

DOKUZ EYLÜL UNIVERSITY
GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES

**ADOPTION OF TECHNOLOGICAL SERVICE
INNOVATION IN THE RETAIL SECTOR**



by
Özge DÜZENLİ

February, 2020

İZMİR

ADOPTION OF TECHNOLOGICAL SERVICE INNOVATION IN THE RETAIL SECTOR

**A Thesis Submitted to the
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by

Özge DÜZENLİ

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İZMİR

M.Sc THESIS EXAMINATION RESULT FORM

We have read the thesis entitled “**ADOPTION OF TECHNOLOGICAL SERVICE INNOVATION IN THE RETAIL SECTOR**” completed by **ÖZGE DÜZENLİ** under supervision of **ASST. PROF. DR. BURCU FELEKOĞLU** and we certify that in our opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

.....
Asst. Prof. Dr. Burcu FELEKOĞLU

Supervisor

.....
Assoc. Prof. Dr. Ali Serdar TAŞAN

.....
Assoc. Prof. Dr. İpek KAZANÇOĞLU

.....
Prof. Dr. Kadriye ERTEKİN

Director

Graduate School of Natural and Applied Sciences

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ADOPTION OF TECHNOLOGICAL SERVICE INNOVATION IN THE RETAIL SECTOR

ABSTRACT

The continuous and increasing speed of technology is directly affecting human behaviour. Human nature accepts some innovations and changes as they are, while resists to accept others. It is not possible to use technology effectively in the retail area without knowing the impact of technological innovations on the customers and the perspectives of customers against such innovations. For this reason, it is of enormous importance for customers to adopt this innovation to achieve success and ensure sustainability of the business models related to technological service innovations. The objective of this study is to investigate the complex structure of the adoption process of the technological service innovation by customers in detail. In light of the comprehensive literature study, The Unified Theory of Acceptance and Use of Technology (UTAUT2) model extended with personal innovativeness (PI) was decided to be used. The extended form of UTAUT2 model was developed and tested for a technological service innovation named “Mkolay” which is actively being used in 28 stores of a major retailer. Research data was collected from 217 participants via online questionnaire and analyzed with Smart PLS 2.0 program using PLS-SEM method. Research findings showed that the potential users’ (customers) intention to use technological service innovation was influenced by performance expectations (PE), effort expectations (EE), social influence (SI) and personal innovativeness (PI) variables ($R^2 = 0.688$). From that perspective, practitioners need to focus not only on which technological service innovation they will invest in, but also on how to encourage the adoption of the relevant innovation by users.

Keywords: Retailing, service innovation, technology adoption, Technology acceptance models, The Unified Theory of Acceptance and Use of Technology2 (UTAUT2)

PERAKENDE SEKTÖRÜNDE TEKNOLOJİK HİZMET İNOVASYONUNUN BENİMSENMESİ

ÖZ

Teknolojinin sürekli ve artan hızı doğrudan insan davranışını etkilemektedir. İnsan doğası gereği bazı yenilikleri ve değişiklikleri olduğu gibi kabul eder, bazıları ise onları kabul etmeye direnir. Teknolojik yeniliklerin müşteriler üzerindeki etkisini ve bu yeniliklere karşı müşterilerin bakış açılarını bilmeden perakende alanında teknolojiyi etkin bir şekilde kullanmak mümkün değildir. Bu nedenle teknolojik hizmet yenilikleri ile ilgili iş modellerinin başarıya ulaşması ve bu iş modellerinin sürdürülebilirliğinin sağlanması için müşterilerin bu yeniliği benimsemeleri büyük önem taşımaktadır. Bu çalışmanın amacı, müşterilerin teknolojik hizmet yenilikçiliğini benimseme sürecinin karmaşık yapısını detaylı olarak incelemektir. Kapsamlı literatür çalışması ışığında Birleştirilmiş Teknoloji Kabul ve Kullanım Teorisi'nin (BTKKT2) kişisel yenilikçilik (PI) ile genişletilmiş formunun kullanılmasına karar verilmiştir. BTKKT2'nin genişletilmiş formu, büyük bir perakendecinin 28 mağazasında aktif olarak kullanılan “Mkolay” adlı teknolojik hizmet inovasyonu için geliştirilmiş ve test edilmiştir. Çevrimiçi anket yoluyla 217 katılımcıdan toplanan araştırma verileri PLS-SEM yöntemi kullanılarak Smart PLS 2.0 paket programı ile analiz edildi. Araştırma bulguları potansiyel kullanıcıların (müşterilerin) teknolojik hizmet inovasyonunu kullanma niyetinin performans beklentisinden (PE), çaba beklentisi (EE), sosyal etki (SI) ve kişisel yenilikçilik (PI) değişkenlerinden etkilendiğini göstermiştir ($R^2=0,688$). Bu kapsamda, uygulayıcıların sadece hangi teknolojik hizmet inovasyonuna yatırım yapacaklarına değil, aynı zamanda ilgili inovasyonun kullanıcılar tarafından benimsenmesini nasıl teşvik edeceklerine de odaklanmaları gerekmektedir.

Anahtar Kelimeler: Perakende, hizmet inovasyonu, teknolojinin kabulü, Teknoloji kabul modelleri, Birleştirilmiş Teknoloji Kabul ve Kullanım Teorisi2 (BTKKT2)

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CHAPTER ONE

INTRODUCTION

In this chapter, firstly, the aim of the thesis study will be presented and then outline of the thesis will be given. In the next chapter, the literature study that sheds light on the research will be discussed.

1.1 Objective of Thesis

Nowadays, service innovation implicates non-physical processes and active interactions between technological and people systems. Service innovation is either based on new service in order to gain more benefit effectively from changes in the new age or it refers renovation of an existing service in the organization. Benefit usually implies the added value that is presented to customers (Toivonen & Tuominen , 2009).

Numerously new service ideas can be followed and used by different academics (Heskett, 1986; Heskett, Sasser, & Schlesinger, 1997; Normann, 2002; Frei, 2008), i.e they either put together the existing service components individually or indicate a combination or configuration of other services.

