innovative technologies as being challenging to use and complex, and the higher the perceived complexity, the higher the technology adoption resistance (Park, 2018). Users may feel the burden that they should learn new technologies and improve their technical skills. In addition, if they think concerned about problems due to the complexity of the latest technology, they may further show responses such as resistance (Park & Kim, 2017).

Older people, who frequently use fast-food restaurant kiosks, can naturally select and use their favorite menus through kiosks because they are familiar with how to use kiosks. However, when using the kiosk for the first time or looking for a new menu, older people feel difficulties and discomfort; in this case, they often ask for help from people around them or staff. In addition, there may be differences in the ability to use new technologies even within generations of similar age groups. The new-silver generation shows the characteristics of actively responding to new technologies, but as they get older, the difference in proficiency with new technologies can become more prominent because opportunities to experience new devices in real life decrease along with the biological problem of slowing down learning speed. As digital literacy is limited to simple tasks and the digital divide widens, psychological reactions to feeling repulsion to new technologies may arise, leading to further increases in adoption resistance. Therefore, it can be expected that the more the new-silver generation experiences complexity when using a fast-food restaurant kiosk, the stronger they perceive technostress, which can make the effect on adoption resistance more extraordinary.

2.3.4 Forced Use

The domestic kiosk market is estimated to be 350 billion won as of 2020, which means that the market, which was only 60 billion won in 2006, has grown by about six times in 14 years (Kim, 2021). The rapid growth of the kiosk market is closely related to the expansion of contactless marketing that provides services in a non-face-to-face form. Kiosks are rapidly spreading in the service industry, and some fast-food stores have kiosk-only stores without staff at the sales counter. The introduction of kiosks is expanding further because consumers can enjoy shorter order waiting times and convenience through kiosks, and stores can obtain

manpower-saving effects and labor cost reduction simultaneously because they can use the workforce for other tasks and are not required to deploy force to take orders. However, the fact that due to the spread of kiosks, situations where consumers can select menus while directly asking an employee or they can be helped by an employee when a difficulty has occurred are decreasing should also be considered. This means that the convenience and efficiency of fast-food restaurants are not offered equally to all consumers.

By using the kiosk, consumers feel they are forcibly induced to use it while their options are excluded, which can cause negative attitudes among consumers (Reinders et al., 2008). Therefore, when using kiosks at fast-food restaurants, new technology and service for the new-silver generation, a variable called forced to use, should be considered as a predisposing factor for technostress. Forced use variables include the “non-option” environment, where ordering and payment must be made only through a kiosk without face-to-face contact with an employee when visiting a fast-food restaurant, and the non-service environment, where customers cannot be helped by an employee even when help is needed while using a kiosk. Through the variables, the relationship between the technostress experienced by the new-silver generation while using a fast-food restaurant kiosk and adoption resistance and the effect will be analyzed.

2.4 Value-Based Adoption Model

The value-based adoption model is a theory in which Kim et al. (2007) presented the concept of the value perceived for technology and service adoption. While TAM focused on the usefulness and ease of use of new technologies, which benefits when new technologies are used in organizations, Kim et al. (2007) argued that individuals as consumers are perceived as different from technology users to improve work performance.

Perceived value means evaluating consumers' gains and losses from using a product or service (Cheng et al., 2021; Zeithaml, 1988). It is formed through the process through which consumers compare benefits and sacrifices to include evaluations of products or services. Perceived value can be explained as the difference between the cost paid by the user and the benefit obtained by the user, and perceived benefits and perceived sacrifices were presented as two factors that mainly affect perceived value (Kim et al., 2007).

Perceived risk refers to concern about loss due to uncertain factors, such as unexpected negative results when a user uses a product or service (Dowling & Staelin, 1994). Users recognize risks in intending to adopt a product or service (Osberg & Shrauger, 1986), and the risks perceived by service users may differ in forming the sacrificial elements according to individuals' subjective. Perceived information and communication technology risks have been treated as an important antecedent variable affecting users' resistance and intention to use (Yang, 2013). Perceived benefit is defined as the result that is helpful for the user to achieve goals or values so that the effect of individuals or the organization increases, or a discount is supplied (Gutman, 1982). Adoption resistance occurs when a new product or service lacks functions or does not meet expectations compared to one already used (Schiffman & Kanuk, 1991). Desirable outcomes expected by consumers can be viewed as perceived benefits, and the more benefits consumers can obtain from a service, the more quickly they decide their adoption intention. Therefore, in this study, considering the results of previous studies and the characteristics of the new-silver generation aged at least 50 years, the perceived value was set as a factor that affects adoption resistance when the new-silver generation uses kiosk services, and the risk of time loss and social risk among perceived threats, and usefulness and pleasure among perceived benefits were composed as measurement items to verify the causal relationships.

2.4.1 Risk of Time Loss

The risk of time loss refers to a situation where a problem occurs with a product or service so that time is taken for repair or replacement (Lim, 2003). Time may be lost due to behaviors in the product purchase process, and various types of time loss may occur, such as time loss due to waiting to return an unsatisfactory product or receive a product (Noh & Lee, 2012). Shin et al. (2015) concluded that the risk of time loss harms trust and loyalty and, thus, it is important to build systems to ensure that consumers do not experience time delays while using travel agency websites and to organize websites so that consumers can easily find the products they want (Shin et al., 2015).

2.4.2 Social Risk

Social risk refers to the risk related to social status evaluation that occurs according to the review by others in purchasing products or services (Jacoby & Kaplan, 1972). It refers to the degree of risk the user perceives in using a kiosk about other people's evaluations, interactions, and mass media (Featherman & Pavlou, 2003). Consumers care more about meeting group expectations than maximizing utility when purchasing a product (Kramer, 2007), and it has been found that social norms or reference groups significantly impact product purchases (e.g., Mandel, 2003; Miller, 1992). The feelings as such are conscious of the evaluation by others in the process of using new and innovative technologies and affect technology or technology use behavior. This can also apply to kiosks, and other people's evaluations of kiosks or messages from the mass media can affect behaviors agonizing overusing (Park & Kim, 2017).

