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An Empirical Study of the Korean Telecommunication Market and IoT Smart Home: Effects of Bundling Strategy on Consumers' Responses

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Abstract

Purpose: This research focused on the fact that the Internet platform is integral to IoT products such as Smart home and studied consumer buying decisions when products are sold bundled with internet service. Contrary to the sales strategies of telecommunication companies, some companies sell IoT products alone, for example Google, Kakao, and Naver. In this market situation, the sales strategies of Korean telecommunication companies were analyzed with bundling theory and technology acceptance model, then it was conducted to figure out which sales and distribution strategies could affect consumers' purchase behavior. **Research design, data, methodology:** Data was collected by149 questionnaires from groups who are familiar with IoT smart home systems, then exploratory factor analysis and regression were used to analyze the research model. **Results:** The results revealed that the perceived ease of use and the perceived usefulness affect the purchase intention of IoT-based products; however, this effect was not found in the case of bundled products. In other words, it is found that selling and distributing Internet services and IoT products together does not affect consumers' purchases. **Conclusion:** It is suggested that Korean telecommunications companies' existing sales and distribution strategies for IoT products need to be changed according to its characteristics.

Keywords: Product Bundling, Bundling Strategy, IoT Smart Home, Technology Acceptance Model(TAM), Telecommuniation Companies, Distribution Strategy

JEL Classification Code: M3, L91, N7, R41

1. Introduction

Recently, Internet-connected products have gained importance with the introduction of the Internet of things(IoT). IoT is one of the key technologies of the 4th Industrial Revolution; IoT refers to devices connected to wired or wireless communication networks that can exchange information collected through sensors without human intervention and independently perform pre-programmed tasks. This allows all objects to be networked, communicated, retrieved, stored, analyzed, and utilized. Smart homes, smart buildings, healthcare, and autonomous vehicles are examples of technologies that can be realized through the IoT systems.

According to Gubbi, Buyya, Marusic, and Palaniswami (2013), "active participants in business, information and social processes where they are enabled to interact and communicate among themselves and with the environment by exchanging data and information sensed about the environment, while reacting autonomously to the real/physical world events and influencing it by running processes that trigger actions and create services with or without direct human intervention (Gubbi et al., 2013, p.4)"

Although attaining this technological stature seems like a distant vision, IoT-products are becoming an integral part of everyday life. Considering the increasing prevalence of IoT-based products, it can be stated that the development and acceptance of IoT technologies may not be distant. Concerning technology, IoT devices can be used to check whether the air conditioner is switched off, a door is locked, or the power of a multi-tap is turned off. Recently, Internet-

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connected products have gained importance with the introduction of the Internet of things (IoT). Also, IoT is also one of the representative applications fields of blockchain technology used in various industries (Kim & Shim, 2018).

In line with this trend, Korean telecommunication companies are launching a strategy for bundling IoT-based products completely reliant on an Internet infrastructure. As of June 2018, LGU + is focusing on the various contract types rather than sales of IoT-related products, and KT is focusing on mandatory control over the its central console system. While some products can be purchased individually depending on use, purchasing these products as a bundle through a telecommunication companies might be cost-effective for the customers, owing to the discount on such bundles. Basically, when customers purchase the same IoT package from the same carrier, they can get contract discounts from 10% to 20%. For example, an AI speaker is presented as a complementary item when it is purchased as a package or a system tool is rented for free on the purchase of a bundle. In these cases, consumers are driven to consider the bundling policy. However, certain products are sold separately as per a carrier's policies. Typically, Kakao, Line Friends, and Google are limited to AI speakers, and they do not require consumers to subscribe to a specific Internet service. Since Internet is integral to the operation of IoT-based products, the functioning of these products is subject to the existence of wireless Internet in the region. Besides these products, Korean brand "Switcher" and China's "Xiaomi home" continue to show the functions of their remote controllers within the specified environment. As the existence of these products indicates the growing significance of IoT, the overall IoT importance has been studied previously. But, there has been little research on the varying characteristics of these product how these differences impact sales in the current market environment.