While service innovation is recognized as the key to development and prosperity for society and countries, it also creates a driving force for economic growth in the community and the sustainable development of different industrial groups (Snyder, Witell, Gustafsson, & Kristensson, 2016). When the service innovation is evaluated from an organizational perspective, it is defined as a concept which is produced by using advanced technology compared to the market and country conditions in which the business operates, mostly focused on a different requirement of the society and creating competitive advantage against its competitors (Sabuncu, 2014).

However, such innovations have evolved into a large area that leads to changes in services in the administrative and organizational context. In the retail industry, where competition is high, service innovation is critical to effectively improve firm performance and ensure long-term sustainability of this performance.

The concept of retailing, which reflects a significant part of the service sector, is about delivering the right services or products at the right place, at the right time to the right consumer. In terms of retail history, innovations of technology have a considerable share in the development of both the society and the retail industry.

However, it is thought that technology has encouraged and facilitated service innovation. New technologies that change dynamically and the concept of continuous innovation play a significant role in ensuring competitive advantage in the retail industry (Inman & Nikolova, 2017). It is not possible to use the technology in a functional way without knowing the impact of technological innovations on the customers and the perspective of the customers against such innovations (Kılıçer, 2008). Acceptance of new technologies has always been a major concern within companies and organizations. Adaptation to new technologies is not always easy, so it is the conscious acceptance is prerequisite to benefit from technological innovations (Biucky, Abdolvand, & Harandi, 2017). It is crucial for customers to embrace this innovation in order to build models for technological service innovations and achieve success and sustainability after initiation. Although there are many studies on the adoption of technological service innovation in the literature, there is a deficiency of addressing the adopting process of the technological service innovation in the retail industry in detail. The objective of this study is understanding the complex structure of the adoption process of the technological service innovation by customers in detail. By using a real case study, it is aimed to reveal the factors that are effective in the adopting process of the technological service innovation.

It is aimed to overcome the lack of information about how the process of adopting technological service innovation is realized by examining the difference between assumptions and expectations and customer perceptions which are revealed when designing service innovation for this purpose.

1.2 Outline of the Thesis

This thesis which aims to reveal the factors effective in the adoption of technological service innovations is organized as follows (see Figure 1.1).

In Chapter 1, a general framework of this thesis is presented. In Chapter 2, a comprehensive literature study has been conducted on the models and theories that examine the adoption of technology. Then, the proposed model is presented and hypotheses to be tested within the scope of the research are mentioned. In Chapter 3, the details of the service innovation discussed in the scope of the thesis (Scan & Go and Mkolay) are given. In Chapter 4, information about the process of collecting research data and the method to be used in the analysis of the research are provided. In Chapter 5, firstly, the data collected through the online survey method were analyzed with the demographic characteristics of the participants.

Afterwards, reliability and validity analyzes are performed. Then, hypotheses are tested using PLS-SEM method. Chapter 6 is divided into 5 sections. In the first section, all hypotheses established are interpreted. In the second section, the theoretical contribution of this thesis to the literature is mentioned. In the third section, critical points for the practitioners are mentioned. In the fourth section, the limitations of the thesis and suggestions for future studies are mentioned and the last section provides a summary of the findings of the research.