2.4.3 Usefulness

Usefulness is a concept that includes relative advantages with which users recognize how good a new product is compared to an existing product considering the efficacy, convenience, appearance, and price (Ram, 1987). Usefulness reduces the consumer's psychological response to attitudes to refuse kiosks, new technology or service, or resistance to innovation in adopting kiosks (Ram, 1987). Therefore, if a user recognizes a product or service as being functional, it will positively affect the attitude toward and intention to use it. Conversely, if the product or service is perceived to be of low usefulness, it may cause resistance to or adverse effects on the product or service. Based on the results, it is judged that the more users recognize the usefulness of a product or service, the less the users resist innovation (Lee, 2019).

2.4.4 Enjoyment

Enjoyment is the level of fun or enjoyment experienced when using a device with a communication function or a specific technology (Van der Heijden, 2004) and represents the degree to be perceived pleasantly from the individual's position (Carroll & Thomas, 1988). Dabholkar and Bagozzi (2002) and Meuter et al. (2000) argued that the enjoyment psychologically generated thanks to the experience of the new service has a positive effect on the tendency to adopt new technologies and is an important factor affecting user satisfaction. Amid the gradual supply of kiosks, the new-silver generation still prefers the existing services provided through face-to-face contact with employees. However, the new-silver generation, who experience enjoyment and pleasure immediately while using kiosks, is expected to adopt the kiosk service more positively than other users (Min & Park, 2010). Therefore, food service companies such as fast-food restaurants should manage kiosks to induce interest in the benefits obtained by users while using kiosks (Song, 2019).

2.5 Innovation Resistance Model

The acceptance resistance (consumer resistance), first established by Sheth (1981), does not view resistance as a concept opposed to innovation but interprets it as resistance within the category of acceptance and presents that existing order or customs and perceived risks are significant acceptance causes resistance. Since consumers face internally confused situations in accepting and using new technologies or services, attention should also be paid to the perspective of resistance (Ram, 1987). Acceptance resistance is defined as a behavior to maintain the status quo in response to forced changes for innovation, and everyone has acceptance resistance (Ram, 1987). Ram (1987) defined acceptance resistance as an attitude to hesitate and reject innovations such as new technologies or services. He stated that since consumers with high acceptance resistance postpone adoption and do not adopt innovation until their adoption resistance is relieved, the time of adoption might be delayed, and if the resistance to innovation is high, success in the initial market will be difficult (Ram, 1987).

To prepare for the rapid development and steady growth of information and communication technology, it is important to identify the factors that users resist and respond quickly to (Park & Kim, 2017). If adoption resistance persists, adopting and accepting innovations may be delayed or lost in the market.

Therefore, analyzing the factors affecting acceptance resistance is necessary to prepare appropriate responses (Park, 2018). In general, it has been shown that as age increases, innovation resistance increases and usage intention decreases (Song, 2019), but there is a lack of specific research on the New Silver Generation, which has emerged as a major consumer group

in the aging era. Through this study, it was attempted to verify how the effect of acceptance resistance to kiosks varies according to predisposing factors with the new-silver generation and demonstrate the acceptance resistance to kiosks of the new-silver generation, which has more innovative characteristics than the existing silver generation using the perceived innovation characteristics and consumer characteristics, which are adoption resistance factors presented in Ram's (1987) innovation resistance model.

3. Research Model and Hypotheses Development

In this study conducted with fast-food restaurant kiosks, factors that affect acceptance resistance were composed by combining the technostress theory and the value-based adoption model. The research model is shown in Figure 1. In addition, to utilize the value-based adoption model, the perceived value was set as a parameter, and independent variables were composed by selecting perceived risks (risk of time loss, social risk) and perceived benefits (usefulness, enjoyment). Based on the technostress theory, this study will examine the effects of innovativeness and IT efficacy, personal characteristics, complexity, and forced use, which are the characteristics of information and communication technology environments, on technostress. In addition, based on the value-based adoption model, this study will examine the effects of the risk of time loss and social risk, which are perceived risks, and usefulness and enjoyment, which are perceived benefits, on perceived value, and thereafter verify hypotheses on how the identified technostress and perceived value affect the acceptance resistance.