Based on the aforementioned Korean market environment, we analyze the conventional marketing strategies of Korean telecommunication companies. Subsequently, we discuss how to approach and complement the existing strategy analysis; additionally, we formulate new marketing strategies based on our research results. Through the analysis of new product research in the current Korean market context, our study on new IoT products can have several implications for academia and corporations.

2. Literature Review

2.1. IoT and Smart Home

Smart home refers to a phenomenon wherein the IoT technology is applied to the residential environment, owing to the complexities of this phenomenon, IoT-based mart home system cannot be defined through a single concept. The IoT-based smart home service is emerging as a lucrative market and offering a high potential to businesses in search of new growth drivers (Kim, Park, & Choi, 2017). Korea Association of Smart Home said "smart home is a human-centered smart-life environment that enables users to enjoy convenience, welfare and safe living by converging IT into the environment of residence." In 2003 the UK Department of Trade and Industry (DTI) defined it as "a dwelling incorporating a communications network that connects the key electrical appliances and services, and allows them to be remotely controlled, monitored, or accessed." Also, Kim et al. (2017) stated, "Today, it is growing into a mammoth industry with the integration of smart devices with high-speed wire or wireless Internet, big data, and cloud, among others (Kim et al., 2017, p.3)." IoT has great potential and capability, and it is worth researching because it is expected to contribute significantly to future industry and academic research. Kwon and Lee (2019) defined the consumer and context for intelligent homecare products, and developed a usability evaluation scale consisting of functionality, error, convenience, and emotion.

As mentioned in introduction, research on IoT and Smart home technology continues to attract attention in recent years with the 4th Industrial Revolution. As technology is still being developed, abstract expressions follow when we all think of IoT. Santoso and Vun (2015) defined IoT (Internet of Things) as interconnected everyday objects' network. And it is now considered as the ready technology for market and new segment of high potential. Whenever a conclusion comes about the IoT related theme, it says there's potential always. Then we need to look more closely at what the potential is.

Skouby and Lynggard (2014) conclude that ICT (Information & Communication Technology) infrastructure has four-layer model for smart city. While each layer may be a tale of a distant future, IoT layer is the cornerstone of how it will help in the next generation supporting direct interaction with users.

After all, what are the universal values that smart home seeks? Mainetti, Mighali, and Patrono (2015) stated that Smart home's autonomously system and services are more and more important for any IoT infrastructure to overcome technical limitations. In short, it's a starting point for technology development beyond just making life easier.

What about a more realistic and wider perspective? This is not a small device in the house, but a view of the larger space through this technology. Khanna and Anand (2016) stated The growth of Internet of Things and technologies have given rise to new possibilities in terms of smart cities. In this study, they linked the possibilities of smart cities and the new parking system to the IoT. These

systems come together one by one, making it possible to configure everything from small parking lots to large cities. That's smart city. Smart city architecture to be smart health, smart environment, smart energy, smart security, smart office and residential buildings, smart administration, smart transport and smart industries (Gaur, Scotney, Parr, & McClean, 2015).

It can also be used in unexpected places. For example, in an emergency, Green, Thapliyal, and Carpendter (2016) explains that smart home environment proposed IoT-based fall detection system can improve the quality of life among older adults. This is one of the potentials Iot has. Not only people but also environmental problems in the future can be affected. As an easy example, Chen, Yang, Zhu, Wang, Liu, and Song (2017) announced the future-oriented concept of Smart Home 2.0, it is affordable to provide people indoor environment and greeneries. Up to this point, it can be seen that the contents of "Potential" are not exactly what it is.

From an academic point of view, research on IoT is more focused on the overall acceptance of IoT technology than on sales strategy or promotion. Although such practical research has been conducted, it is true that the flow of research on IoT is not focused on consumers.