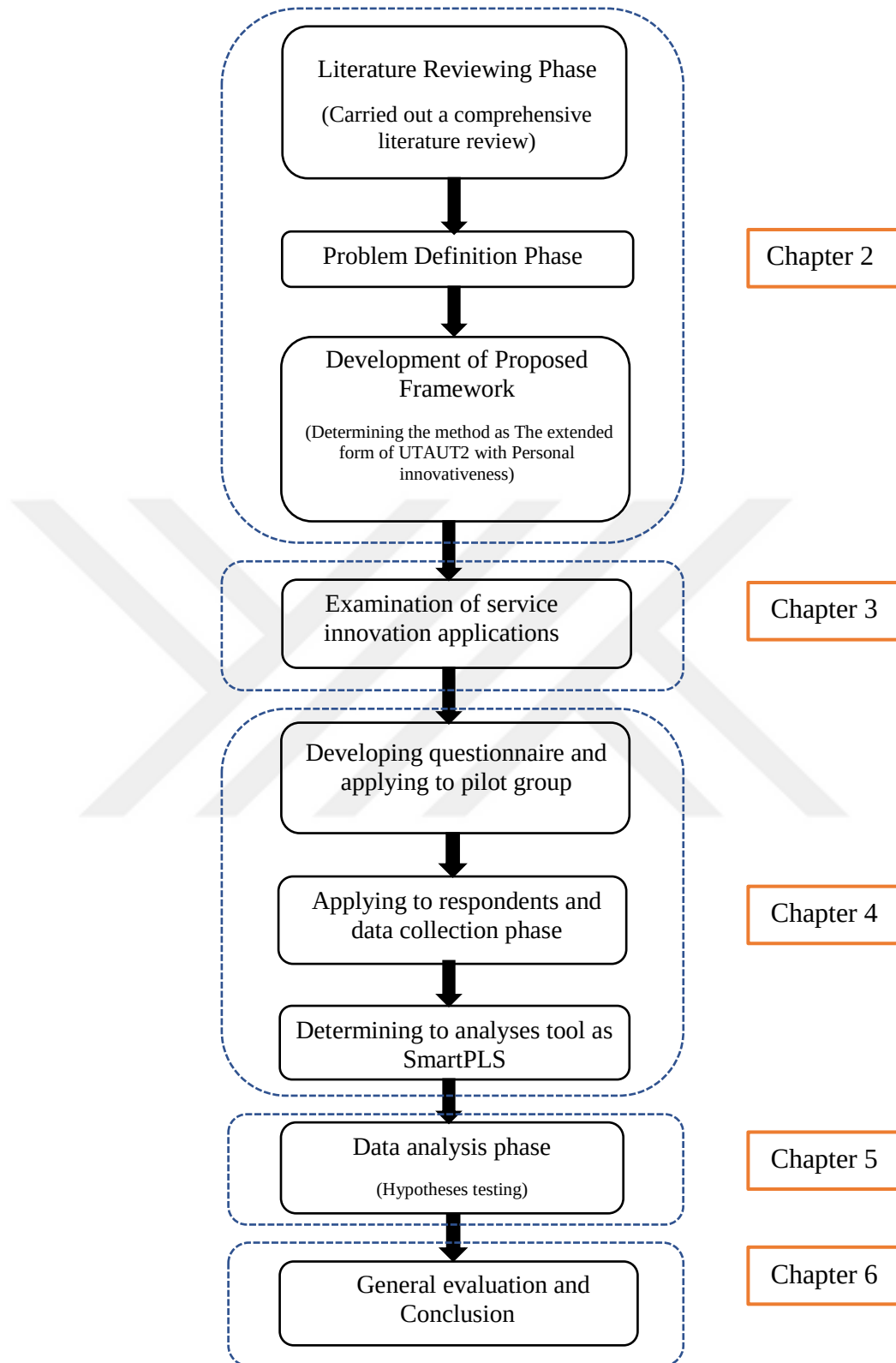


Figure 1.1 Structure of the thesis

CHAPTER TWO

KEY MODELS RELATED TO USER ACCEPTANCE OF NEW TECHNOLOGY

This chapter, provides brief information about the models and theories that examine the adoption of the new technology. Then the research question will be presented and the proposed model will be put forward based on the reference frame. After the model is presented, the hypotheses created within the scope of the research will be included. In the next chapter, the details of the service innovation considered in this thesis will be presented.

2.1 What does acceptance mean?

On the whole, acceptance is defined as the opposite of the rejection term and the affirmative decision for using of an innovation (Simon, 2001). Innovation adoption is seen as a process that involves a number of stages leading to achieving decisions to adopt this innovation (Turnbull & Meenaghan, 1980). Before a new system is established, decision-makers may be able to consider these issues at the development stage if they are aware of the issues affecting the decisions of the target users (Mathieson, 1991). Both practitioners and researchers wonder why people accept some new technologies and refuse some of them. Answering this question is important for creating better new models in order to predict the behavior of users against new technologies, to design and evaluate new technologies (Dillon & Morris, 1996).

Figure 2.1 shows the basic conceptual framework of fundamental individual information technology acceptance model that underlying the basis of lots of research.

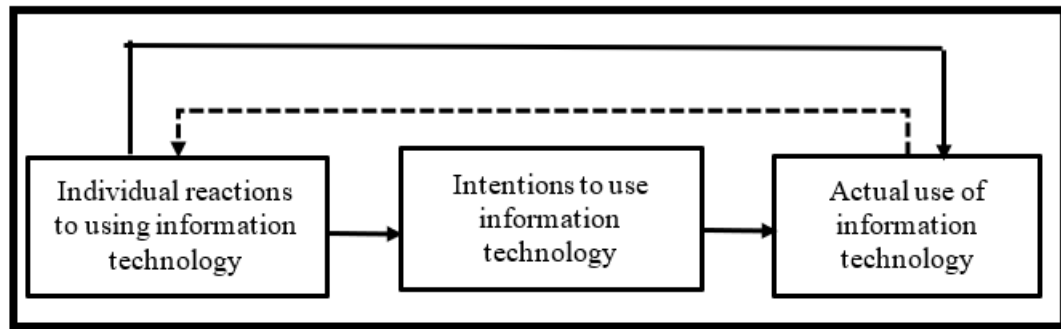


Figure 2.1 Fundamental construct for basic user acceptance model (Kraljic & Pestek, 2016)

2.2 Types of User Acceptance Models of New Technology

A number of theories and models have been introduced to bring users to adopt new technologies, and these models and theories offer factors that can influence the use of new technologies by users (Taherdoost, 2018).

The main popular models in the scientific literature are as follows; The Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behavior (TPB), the Decomposed Theory of Planned Behavior (DTPB), A model combining TAM and TPB (C-TAM&TPB), The Model of PC Utilization (MPCU), the Innovation Diffusion Theory (IDT) and Social Cognitive Theory (SCT).

As seen, some of these theories and models have been extended from other models and theories over the years (Venkatesh, Morris, Davis, & Davis, 2003). All of the theories created based on the adoption of technology are designed to measure the acceptance and satisfaction levels of individuals against any new technology or information system from different perspectives depending on their specific determinants (Momani & Jamous, 2017).

2.2.1 Theory of Reasoned Action (TRA)

TRA is one of the most significant theories known used to investigate users' adoption behavior and to reveal critical factors in obtaining full benefits of information

technology (Venkatesh et al., 2003). TAM and TPB are based on the TRA in terms of content.

The most important factor that determines the behavior according to TRA is intention and it is influenced by subjective norms and attitude. As seen in Figure 2.2, there is a related intention behind the behaviors of individuals. Also individuals' attitudes towards behavior and subjective norms affect behavioral intentions (BI) according to TRA.

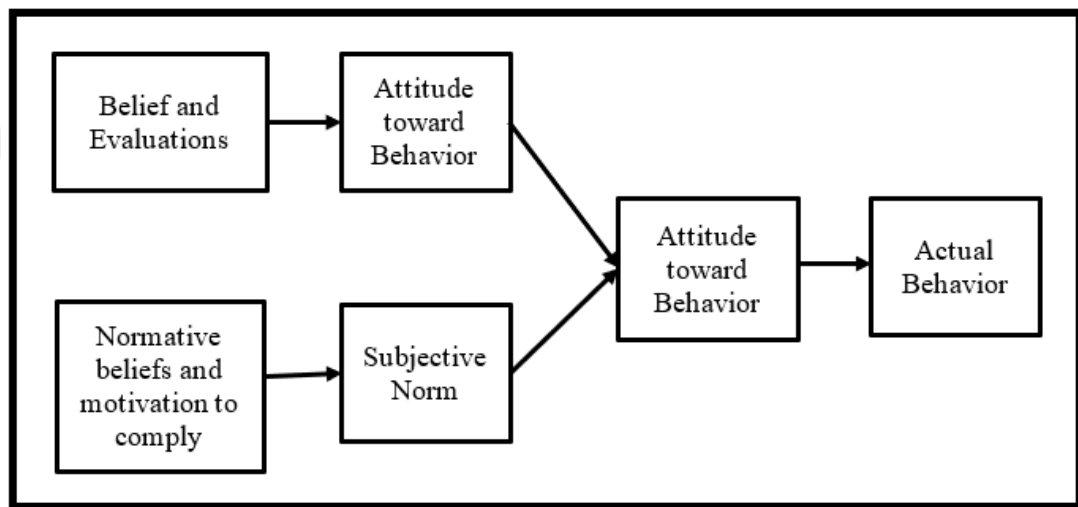


Figure 2.2 The TRA model (Ajzen & Fishbein, 1975)

Martin Fishbein and Icek Ajzen began to work together in 1980 by optimizing TRA and turned it into PBT (Ajzen & Fishbein, 1980). On the other hand, TRA remains a relatively weak model because it contains abstract concepts such as belief (Aktaş, 2007). In this context, TAM is a more powerful model which is shaped by TRA with the more quantitative of independent variables. The definitions of core **TRA** constructs have been shown on table (see Appendix-1).