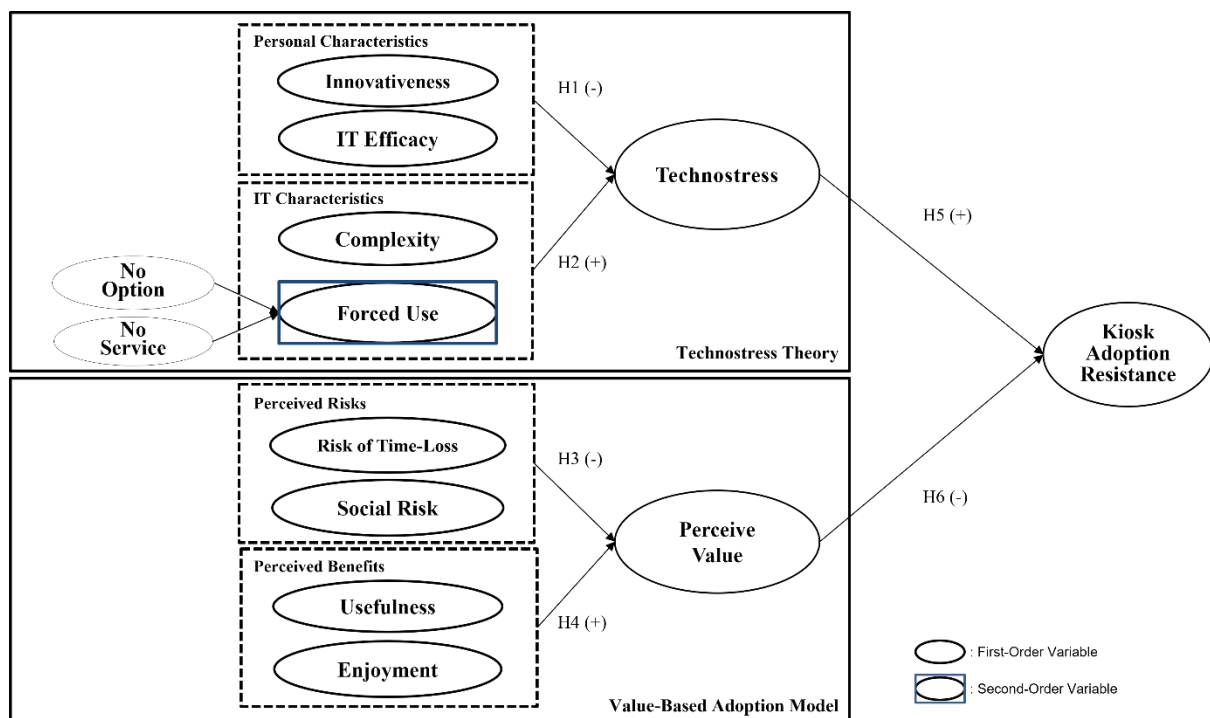


Fig. 1. Research model

3.1 The Relationship between Personal Characteristics and Technostress

Innovativeness refers to the extent to which an individual adopts an innovation relatively earlier than other members, and Hirschman and Newman (1988) defined it as an individual's propensity to use new things without difficulty. Individuals with

high innovativeness tend to adopt new technologies faster than others and be technologically ahead (Parasuraman, 2000). Since individuals with high innovativeness have positive feelings about new technologies, they actively adopt new technologies or services. This becomes a factor that reduces adoption resistance. Therefore, when the results of previous studies are put together, it is expected that the higher the innovativeness, the lower the

perceived technostress. Since the new-silver generation tends to positively and actively accept new technologies, services, and products, it is expected that the higher the innovativeness of the new-silver generation, the lower the technostress perceived by them in the fast-food restaurant kiosk environment. For this reason, the following hypothesis is established:

H1a: Innovativeness will have a negative effect on technostress.

Bloom and Hautaluoma (1990) viewed computer ability and experience as the main cause of technostress, and a lack of confidence in computer literacy will cause anxiety about using information systems and eventually cause technostress (Nho et al., 2015). Shu et al. (2011) presented a model in which technology dependence exacerbates technostress, while computer self-efficacy reduces technostress, and empirically analyzed the model to confirm that the model was supported as a result (Jung et al., 2013). Kim and Yeo (2007) conducted a technostress study on the adoption of ICT products and found that the lower the ability to use a computer, the higher the perceived technostress, and that women, the elderly, and those with low computer literacy perceived higher technostress (Jin et al., 2012). Based on the results of previous studies, in this study, it is expected that among the new-silver generation, those with high IT efficacy have reduced anxiety about new technologies while using fast-food restaurant kiosks and thus perceive low technostress. Accordingly, the following hypothesis is established:

H1b: IT efficacy will have a negative effect on technostress.

3.2 The Relationship between IT Characteristics and Technostress

Technostress can be a stress-inducing factor due to the maladaptation caused by the inability to create appropriate responses to deal with work in a high-complexity environment (Sami & Pangannaiah, 2006). Hwang and Kim (2019) interviewed people in their 50s and 60s who used kiosks at fast-food restaurants and found it challenging to start from the first screen and locate the desired product. In addition, when selecting a set menu, the options screen was complex and challenging, the payment process was complex, and the path from ordering to payment was intricate and difficult. Based on these findings, it is expected that the new-silver generation will find it challenging to accept kiosks as innovative in the environment of using fast-food restaurant kiosks, and the higher the complexity, the higher the perceived technostress. Therefore, we develop the following hypothesis:

H2a: Complexity will have a positive effect on technostress.

Along with the rapid progress of the 4th industrial revolution, the consumption life of consumers has also changed rapidly. Accordingly, not only automation, unmanned, and "smartization" are in progress, but also kiosks are spreading further, and the use rate is increasing as non-face-to-face services are emerging due to rapid increases in the minimum wage along with changes in contactless consumption trends. Due to the phenomenon, face-to-face service cannot be provided in a fast-food restaurant kiosk environment, and unmanned stores where employees do not reside are also gaining popularity. Some fast-food companies have the advantage of reducing labor costs and store operating costs by not operating the existing checkout counter and operating only kiosks during busy hours, even if there are employees, so the introduction of kiosks is expected to expand more and more. However, it is expected that the new-silver generation will suffer from psychological stress due to the involuntary, non-optional, and forced kiosk use environment. In addition, if a non-service situation where one cannot be helped when a problem has occurred or an inquiry is needed because there is no resident staff is experienced, even consumers who have continued to use the kiosks may experience negative feelings, and this may induce stress to affect adoption resistance. For this reason, as such, the following hypothesis is established:

H2b: Forced use will have a positive effect on technostress.

3.3 The Relationship between Perceived Risks and Perceived Value

In an environment where kiosks are used in fast-food restaurants, more and more stores require kiosks rather than checkout. Consequently, it is expected that the degree to which consumers using kiosks and the new-silver generation experience time loss due to incorrect orders or payments will increase. This time loss is likely to affect the level of risks consumers perceive. Song (2019) mentioned that high adoption resistance is caused due to difficulties in processing procedures or screen arrangements in some processes required for users to use kiosks and stated that users experience anxiety and discomfort. In addition, as the most important influencing factor in terms of time, when users perceive that using a kiosk takes a long time or increases waiting time, the satisfaction felt when the kiosk is quickly and efficiently used reduces adoption resistance. Based on the results of previous studies as such, it is expected that when visiting a fast-food restaurant, the new-silver generation perceives a higher risk of time loss in the process of purchasing a menu using a kiosk than when ordering directly from an employee the effect on the perceived value will become lower. For this reason, as such, the following hypothesis is established:

H3a: The risk of time loss will have a negative effect on perceived value.