The low acceptance of IoT can be attributed to consumers' concerns about the security and privacy of using IoT systems, for example, for backdoors (Arias, Wurm, Hoang, & Jin, 2015; Wurm, Hoang, Arias, Sadeghi, & Jin, 2016). While studies on the aforementioned issue exist, to the best our knowledge, research on the varying characteristics of IoT-based products has not been conducted. In addition to the speed of technology development, it will be a problem for commercialization. Dorri, Kanhere, Jurdak, and Gauravaram (2017) announce that IoT security is gaining a lot of attention these days from both academia and industry. Existing security solutions are not necessarily suited for IoT due to high energy consumption and processing overhead. The reason is that Internet of Things (IoT) consists of devices that generate, process, and exchange vast amounts of security and safety- critical data as well as privacy-sensitive information, and hence are appealing targets of various cyber-attacks. In other words, there are a lot of potential capabilities, but there are still many things to solve, and that is a lot of money. This would be a major obstacle to the commercialization problem, and the company's R&D costs and sales could not be lowered further.

On the one hand, efforts are made to improve these problems. Al-Ali, Zualkernan, Rashid, Gupta, and AliKarar (2017) states that, a smart Energy Management System (EMS) can contribute towards cutting the costs while still meeting energy demand, and it is trying to reduce the costs invested in IoT. In line with these efforts, this study will focus on how to study practical improvements for the IoT. Hence, we attempt to reveal the varying characteristics of IoT-based products, which are determined sales by promotion strategy.

This study introduces the perspectives of the technology acceptance model (TAM) and the bundling theory for achieving the research purposes.

2.2. Technology Acceptance Model(TAM)

Before configuring the main research model, it is important to find out the interest of Korean consumers in using IoT systems. Since it is a recently emerged technology, the consumers may be concerned about the life cycle of the IoT products. The technology acceptance model (TAM) is an information systems theory that predicts consumers' acceptance and use of a new technology; additionally, it suggests that several factors influence consumers' understanding of and decisions to use a new technology (Davis, 1989). It consists of two parts, one is perceived usefulness, and the other one is perceived ease-of-use. Throughout these two variables influence consumer attitude toward the product or service purchase intention, determining consumer actual behavior.

It is well-known that the TAM presents factors that highly influence acceptance and purchase behavior towards new technology (Gefen & Straub, 2000). According to this research, TAM can be beneficial for ecommerce businesses Moreover, various studies have been carried out on TAM. Kim and Oh (2014) combined and extended TAM model with additional determinants suggested in previous studies related to mobile service. This indicated that functionality and added value mobile application services are usefulness and easy to use, and operate in the process of using them (Kim & Oh, 2014). Bae and Kim (2015) investigated the effect of the experiences associated with new technologies, such as augmented reality (AR), on consumer purchase intention. They found a positive relationship between consumer intention and innovation, the perceived usefulness, and the perceived ease of use. Although this research is based on a different context, there are similar research cases that highlight the use of TAM. Lee, Becker, and Potluri (2016) explores determinants of corporate adoption of social media and the role of technology acceptance model. It showed the results that corporate needs, social expectations, ease of use and usefulness should be viewed as important antecedents to explain the firm's behavioral intention to use social media (Lee, Becker, & Potluri, 2016). Chin and Kim (2017) examined a new type of sportswear item which can be categorized as a technology-based item. They found a positive relationship among acceptance, perceived ease of use, perceived usefulness, and purchase intention. Kim and Park (2017) analyzed sub-factors of technology readiness & acceptance