2.2.2 Technology Acceptance Model (TAM)

There are many models in the literature explaining why people use it information technologies and information systems (Venkatesh et al., 2003). TAM is one of these models and this model is a theoretical model that aims to explain why people prefer to

use certain technologies in their business activities (Davis, 1989). In this model, two motivational variables are considered to influence the use of technology in people's own business activities.

The first one is the perceived usefulness and the other is the perceived ease of use. These variables are significant for determining BI related to use a system or technology. Here, the perceived usefulness is expressed as the belief that an individual's job performance will increase after using technology. According to the oldest TAM, behavior intentions are directly affected by perceived usefulness and attitude toward use (see Figure 2.3).

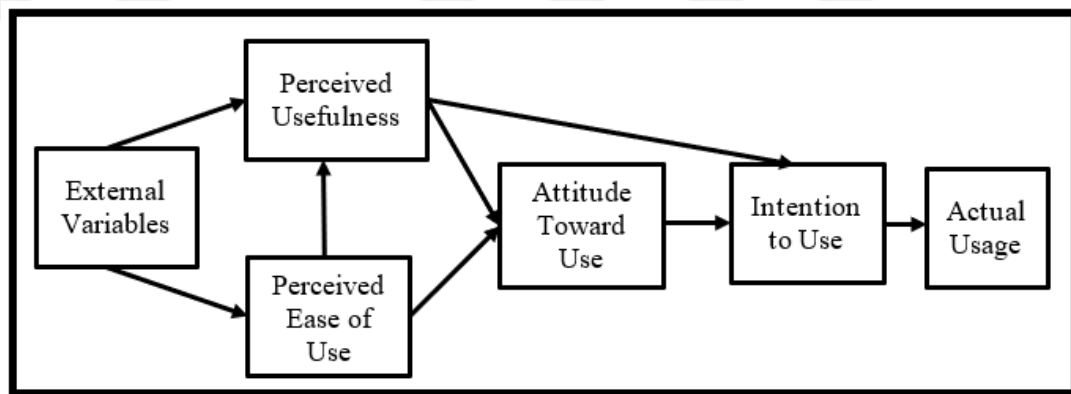


Figure 2.3 The earliest form of TAM (Davis, Bagozzi, & Warshaw, 1989, p.985)

At the end of the studies, "attitude" variable was removed from the model since it was found that perceived ease of use and perceived usefulness were directly effective on BI. Eventually, Venkatesh & Davis (1996) conducted the latest TAM. According to the latest TAM, BI is directly affected by perceived usefulness and perceived ease of use (see Figure 2.4).

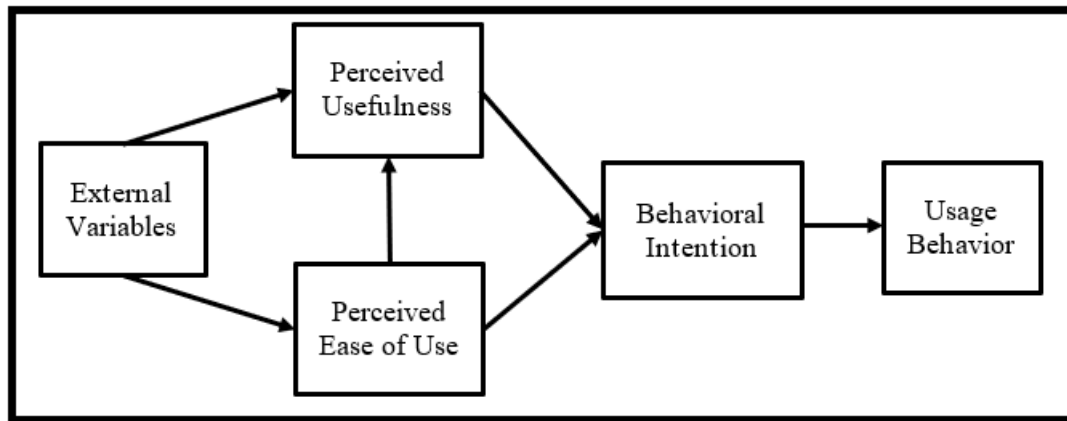


Figure 2.4 The latest form of TAM (Venkatesh & Davis, 1996)

Many studies have been done on the TAM and the model has been tried to be developed from Davis' first design, TAM2 is one of them. TAM 2 has been tested with extended and longitudinal research designs by adding subjective norms to TAM (Venkatesh & Davis, 2000).

In general, both explain about 40% of system use. Analysis of empirical research using TAM suggests that the results are not entirely consistent or clear (Legris, Ingham, & Collette, 2003). Figure 2.5 shows variables of TAM2. The definitions of **(TAM)** core constructs have been shown on table (see Appendix-1).