Perceived risk is a psychological risk consumers feel due to the severity and uncertainty of consequences that have not yet occurred. To examine how consumers perceive the risk of consequences that have not yet occurred while using the kiosk, the risk factors that consumers can perceive were classified into five ones: privacy, function, economy, society, and service and indicated that among them, the social risk does not have a significant effect on conflicts in the use of simple payment services (Park & Kim, 2017). However, in a study conducted with 36 participants (10.0%) aged 50 years or older, a result indicated that in the process of using new and innovative technology, users are conscious of others' evaluation of their behavior, and this affects users' attitudes and behavior was derived (Hyun et al., 2017). In addition, Chang and Park (2010) found that adoption resistance decreases when consumers perceive that adopting an innovative technology or service improves their social status or image. Based on the results of previous studies, in this study, it is expected that as the social risk perceived by the new-silver generation increases, the effect on the perceived value experienced while using a kiosk at a fast-food restaurant will increase. Accordingly, the following hypothesis is established:

H3b: Social risk will have a negative effect on perceived value.

3.4 The Relationship between Perceived Benefits and Perceived Value

The benefits experienced and perceived by consumers satisfy consumers' purchasing motivation and expectations and make consumers obtain positive results when using products after purchase (Cardin & Olson, 1994). Davis (1989) and Rogers (1995) defined that usefulness among perceived benefits contributes to improving work performance or a sense of accomplishment by using a new technology or system. Based on the results of previous studies, in this study, it is expected that as the new-silver generation perceives the usefulness while using fast-food restaurant kiosks and becomes accustomed to them, the factors that hinder adoption will decrease, and they will experience perceived value or benefits. Therefore, the following hypothesis is established:

H4a: Usefulness will have a positive effect on perceived value.

Enjoyment means the degree to which the user feels pleasure by himself/herself, regardless of expected performance (Carroll & Thomas, 1988). Those who experienced immediate pleasure and joy from using kiosks are expected to adopt kiosks faster and more than others. In a study on computer use, Davis et al. (1992) found

that customers gave value to the enjoyment they felt from using a new technology or service. Among the attributes of kiosks, enjoyment was derived as a variable that has the largest effect on adoption attitude, and customers who experienced pleasure will use the kiosk more often than other customers because the ordering process per se is perceived as enjoyment (Min & Park, 2010). Based on the results of previous studies, it is expected that the new-silver generation will be motivated by innovation and curiosity, which are their characteristics, and feel the active feeling termed perceived enjoyment in the process of using a fast-food restaurant kiosk. When considering the dynamic and future-oriented nature of the new-silver generation, it is judged that the new-silver generation who experienced enjoyment in using the kiosk will experience perceived value, and the positive psychological effect will affect adoption resistance. Therefore, the following hypothesis is established:

H4b: Enjoyment will have a positive effect on perceived value.

3.5 The Relationship between Technostress and Post-Adoption Resistance

According to the technostress theory, technostress occurs due to a mismatch between personal and technological characteristics, and adoption resistance can occur due to psychological factors as such (Ellen et al., 1991). Technostress becomes to affect the adoption of information and communication technology (Kim et al., 2017). In addition, a result indicating that technostress acts as an obstacle to the spread of cloud services among cloud computing service users in the public sector was confirmed, and it was argued that adoption resistance exists even when the consensus on the usefulness of cloud computing is high. Therefore, based on the results of previous studies, it is expected that in the case of the new-silver generation using fast-food restaurant kiosks, the higher the degree of perceiving technostress, the higher the adoption resistance. Based on these discussions, the following hypothesis is established:

H5: Technostress will have a positive effect on adoption resistance.

3.6 The Relationship between Perceived Value and Post-Adoption Resistance

In the field of information system studies, it was found that perceived value has significant effects in relation to e-commerce purchase intentions (Chen & Dubinsky, 2003) or social commerce reuse intentions (Park & Jeon, 2013). In addition, in a study on adoption resistance when using personal cloud services, the results announced by Jo et al. (2015) also showed that the higher the user's perceived value for the service, the higher the intention to use and the lower the adoption resistance (Jo et al., 2015). In addition, a study on adoption resistance to paid mobile applications conducted by Song et al. (2013) confirmed that perceived value had a negative effect on adoption resistance. Therefore, based on the results of previous studies, it can be expected that when the new-silver generation uses a fast-food restaurant kiosk, the higher the perceived value, the lower the adoption resistance. Based on these discussions, the following hypothesis is established:

H6: Perceived value will have a negative effect on adoption resistance.

4. Research Methodology

4.1 Data Collection

This study conducted a questionnaire survey to analyze the effects on adoption resistance in the fast-food restaurant kiosk use environment with new-silver generation users (born between 1955 and 1970) who had experienced using kiosks at fast-food restaurants (e.g., McDonald's, Burger King, KFC, Lotteria, etc.). Prior to this survey, a pilot test was conducted from April 6 to April 9, 2020, and inappropriate questionnaire items were corrected and supplemented to secure face validity. After that, the main survey was conducted online between April 21 and April 25, 2020, with the new-silver generation who had experienced using fast-food restaurant kiosks. Then, the new-silver generation, who had no experience using a fast-food restaurant kiosk, was asked to visit a fast-food store and use the kiosk for the first time and immediately conducted a questionnaire survey online and offline. The questionnaire survey was conducted through the convenience sampling method, and a total of 245 valid responses were collected (see Table 2). Based on the collected responses, descriptive statistical analysis, reliability and validity tests, and hypotheses validations were performed using IBM SPSS Statistics 25 (SPSS 25) and SmartPLS 3.0 statistical analysis programs.