model and technology paradox model, bonded the common factors, then accomplished unified model. Then it suggested empirical results that are almost same as the result from two models (Kim & Park, 2017). Byun (2018) tested the effect of personal product knowledge on the predictability of a technology acceptance model. Following the results of Byun (2018), attitude that is explained by the two perceived usefulness and ease of use was relatively small when the survey respondents had lower amount of product knowledge. Chen and Shang (2018) focused the technology acceptance model and social network theory, then identified factors influencing the users' word-of-mouth intention regarding mobile apps. Kim and Park (2019) examined the role of airport self-service characteristics and access the influence of the technology acceptance model on both customer satisfaction and behavioral intention. Gu, Bao, and Lee (2019) established a model of the continuance intention of fresh products O2O electronic commerce application based on the expectancy theory, technology acceptance model, success model, and trust model. Also, previous research showed a positive relationship between innovativeness and consumers' intentions to adopt the technology-based products and services (Ling & Yuan, 2012; Ryu, 2019).* Ling and Yuan (2012). An empirical research: Consumer intention to use smartphone based on consumer innovativeness. Paper presented at the 2nd International Conference on Consumer Electronics, Communications and Networks (CECNet) (pp.2368-2371). Mansur, Sule, Kartini, Oesmn, Putra, and Chamidah, (2019) focused on the ease of use and convenience aspects, then examined the relationship between the theory of technology to consumer behavior in using e-commerce applications. In this result, the components of technology acceptance theory moderate consumer behavior variable in the digital era (Mansur et al., 2019). Le, Ngo, Trinh, and Nguyen (2020) used theoretical frameworks based on Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) and aimed to identify the main factors affecting customers' decision to use mobile banking service in Vietnam. Yoo, Suh, and Kim (2020) examined the effects of AI speaker on the elderly living alone to improve the quality of life for the elderly living alone applied to the technology acceptance model.

In this context of theses previous studies, TAM is essential to analyze the latest technologies, such as IoT and smart home systems. Hence, we posit the followings:

H1: Perceived usefulness positively affects consumer purchase intention of IoT smart home systems.
H2: Perceived ease of use positively affects consumer purchase intention of IoT smart home systems.

2.3. Bundling Theory

According to the paper by Guiltian (1987), based on the bundling theory, two or more products and/or services are sold in a single package at a price equal to or less than the combined price of the individual products. Reinders, Frambach, and Schoormans (2010) defined price bundling as the sale of two or more individual products and services in a package at a special price or discount, regardless of product integration. According to a study by Eppen, Hanson, and Martin (1991), one of the main advantages of a bundle is that it targets specific consumer groups. Additionally, Sheng, Parker, and Nakamoto (2007) discussed how a mixed-leader bundle has influenced consumer evaluations of discounted products. In a study by Bakos and Brynjolfsson (1999), it was argued that it is suitable to consider different bundles of menus when systematically differentiating various product categories. Moreover, several studies discuss the auction format for selling multiple units. Palfrey (1983) studied bundled versus spate formats and found that the relative profitability of component auctions increases with an increase in the number of bidders. Drawing on these existing studies, and given Korean telecommunication companies' product offerings, we realized the importance of identifying which factor of product bundling will exert the highest impact on consumers. In other case of example, Kwon (2015) examined a bundling effect on production and distribution in patent-protected industry, then suggested results that bundling in an effective strategy, resulting in multiple products. That, the firm could utilize the bundling strategy obtaining technology from the standalone single-patent firms (Kwon, 2015). Samuel (2016) argued that IoT cannot be independent without the Internet. Based on this, the Korean market is pursuing a policy of bundling Internet services and IoT Smart home services together. Except for certain products, companies' IoT product policies are always "bundled". An empirical study of IoT and the Korean telecommunication market industry scenario reflect the damaging fair trade and limited consumer choice in consumer welfare. Of course, there are no legal issues or existing case studies on this. That's why we built this hypothesis.

The following hypotheses were set up to predict how this would affect actual consumers.

H3: The product fit of bundled products positively affects consumer purchase intention of IoT smart home systems.

Based on this background, we suggest our hypotheses and research model.