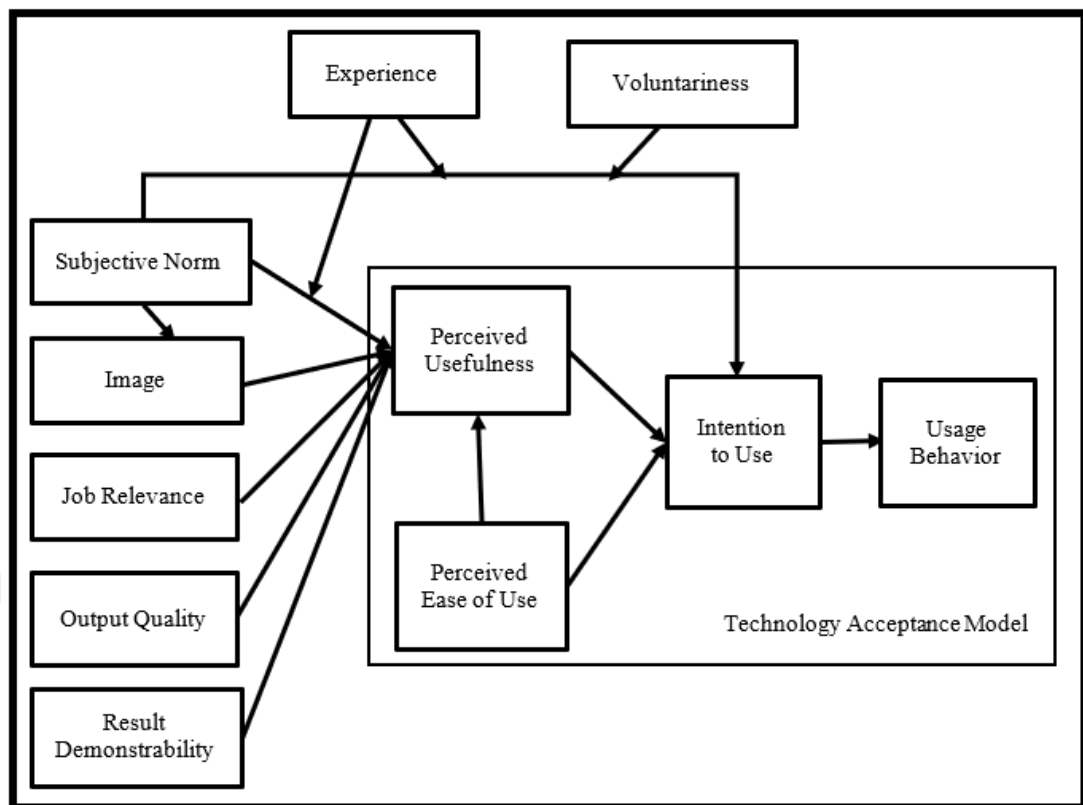


Figure 2.5 The framework of TAM2 (Venkatesh & Davis, 2000, p.188)

2.2.3 Motivational Model (MM)

MM was used in 1992 by Davis, Bagozzi and Warshaw to understand the adaptation of individuals to new technologies (Davis, Bagozzi, & Warshaw, 1992).

The basic components of the model are external motivation and internal motivation (Venkatesh et al., 2003). According to Vallerand (1997) intrinsic motivation emphasizes pleasure or satisfaction from a particular activity or situation, and that extrinsic motivation is the behavior exhibited in order to achieve and complete a specific purpose.

Extrinsic motivation examples are subjective norm, perceived ease of use and perceived usefulness. In other respect, intrinsic motivation examples are enjoyment and computer playfulness (Davis et al. , 1992; Venkatesh & Davis, 2000). Figure 2.6 shows the MM. The definitions of **(MM)** core constructs have been shown on table (see Appendix-1).

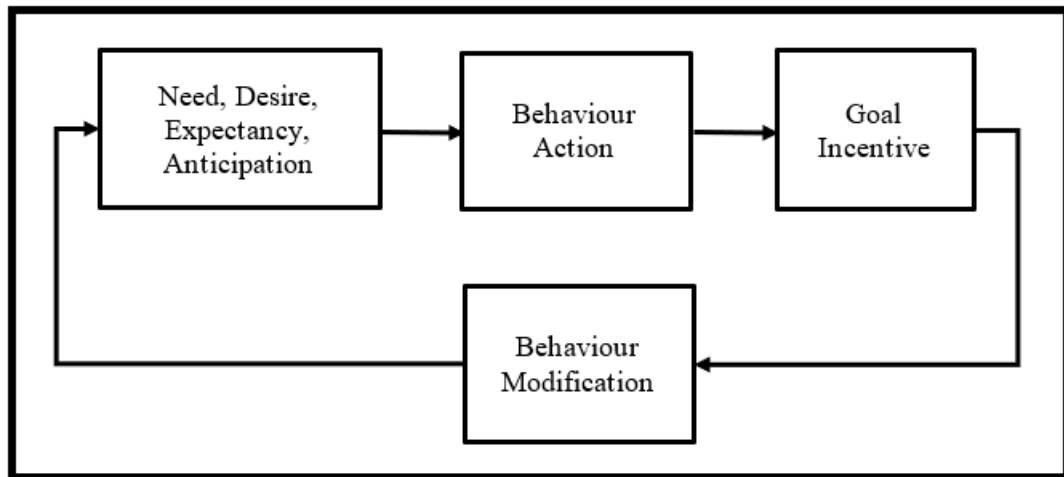


Figure 2.6 The framework of MM (Davis, Bagozzi, & Warshaw, 1989)

2.2.4 Theory of Planned Behaviour (TPB)

TPB was developed by Ajzen as an extension of TRA (Ajzen, 1991). Attitudes and subjective norms are the same as TRA in determining the behaviors of individuals. In addition to these, Ajzen added perceived behavioural control (PBC) to the TRA model after a while. PBC refers to the self-confidence of the person in conducting the related behavior. Figure 2.7 shows the indirect effect of the PBC factor on behavior and also direct effect of it's on intention.

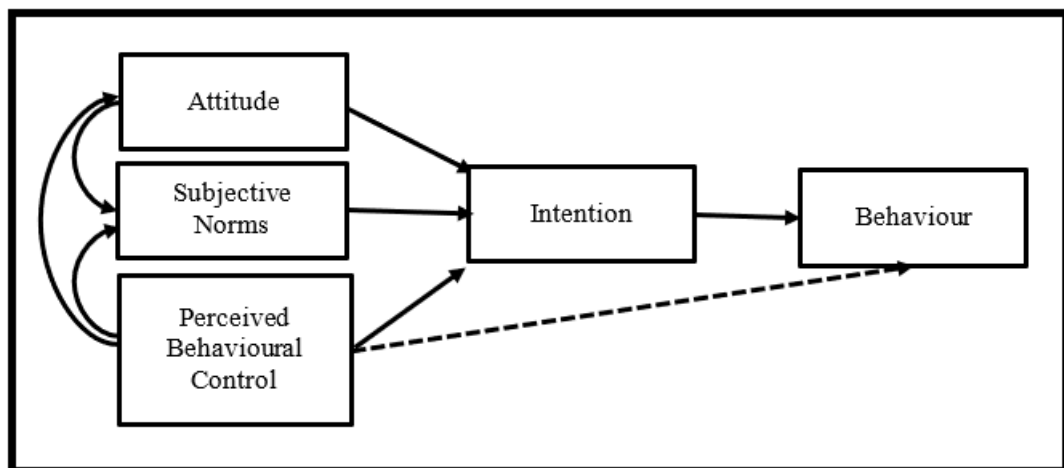


Figure 2.7 The framework of TPB (Ajzen, 1991, p.182)