Table 2. Demographics of respondents (n=245)

Variable	Category	Frequency	Percent (%)
Gender	Male	74	30.2
	Female	171	69.8
Age	50-54	132	53.9
	55-59	53	21.6
	60-65	60	24.5
Education	Elementary school degree	18	7.3
	Middle school degree	74	30.2
	High school degree	129	52.7
	Undergraduate (University) degree	24	9.8
The average cost of dining out per person	0 ~ 10 USD (U.S. Dollars)	10	4.1
	10 ~ less than 30 USD	124	50.6
	30 ~ less than 50 USD	42	17.1
	50 ~ less than 100 USD	35	14.3
	Over 100 USD	34	13.9

The number of questionnaire respondents with no experience of kiosk use was identified as 100 (40.8%), and the number of those with two or more experiences of kiosk use was identified as 145 (59.2%). As the fast-good restaurants where kiosks were used frequently or for the last time, McDonald's was mentioned in 94 cases (38.4%), Burger King in 71 cases (29.0%), and Lotteria in 55 cases (22.4%) to show similar ratios (see Table 3). The rate of visits to fast-food restaurants and the

rate of use of kiosks are similar, implying that there are many new-silver generation users who use the kiosk for the first time, but there is no new-silver generation that uses the kiosk only once. In this study, a questionnaire survey was conducted focusing on collecting first-time users to learn more about the factors for the effects of consumers who try fast-food restaurant kiosks for the first time, the new-silver generation on adoption resistance to fast-food restaurant kiosks.

Table 3. Distribution of kiosk experience in the sample (n=245)

Variable	Category		Frequency		Percent (%)
Kiosk experience	1 time	offline	73	100	40.8
		online	27		
	more than 2 times	offline	27	145	59.2
		online	118		
A fast-food restaurant with a kiosk you've used many times or recently	McDonald's		94		38.4
	Burger King		71		29.0
	Lotteria		55		22.4
	KFC		16		6.5
	Mom's Touch		4		1.6
	Quiznos		1		0.4
	Subway		4		1.6

4.2 Measurements

This study verified the research model and hypotheses proposed to check studies on the effects of the technostress derived through the personal characteristics of the new-silver generation, the information and communication technology environments of kiosks, and the perceived risks and perceived benefits experienced by the new-silver generation while using kiosks on adoption resistance. To that end, questionnaire items were prepared by referring to existing literature and previous studies and partially modifying them according to the purpose and direction of this study, and the forced use variables among the characteristics of the information and communication technology environment were directly developed and applied to the fast-food restaurant kiosk environment to construct them. Based on the on-

site interviews conducted with academic and practical experts, face validity was secured by reviewing, revising, and supplementing the questionnaire measurement items. Based on the questionnaire developed and used based on previous studies, the 7-point Likert scale was used as a variable measurement tool adopted in this study. The forced use, a second-order variable developed for this study, was composed of two factors: non-option and non-service, which are the first-order variables. The variables used in the research model and the operational definitions of individual variables are shown in Table 4, and the measurement items were constructed according to the operational definitions of individual variables (see Table 5).

Table 4. Operational definitions of constructs

Construct	Operational definition	Reference	
Innovativeness (IV)	The degree of one's tendency to be friendly to new information and communications technologies and to try them before others	Patil et al. (2020)	
IT Efficacy (IT)	The degree of one's belief in her/his ability to use information technologies or information systems	Alfadda and Mahdi (2021)	
Complexity (CO)	The degree to which one feels that it is more challenging to use kiosks than to use cash registers	Ragu-Nathan et al. (2008)	
Forced Use (FU)	No Option (NO)	The degree to which one has experienced a situation in which she/he was forced to use a kiosk involuntarily due to the inability to use a cash register	Self-developed
	No Service (NS)	The degree to which one had experienced a situation in which she/he could not find an appropriate person to ask when help was needed while using a kiosk	Self-developed
Risk of Time Loss (TR)	The degree to which one has experienced a loss of time when using a kiosk than when using a cash register	De Lapparent (2010)	
Social Risk (SR)	The degree of one's perception of risk of losing her/his social status due to the negative evaluation of others when she/he is unfamiliar with using kiosks	Ram and Sheth (1989)	
Usefulness (US)	The degree to which one believes that using kiosks would enhance her/his order performance	Davis (1989)	
Enjoyment (EN)	The degree to which one believes that it is fun to use a kiosk as the use itself apart from the expected outcomes or results	Kim et al. (2007)	
Technostress (TE)	The degree of one's mental burden that she/he feels by using kiosks	Lee et al. (2016)	
Perceived Value (PV)	The degree of one's perceived evaluation from a bi-directional trade-off between giving and getting when using kiosks	Sánchez-Fernández and Iniesta-Bonillo (2007)	
Kiosk Adoption Resistance (AR)	The degree of one's perceived rejection or reluctance to continuously use kiosks after the prior experience of use	Ram and Jung (1991)	