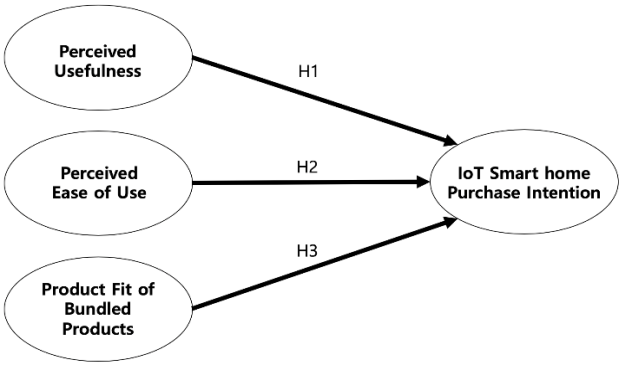

Figure 1: Research Model

3. Research Methods and Materials

3.1. Measurement

To empirically test the hypotheses, it would be essential to investigate the TAM and bundling strategy. For the TAM, we refer to the most basic research by Davis (1989). Based on the TAM model, items for each variable were set in consideration of recent research. Park, Ko, Kim, Choi, Park, and Youn (2019) selected four questionnaires each for the perceived usefulness and the perceived ease of use. Their research was also contextualized with the latest technology, and hence method could be easily modified. As a next step, we decided our approach toward the bundling variables. In importing bundling survey metrics, the survey items that overlap with the TAM were excluded as much as possible. Finally, only the constructs essential for bundling were taken, modified, and adapted to the context of our research.

According to Reinders et al. (2010), this research measured product comprehension, product evaluation, adoption intention, prior knowledge, product fit, and the comprehensibility of the product description. The context of IoT-based smart home system was applied by selectively using the questionnaire required in this research. The main questionnaire of this research is shown in Table 1 below.

Table 1: Construct and Measurement

Construct	Measurment	References
Product Fit of Bundled Products (PFBP)	How is the 'fit' between both products? 1. Good – bad product combination 2. Logical – not logical product combination	Reinders, Frambach, and Schoormans (2010), Simonin and Ruth (1995)
Perceived Usefulness (PU)	PU1 :Using the Smart home (IoT) systems are helpful for me PU2 :Smart home systems are effective to me PU3: Smart home systems are useful to me PU4 :Smart home systems increase my efficiency of daily life PU5: I can use a Smart home system well	Davis (1989)
Perceived of Easy of Use (PEOU)	EOU1: it is convenient to use a IoT smart home system EOU2: I find the smart home system to be flexible to interact with me EOU3: I would find the systems to easy to use (user-friendly) EOU4: I have a clear understating of the function of Smart home systems EOU5: Learning to operate the system would easy for me	Davis (1989)
IoT Smart home Purchase Intention	IU1: Assuming I have access to the smart home system, I intend to use it IU2 : Given that I have access to the IoT Smart home system, I predict that I would use it	Davis (1989)

Notes: all measurement items were measrued on 1 5-point scale.

3.2. Survey and Data Collection

The "description" in the questionnaire is the most important part of this study. After several revisions, we selected and completed the descriptions. First, we describe a general type of IoT smart home product for understanding TAM. Second, our explanation describes Internet-related products sold by Korean telecommunication companies and the actual cases of selling them with IoT products. We explained the price benefit that can be gained by purchasing the two together through this description; this can be referred to as price bundling. The reason for this process was that people who had little understanding of IoT or Smart home products could not get proper results if they participated in the survey. In addition, it was confirmed in advance that even if you read the description, you can create a situation where interpretation is insufficient. In actual preliminary work, I have asked some unrelated people verbally to ask questions and found that understanding and organizing the product from the start was difficult. That's

why this process has been an important part of this study.

The Internet infrastructure was used to increase the efficiency of the research. Using the Qualtrics, survey questionnaires were distributed through the Korean web platforms, which emphasize various IT-related topics (Example: YouTube community tab, Naver café). This survey was conducted only for two weeks to maintain consistently the characteristics of the cutting-edge product. As a result of the survey, this study collected 149 questionnaires for analyzing the research model (Data with errors was excluded).