PBC in the model appears to have a direct effect on the BI. In other words, strengthening or weakening of intention depends on the internal and external control that the person has when performing the relevant behavior (such as human, skill, physical competence, information, money, and tools). Many criticisms have been made since the publication of TPB to the present day. So that the common opinion of the experts evaluating and criticizing the TPB in this regard is the further development of the TPB. The definitions of **(TPB)** core constructs have been shown on table (see Appendix-1).

2.2.5 Decomposed Theory of Planned Behavior(DTPB)

Taylor and Todd (1995a) by the purpose of improving the PBT have been put forward DTPB. In the theory, subjective norm, PBC and attitude variables were determined by adding new sub-variables to explain the actual behavior of the consumer. These variables are: Ease of use, perceived usefulness, compatibility, peer influence, superiors's influence, self-efficacy, resource FC, technology FC (Taylor & Todd, 1995b). Figure 2.8 shows the relationships between the variables. DTPB is expected to be more powerful in explaining user behavior with more variables than TPB.

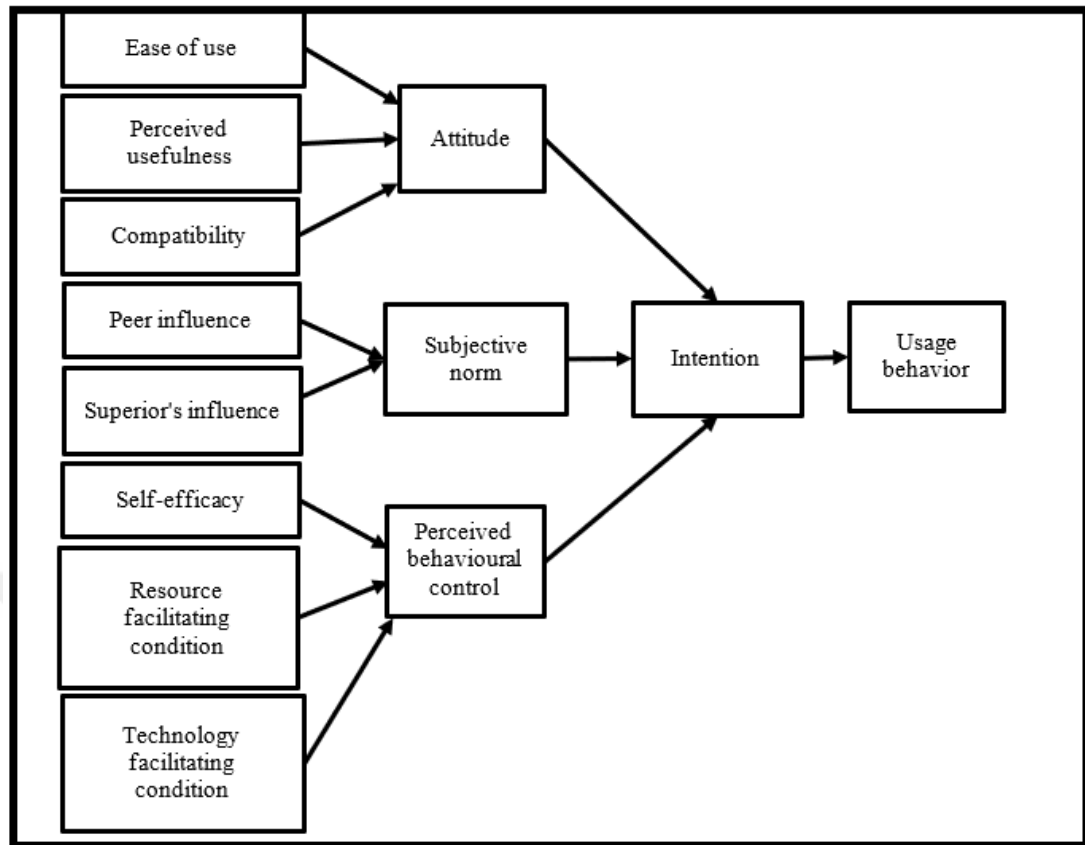


Figure 2.8 The framework of DTPB (Taylor & Todd, 1995b)

2.2.6 Combined TAM and TPB (C-TAM-TPB)

TAM is among the most effective and widely discussed theories used to explain system use and user behavior (Venkatesh & Davis, 2000). Although the TAM is one of the most effective and most widely used models, it is recommended that the model be expanded by including new variables including human and social factors. When the literature is examined, it is seen that TAM has limitations and the model has been criticized.

In this context, two different variations of the TAM and TPB have been tested to determine which model best describes the use of technology and results were compared. When the results of the study were examined, it was seen that three models explained technology usage in similar proportions and the explanation of the behavior would be greatly increased by combining these models.

As a result, Taylor and Todd developed the C-TAM&TPB model in 1995 by integrating TAM and TPB models (Taylor & Todd, 1995b). As seen Figure 2.9, the main variables of the C-TAM&TPB Model are: Perceived usefulness, perceived ease of use, attitude towards using, subjective norm, PBC, BI and actual use. The definitions of **(C-TAM&TPB)** core constructs have been shown on table (see Appendix-1).