Table 5. Reliability and convergent validity

Construct	Measurement Items	Factor Loadings	Cronbach's Alpha	CR	AVE
IV	I tend to be interested in trends, such as new products/services.	0.771	0.914	0.934	0.703
	I am a big fan of trying new products/services.	0.900			
	I am an active buyer or user of new products/services.	0.891			
	I tend to teach myself how to utilize new products/services.	0.730			
	I tend to use new products/services before everyone else.	0.882			
IT	I love to tell others about new products/services.	0.840	0.896	0.928	0.763
	I tend to use ICT better than others.	0.888			
	I tend to learn how to use ICT on my own.	0.882			
	I do not feel much difficulty in using ICT.	0.882			
	I do not need help from others to use ICT.	0.841			
CO	Compared to the checkout counter, the kiosk is more difficult to use.	0.920	0.930	0.950	0.827
	The kiosk has a more complicated use procedure than the checkout counter.	0.933			
NO	Compared to using a checkout counter, kiosks require more time and effort.	0.925	0.751	0.876	0.781
	Compared to using a checkout counter, kiosks have more unnecessary functions.	0.856			
FU	There are many stores where you only need to use the kiosk, not the checkout counter.	0.961	0.842	0.927	0.863
	There are often when you only need to use the kiosk, not the checkout counter.	0.800			
NS	If a problem arises when using a kiosk, help is often unavailable.	0.920	0.930	0.950	0.827
	When using the kiosk, there are frequent cases where the person (employee) to whom to inquire is not found, even if there is an inquiry.	0.938			
TR	It will take more time to select a menu when using a kiosk than when using a checkout counter.	0.888	0.930	0.950	0.827
	It will take more time to pay when using a kiosk than when using a checkout counter.	0.931			
SR	It will take more time to correct wrong orders and payments when using a kiosk than when using a checkout counter.	0.654	0.967	0.974	0.905
	It will take more time to look at unnecessary menus when using a kiosk than when using a checkout counter.	0.838			
US	I am worried that others will judge me negatively if I do not use the kiosk.	0.960	0.959	0.971	0.892
	I worry that others will judge me negatively if I do not know how to use the kiosk.	0.978			
EN	I am worried that others will judge me negatively because of my inexperienced kiosk use.	0.943	0.953	0.966	0.877
	I am worried that others will evaluate me negatively if I choose the wrong menu when using the kiosk.	0.924			
TE	Orders and payments can be processed quickly using kiosks.	0.931	0.863	0.903	0.703
	Kiosks allow you to complete orders and payments more effectively than other methods.	0.951			
PV	The use of kiosks helps to process orders and payments conveniently.	0.970	0.929	0.946	0.779
	Using the kiosk is useful overall.	0.925			
AR	I have fun using the kiosk.	0.944	0.945	0.956	0.785
	I am interested in using the kiosk.	0.967			
AR	I enjoy using the kiosk.	0.964	0.863	0.903	0.703
	It is amazing that I use the kiosk.	0.867			
AR	I get stressed about using the kiosk.	0.904	0.863	0.903	0.703
	I get stressed about the constantly newly developed kiosk.	0.931			
AR	I am worried that I will fall behind the times if I do not use the kiosk well.	0.654	0.929	0.946	0.779
	I am worried that I will not be able to learn the new function added to the kiosk.	0.538			
AR	Using the kiosk gives me more benefits compared to the time I invested.	0.881	0.945	0.956	0.785
	The use of the kiosk gives me more benefits than the effort I invested.	0.908			
AR	Using the kiosk offers me a good benefit.	0.897	0.945	0.956	0.785
	I think using a kiosk will provide great value in my life.	0.875			
AR	I think using a kiosk improves my standard of living.	0.851	0.945	0.956	0.785
	I feel reluctant to use the kiosk.	0.896			
AR	I will refuse even if someone recommends using the kiosk.	0.904	0.945	0.956	0.785
	I have a negative opinion about using the kiosk.	0.896			
AR	I will stick to the existing counter instead of the kiosk.	0.880	0.945	0.956	0.785
	I think using the kiosk is a waste of time.	0.834			
AR	I find it tiring to use the kiosk.	0.903	0.945	0.956	0.785

* Note: All factor loadings were significant at the $p < 0.05$ level.

5. Results

This study used SPSS 25 and SmartPLS 3.0 to analyze the data collected. To evaluate the reliability and validity of the measurement items, Cronbach's Alpha values were calculated using SPSS 25. In addition, confirmatory factor analysis (CFA) was performed using SmartPLS 3.0 to verify the validity of the measurement items.

5.1 Measurement Model

This study analyzed the measurement model to verify reliability, convergent validity, and discriminant validity. The reliability was verified by measuring Cronbach's Alpha and Composite Reliability (CR) values. Generally, the reliability is judged to be high when Cronbach's Alpha value is at least 0.7, and the CR value is at least 0.7 (Nunnally & Bernstein, 1994). Based on the analysis results, Cronbach's Alpha values ranged from 0.751 to

0.967, and the CR values ranged from 0.876 to 0.974, so high reliability was confirmed in all variables. Therefore, it was judged that the reliability of the analysis data was secured (see Table 5). In addition, to verify the validity of individual variables, CFA was conducted to confirm convergent validity. Convergent validity indicates how consistent the measurement items of a variable are in relation to that variable. Based on the results of the analysis, the average variance extracted (AVE) values of all variables were over 0.7, exceeding the recommended value of 0.5 (Fornell & Larcker, 1981), and the factor loading values of all measurement items ranged from 0.538 to 0.978 confirming that the measurement

items were significant (Bagozzi et al., 1991). Accordingly, it can be judged that convergent validity has been secured. In addition, the AVE values and the correlation coefficients between variables were compared to verify the discriminant validity. Table 6 lists the correlation coefficients between the variables, and the AVE square root values were displayed on the diagonal for comparison. As a result of the analysis, the values of the correlation coefficients between all variables exceeded the value of the square root values of the AVE, and it was judged that discriminant validity was secured (Fornell & Larcker, 1981).

Table 6. Results of correlation and discriminative validity analysis

	IV	IT	CO	NO	NS	TR	SR	US	EN	TE	PV	AR
IV	0.838*											
IT	0.729	0.873										
CO	-0.542	-0.513	0.909									
NO	0.046	0.089	0.119	0.884								
NS	-0.186	-0.098	0.346	0.287	0.929							
TR	-0.391	-0.379	0.688	0.076	0.391	0.909						
SR	-0.082	-0.164	0.177	0.249	0.246	0.161	0.951					
US	0.414	0.410	-0.593	0.102	-0.206	-0.630	-0.046	0.944				
EN	0.584	0.481	-0.615	0.006	-0.239	-0.564	0.045	0.666	0.936			
TE	-0.599	-0.553	0.718	0.132	0.357	0.524	0.355	-0.457	-0.494	0.839		
PV	0.381	0.300	-0.452	0.124	-0.124	-0.518	0.105	0.602	0.547	-0.278	0.883	
AR	-0.585	-0.490	0.740	0.062	0.371	0.485	0.203	-0.492	-0.503	0.811	-0.289	0.886

* Diagonal values represent the square root of AVE.