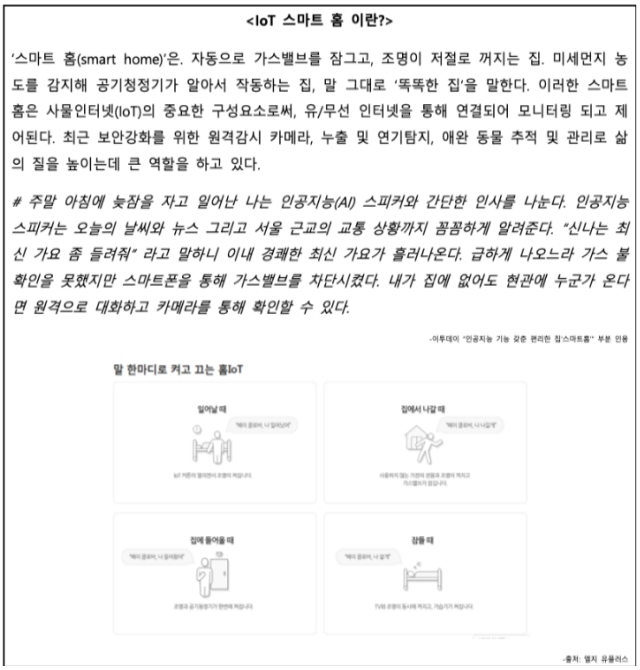

Figure 2: Actual Description in Survey

4. Results and Discussion

Before analyzing the research model, exploratory factor analysis (EFA) was conducted to ensure construct validity and reliability of the study using SPSS 18.0 version. In this study, we applied the factorial rotation of varimax and set number of fixed extraction factors to four.

As a result of the analysis, all measurement items except, perceived ease of use 1 (PEOU1), were loaded on each concept; additionally, it was confirmed that the factor loadings exceeded 0.6 or more. Communality was also over 0.4 or more, and hence the concepts of factors are considered to have convergent validity and discriminant validity. In addition, Cronbach Alpha coefficient of all the construct satisfied the criterion of 0.7 or more, confirming that the reliability is secured. In order for confirming the validation of EFA, we conducted the Kaiser-Meyer-Olkin (KMO) and Bartlett's Sphericity test. The value of Kaiser-Meyer-Olkin (KMO) test is 0.872, and the p-value of Bartlett's Sphericity is 0.000. Therefore, we confirmed the validation of EFA results. The results of the analysis are shown in Table 2 below.

Next, multiple regression analysis was conducted to verify the hypothesis of this study. The dependent variable is the purchase intention of the IoT smart home product. The independent variables are perceived usefulness (PU), perceived ease of use (PEOU), and product fit of bundled products (PFBP). As a result of multiple regression analysis, perceived usefulness and the perceived ease of use in H1 and H2, respectively, showed a positive effect on purchase intention of the IoT smart home at a significance level of 0.05. Therefore, H1 and H2 are supported. These results suggest that consumers can use IoT smart home products effectively when they recognize its perceived usefulness and perceived ease of use.

Table 2: Exploratory Factor Analysis

	Factor Loading Value				Commonality	Cronbach's Alpha	Mean	Standard Deviation
	1	2	3	4				
PU1	.775	.403	.195	.269	.873	.922	3.688	.917
PU2	.784	.322	.313	.057	.820			
PU3	.813	.290	.269	.207	.860			
PU4	.745	.134	.428	.129	.772			
PEOU2	.535	.662	.206	.153	.790	.852	3.593	.932
PEOU3	.225	.699	.516	.172	.835			
PEOU4	.332	.774	.251	.133	.790			
PFBP1	.131	.118	.060	.927	.895	.873	3.399	.926
PFBP2	.159	.118	.055	.914	.877			
INT1	.380	.292	.834	.079	.932	.936	4.040	.994
INT2	.414	.332	.791	.038	.909			
The value of Kaiser-Meyer-Olkin (KMO): 0.872, P-value of Bartlett's Sphericity: 0.000.								

Notes: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Product Fit of Bundled Products (PFBP), IOT purchase intention (INT)

However, the product fit of bundled products, H3, was not statistically significant in influencing the purchasing intention of the IoT smart home systems, at a significance level of 0.05. Therefore, H3 is not supported, and the sales strategy of the product fit of bundled products does not affect the purchase intention of IoT smart home systems. The adjusted R-squared of the purchase intention of the IoT smart home was 0.621. Multicollinearity measured by the variance inflation factor (VIF) index was less than 10 in all. Therefore, it is hard to find any related problem in multicollinearity.