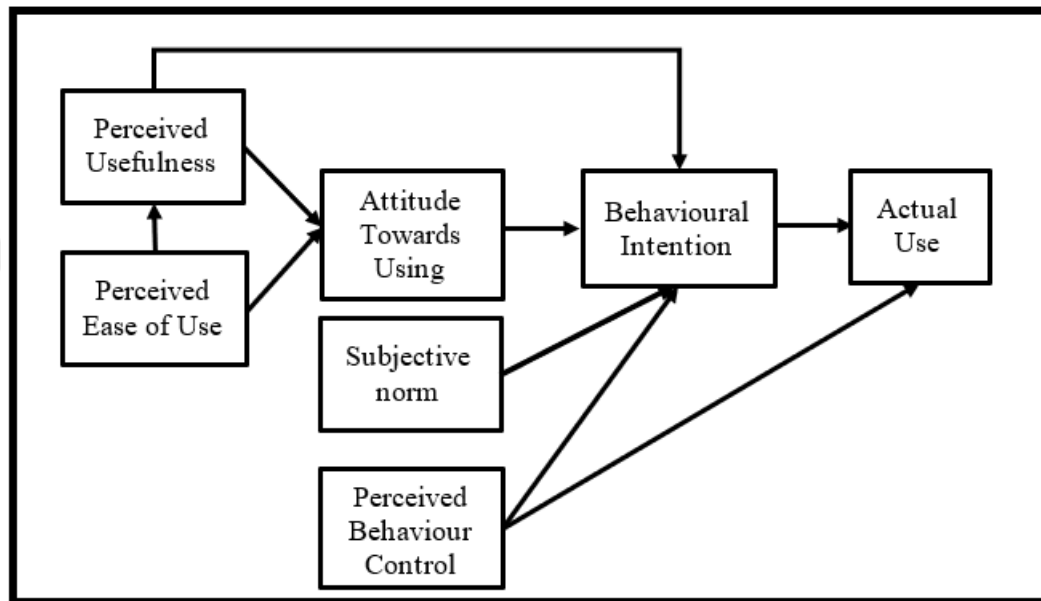


Figure 2.9 The framework of C-TAM&TPB (Taylor & Todd, 1995)

2.2.7 Model of PC Utilization (MPCU)

MPCU produced by Triandis in (1977) based on the theory of human behavior, offers a competitive perspective against the models of TRA and TPB (Venkatesh et al., 2003). This model was developed by Thompson, Higgins, & Howell (1991) by using the human behavior theory of Triandis and was adapted to the information systems. The purpose of this model which is adapted is to predict the utilization of pc.

The structures that constitute the model are as follows; facilitating conditions (FC), social factors, affect towards use, long-term consequences, complexity and job-fit. These are used to predict pc utilization (Venkatesh et al., 2003). Figure 2.10 shows the variables of this model. The definitions of **(MPCU)** core constructs have been shown on table (see Appendix-1).

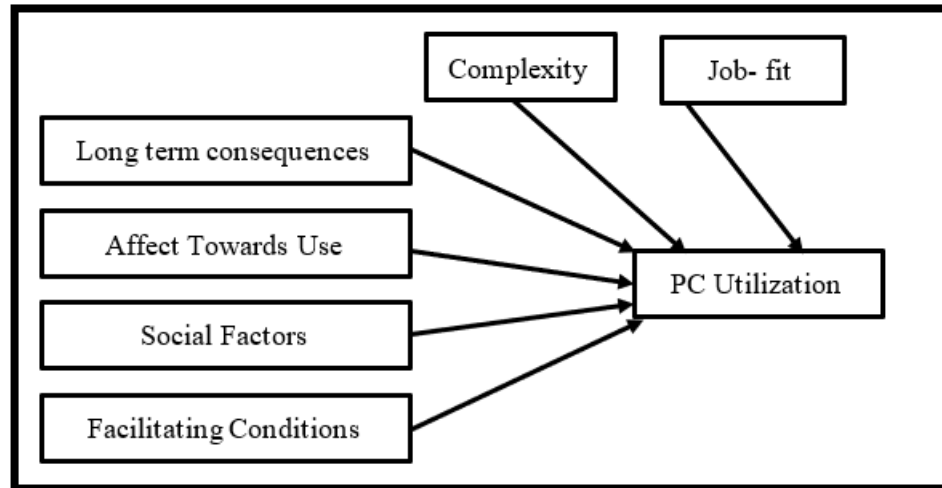


Figure 2.10 The framework of MPCU (Thompson et al., 1991)

This model, which was developed for pc utilization, explained not only pc but also the use of various information technologies (Thompson et al. ,1991).

2.2.8 Innovation Diffusion Theory (IDT)

IDT was put forward by Everett Rogers in 1962 and has been valid until today. This model based on sociology is used to describe the innovation-decision process in detail. In order to better understand IDT, it is necessary to explain what innovation and diffusion mean in theory.

The model's 5-stage innovation - decision - making process is shown in Figure 2.11 (Rogers, 2003). These stages are "knowledge, persuasion, decision, implementation and confirmation". In the first stage, the knowledge stage, the person realizes that there is an innovation.

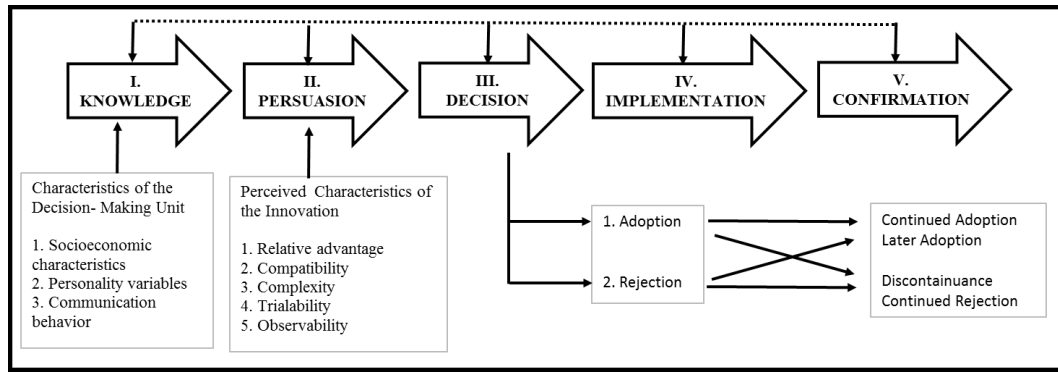


Figure 2.11 The framework of the innovation-decision process (Rogers, 2003, p. 170)

Also Figure 2.12 shows the variables of IDT. The definitions of **(IDT)** core constructs have been shown on table (see Appendix-1).