5.2 Structural Model

In this study, the bootstrapping resampling technique of the SmartPLS 3.0 program was used to verify the hypotheses. The total number of samples was 245, and the number of times re-sampling was set to 5,000 for analysis. As a result of the hypothesis verification, it was confirmed that innovation and IT efficacy among personal characteristics had negative effects on technostress (H1a and H1b supported), and complexity and forced use among the characteristics of information and communication technology environments had positive effects on technostress. (H2a and H2b supported). In addition, it was confirmed that the risk of time loss among perceived risks had a negative effect on perceived value (H3a supported), but the social risk was confirmed to have a positive effect on perceived value (H3b not supported). It was confirmed that usefulness and enjoyment

among perceived benefits positively affected perceived value (H4a and H4b supported). In addition, hypotheses H5 and H6 were supported as they confirmed that technostress has a positive effect on adoption resistance and perceived value has a negative effect on adoption resistance. Forced use was a secondary variable consisting of two primary variables: non-option and non-service. The factor score of the primary variable was used to construct forced use, which is the secondary variable. As a result of the analysis using the secondary variable, all nine hypotheses were supported except for the effect of social risk on perceived value (H3b) out of the total of ten hypotheses presented in this study. It can be confirmed that both non-option and non-service have positive effects on technostress. The results of the hypotheses test are summarized in Table 7.

Table 7. Summary of hypotheses testing results

Hypothesis	Path	Path Coefficient	t-value	Result
H1	H1a Innovation → Technostress	-0.210	2.946*	Supported
	H1b Innovation → Technostress	-0.139	2.166*	Supported
H2	H2a Complexity → Technostress	0.485	8.470***	Supported
	H2b Forced Use → Technostress	0.138	2.697**	Supported
H3	H3a Risk of Time Loss → Perceived Value	-0.217	2.842**	Supported
	H3b Social Risk → Perceived Value	0.148	2.335**	Not supported (opposite direction)
H4	H4a Usefulness → Perceived Value	0.348	4.651***	Supported
	H4b Enjoyment → Perceived Value	0.187	2.191*	Supported
H5	Technostress → Adoption Resistance	0.792	36.189***	Supported
H6	Perceived Value → Adoption Resistance	-0.068	1.729+	Supported

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

6. Discussion

6.1. Research Findings

To identify the inclinations and characteristics of the new-silver generation and propose strategies and countermeasures to activate their use of kiosks, this study analyzed the factors that

affect the adoption resistance of the new-silver generation when they use fast-food restaurant kiosks through the technostress theory and the value-based adoption model. The results of the analysis in this study are as follows. First, when the relationship between the personal characteristics and technostress of the new-silver generation was examined, it was confirmed that the two factors (innovation and IT efficacy) had significant effects on

technostress, and technostress also significantly affected adoption resistance. Even though kiosks are a new technology and service, it could be confirmed that technostress could be reduced to the new-silver generation with innovativeness and that the higher the IT efficacy, the more technostress can be reduced. Technostress is caused to respond to the environment as such, but unlike the previous passive and conservative silver generation, the new-silver generation has the characteristics of having not only high media literacy but also low fear of new technologies and a desire to learn innovation so that their technostress is reduced because their two characteristics, innovativeness, and IT efficacy are prominent.

Second, the relationship between information and communication technology environment characteristics and technostress was examined, and based on the result, it was confirmed that complexity and forced use had significant effects on technostress. If a new technology, such as a kiosk, is complex, nonconformity may occur because appropriate responses cannot be made during the ordering and payment process, which will become a factor that causes stress. This means that the new-silver generation may experience such difficulties and inconveniences while using kiosks to form negative feelings leading to the perception of technostress and increased adoption resistance. It was confirmed that among the characteristics of ICT environments, the two variables (non-option and non-service), which are primary variables when the new-silver generation uses a fast-food restaurant kiosk, had significant effects on forced use, a secondary variable. It was found that the negative feelings and psychological pressure experienced by the new-silver generation in a non-option and non-service environment when using a fast-food restaurant kiosk led to technostress.

Third, the effects of the risks and benefits perceived by the new-silver generation when using the kiosk on the perceived value were checked, and based on the results, it was confirmed that the risk of time loss had a significant effect on the perceived value. The new-silver generation perceives time loss more when using a kiosk than when using a checkout counter, and the perceived value tends to decrease as they feel psychologically negative feelings due to their inexperience in using the kiosk.

Fourth, although the social risk was expected to be a predisposing factor of the perceived risk of perceived value, it was confirmed that a positive effect actually works. They tend to focus on themselves rather than the views or opinions of those around them and tend to solve problems personally or deal with them on their own. It was found that social risk did not negatively affect perceived value because the new-silver generation tended not to feel much pressure from negative views or opinions due to individual mistakes or inexperienced handling while using the kiosk.

Fifth, usefulness and enjoyment as two factors of perceived benefits showed significant relationships with perceived value. This means that the new-silver generation, who use kiosks at fast-food restaurants, should be provided with various benefits and useful information and experience smooth handling in the process of ordering and payment. At the same time, if the new-silver generation can experience visual satisfaction and entertainment while using the kiosk, they will feel enjoyment and fun, their adoption resistance will be reduced, and they may continuously use it. Therefore, fast-food companies must develop services to provide benefits to meet the needs of the new-silver generation and provide kiosks considering factors that give users pleasure and satisfaction.

Lastly, it was confirmed that adoption resistance increased as the degree of perception of technostress due to fast-food restaurant kiosks by the new-silver generation increased. Therefore, to alleviate the technostress perceived by new-silver generation consumers and promote their use, efforts to reduce the adoption resistance to fast-food restaurant kiosks of the new-silver generation are necessary. Therefore, fast-food companies should carefully understand and manage the negative feelings that may be experienced by the new-silver generation while providing

kiosks to induce continued use. In addition, as expected, it was confirmed that perceived value was also related to a decrease in adoption resistance to fast-food kiosks. This means the more the new-silver generation recognizes high values while using fast-food restaurant kiosks, the more positive behaviors and attitudes can be induced. Therefore, when fast-food companies establish marketing strategies for customers, they must clearly set the core values of kiosks and properly expose them to improve the value the new-silver generation can feel.