These results indicate that customers are willing to purchase IoT products when they perceive that the usefulness of the IoT products is high. In addition, it means that the more an IoT product is easier to use, the higher the individual's willingness to purchase the IoT product. However, it can be seen that individuals do not care much about the IoT product bundling proposal and do not improve the intention to purchase IoT products.

The results of hypothesis testing are described in Table 3 below.

Table 3: Multiple Regression Analysis

Independent variable	B	SE	Beta	p-value	VIF
Constant	.981	.244		0.000	
Perceived Usefulness	.483	.087	.446	**0.000**	2.511
Perceived Ease of Use	.464	.085	.435	**0.000**	2.481
Prduct Fit of Bundled Products	-.114	.059	-.107	**0.054**	1.176

5. Conclusions

5.1. Implication

The purpose of this study is to analyze the practical situation of different sales and distribution strategies for the products sold in the IoT smart home market. Practical sales strategies for IoT smart home products are colliding, but the academic field has not clearly identified which IoT product sales strategies are effectively perceived by consumers at this time. In order to solve this problem, this study introduced the TAM and bundling theory to investigate consumer's perception of IoT product purchase intention. As a result, it was found that only the usefulness and “ease of use” factors of the TAM had a significant influence on the intention to purchase IoT Smart home products.

The findings of this study provide theoretical implications for the consumer, as well as implications for improving the marketing strategy for bundling. This study suggests that there is a need for research to support theoretical evidence consistently in the academic field on sales strategies that are being conducted in practice. We hoped that the findings of this study can support theoretical evidence in the formulation and implementation of future IoT product sales and distribution strategies.

Based on these results, the most wanted part is the effect of product bundling. As the results of this study were insignificant, it can be said that there is no need for bundling when selling products in practice. In fact, many companies are selling IoT Smart home products separately from telecommunications products. If you look closely at the online shopping malls in Korea, you can see that it is not difficult to sell them alone rather than packaged bundles. If it is not made by a telecommunications company, it is already sold alone, such as Kakao, Google, and Xiaomi. It cannot be denied that the situation of a company that is already selling alone was correct.

Understanding the conclusions of this study and the market situation together, Korean telecommunications companies need to boldly change their marketing strategies. In other words, the Internet and various services and IoT products should not be bundled and sold. Focusing on quality improvement of service and independent marketing strategy for each service and product will be much more efficient for consumers satisfaction at this point.

5.2. Limitation

The biggest regret is the number of samples. As I explained earlier, we tried to study people who understand IoT system and smart home devices, so there were many limitations in time and money. It would have been more effective if it was an experiment conducted with actual IoT products or smart homes rather than surveys with enough time and capital.

In addition, this study conducted product bundling among various bundling strategies. In other words, it was not predictable about the price discount or the mixed situation rather than simply selling the products together. Further research is needed on the part, and the results will be very interesting.

5.3. Future Research

Unfortunately, it is said that the awareness of IoT is not high not only in Korea but also in the world. Therefore, there were many regrets when proceeding with this study.

In the future research, rather than finding the objects who are understood, the research itself will be approached in a more diversified manner with sufficient time and access.

First, we will expand the sample by examining the

research background in various environments such as the United States and China as well as Korea. There will be a difference in the atmosphere and understanding of the people, and research through the variables found in the difference will certainly have a significant contribution. Second, as mentioned in the previous limitation, we will adopt a method of direct research rather than a simple questionnaire. Although it takes a lot of time and investment, it must be a necessary method when looking back at this study. Thirdly, if it's an opportunity, I want to do research with a real company. Even though there are three major Korean telecommunication companies (SKT, KT, LGT), it was difficult to find a common part due to the characteristics of each company, marketing strategy, and package bundling. In addition, it was difficult to cite as the material released by the company was not large. Obviously, this research is in line with the future IoT industry and development, in other aspects, the consumer and enterprise strategy building, too. Therefore, if we conduct research with telecommunication companies, it will be able to do research that overcomes many technical and statistical deficiencies.

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