6.2 Theoretical Implications

The academic contributions of this study are as follows. First, this study was conducted with the new-silver generation among studies on adoption resistance to fast-food restaurant kiosks. Previous studies mainly focused on verifying the factors affecting the intentions to adopt and use kiosks. However, after theoretically analyzing the characteristics of the new-silver generation, a new consumption target, this study systematically derived and verified how their characteristics affect the adoption resistance to kiosks. The new-silver generation is expected to change into a central consumer group. Unlike the existing silver generation, as a generation with accumulated economic power, they have the economic power to consume while pursuing a pleasant life. Therefore, they are becoming an important target of interest in the new market. In addition, South Korea's fast-food franchise market is showing steady growth every year, and the new-silver generation seeking reasonable consumption is expected to further increase the rate of use of fast-food restaurants where they can enjoy simple and inexpensive desserts. Moreover, since the new-silver generation is in a central position amid changes in consumption trends along with the development of information and communication technology and the formation of contactless consumption culture, the contribution of studies on the new-silver generation should be high.

Second, this study combined the technostress theory and the value-based adoption model to systematically derive and verify the influencing factors of technostress and the perceived value that affect adoption resistance when the new-silver generation use kiosks. To that end, hypotheses indicating that technostress and perceived value directly affect adoption resistance were established, and the predisposing factors for these two variables were derived and verified based on each theory. Since studies related to adoption resistance to kiosks are relatively insufficient compared to the intention to use kiosks, it is judged that the result of this study, in which technostress and value-based adoption models were combined, can contribute to expanding studies related to adoption resistance.

Lastly, this study confirmed the effect of the predisposing factors for forced use, one of the characteristics of the information and communication technology environment, on technostress. Currently, automation and unmanning are progressing thanks to the progress of the 4th industrial revolution, and due to the burden of labor costs and changes in consumption trends, fast-food restaurant kiosks are operated in a time zone in which fast-food restaurants can be used only at unmanned stores. Because of the foregoing, the new-silver generation cannot but complain about the inconvenience and difficulty of being forced to use the kiosk when visiting fast-food restaurants. It was confirmed that the new-silver generation had negative psychological experiences when exposed to forced use, which caused stress and could be expressed as technostress. Therefore, it was verified that technostress would increase further if the new-silver generation used a fast-food restaurant kiosk in a no-option and no-service environment. Kiosks, an unavoidable unmanned system in the smart convergence era, are expected to result in increased technostress and adoption resistance if the new-silver generation is forced to use them. This is expected to not only hinder the use of kiosks but also reduce the use rate of fast-food restaurants. It is expected that hereafter, studies considering the effect of forced use variables on

adoption resistance and intention to use in the information and communication technology environment will be an important factor.

6.3 Practical Implications

The results of this study provide companies providing kiosks with useful information about the risk factors that may make the new-silver generation experience difficulties in adopting kiosks. Accordingly, the practical implications are examined as follows. First, companies that have installed kiosks should prepare a strategy to let the new-silver generation who use kiosks know they can use kiosks more easily and conveniently than face-to-face services. Since the new-silver generation recognizes that using a kiosk is unfamiliar and difficult, it is important to maximize its simplicity and develop it so that users can use it easily. In addition, it is necessary to make efforts to minimize the discomfort by emphasizing the usefulness of using the kiosk. Second, in cases where face-to-face services cannot be used and only kiosks must be used, a service environment should be created so that users do not experience an environment where adoption resistance increases due to non-service. To this end, providing an environment where users can receive help is important by providing an employee call function or wired voice service when a problem occurs. Third, methods to reduce the sense of distance felt by the new-silver generation and cause their curiosity should be considered, such as conducting training and advertisements about the kiosk through offline and online channels. Educational programs and content should be developed while emphasizing kiosks' advantages, innovativeness, and enjoyment to help the new-silver generation gain the motive and confidence to use kiosks more easily. Fourth, companies that have introduced kiosks by utilizing the government's digital divide bridging laws and measures need efforts to develop and operate educational programs and content that meet the needs and levels of the new-silver generation in connection with government educational programs. To respond to the development of kiosk technology, the new-silver generation's fear should be reduced through repeated education and experience, and the new-silver generation should be supported to increase satisfaction and IT efficacy together when using the kiosk. Considering the implications, companies providing kiosks should make efforts to maintain relationships with customers, minimize the inconvenience elements experienced by the new-silver generation to reduce adoption resistance, and strive to increase the satisfaction of the new-silver generation.

6.4 Limitations and Future Research

Despite this study's academic and practical implications, the study's limitations are as follows. First, since the response environments of offline and online surveys may differ, future studies should try to improve the representativeness of the samples by introducing a survey method considering the response environment of the new-silver generation and fast-food restaurant kiosks. Second, this study may lose representativeness as it merged all users into one group rather than dividing and comparing the first-time users and users who used kiosks many times. In future studies, studies are proposed to find out why they do not use a kiosk only with the new-silver generation who have no kiosk experience. Third, variables such as forced use, non-option, and non-service developed by the researcher were based on data collected using survey questions that had not yet been confirmed. In studies hereafter, it is necessary to secure the reliability and validity of variables by developing and verifying questionnaire items through additional studies. Fourth, the effect of forced use variables on adoption resistance when using a fast-food restaurant kiosk was checked, and based on the result, it is judged that it is worth conducting studies to reduce adoption

resistance by applying the variables to new technologies and services. In addition, a process of additionally developing and verifying a tool for measuring forced use variables is required. Finally, since this study only focused on the new-silver generation, future studies could extend the existing research to target the traditional silver generation. Based on this study, it is hoped that the results will provide an opportunity to understand the new-silver generation's adoption resistance to adopting the use of fast-food restaurant kiosks and to conduct further studies that will help develop technologies and services in the future.

Declaration of competing interests


The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.


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