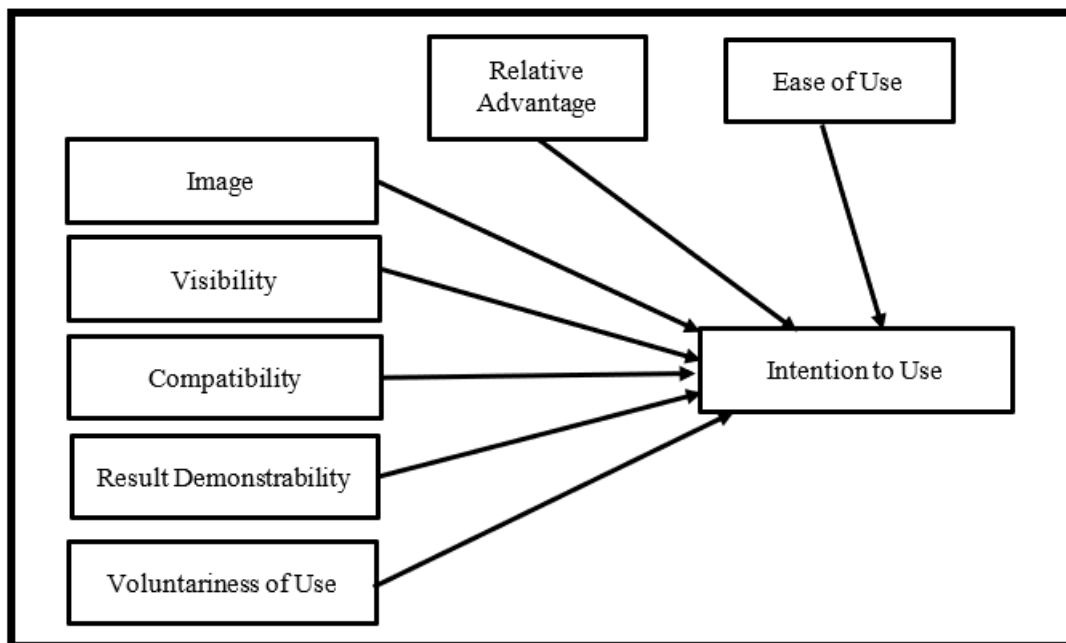


Figure 2.12 The framework of IDT (Moore & Benbasat, 1991)

Moore & Benbasat (1991) enlarged the factors set to study technology acceptance in the information systems field. The set consist of: Visibility, compatibility, relative advantage, ease of use, image, voluntariness of use and results demonstrability.

2.2.9 Social Cognitive Theory (SCT)

One of the most important theories explaining human behavior is Bandura's Theory (SCT) (Venkatesh et al., 2003). Compeau & Higgins (1995) developed this theory based on the model and implemented applications on computer use.

According to SCT, individuals must have the ability and capacity to perform the behavior in order to perform a certain behavior (Bandura, 1997). Therefore, the model was designed to examine the effects of the beliefs of people on computer use competencies and their use Compeau & Higgins (1995). This theory explains how people gain and sustain certain behavior patterns. Although the use of computers in the research has been studied, the model is also suitable for applying other information technologies (Venkatesh et al., 2003).

The main components of the theory are the outcome expectations - performance, outcome expectations - personal, self efficacy, affect and the anxiety. Figure 2.13 shows the components of this model. The definitions of **(SCT)** core constructs have been shown on table (see Appendix-1).

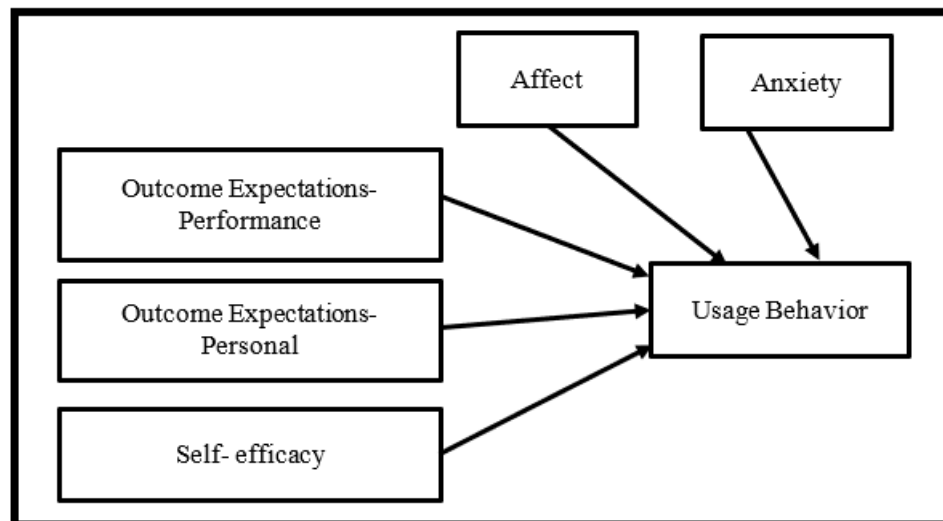


Figure 2.13 The framework of SCT (Compeau & Higgins, 1995b)

2.2.10 The Unified Theory of Acceptance and Use of Technology (UTAUT)

It was mentioned that the TAM was one of the most powerful models in explaining the usage behavior of individuals and it was used in many areas. Although the TAM model largely meets the expectations of the researchers in this context, it is tried to create wider structures by using human and social factors in the model together with different models in different researches.

UTAUT has been developed by assessing the strengths and weaknesses of eight different theories and models for technology acceptance (Venkatesh et al., 2003). In UTAUT, four basic variables are used as determinants of usage behavior and intention. These variables are performance expectancy (**PE**), effort expectancy (**EE**), social influence (**SI**) and (**FC**). These factors play an important role because of they are directly influential in the technology acceptance and use behavior of individuals. Also, the four moderator variables included in the model are as follows; age, gender, experience and voluntariness of use. As can be seen in Figure 2.14, PE, EE, SI directly affect the BI. However, BI and FC are effective on direct use behavior (Venkatesh, Thong, & Xu, 2012).

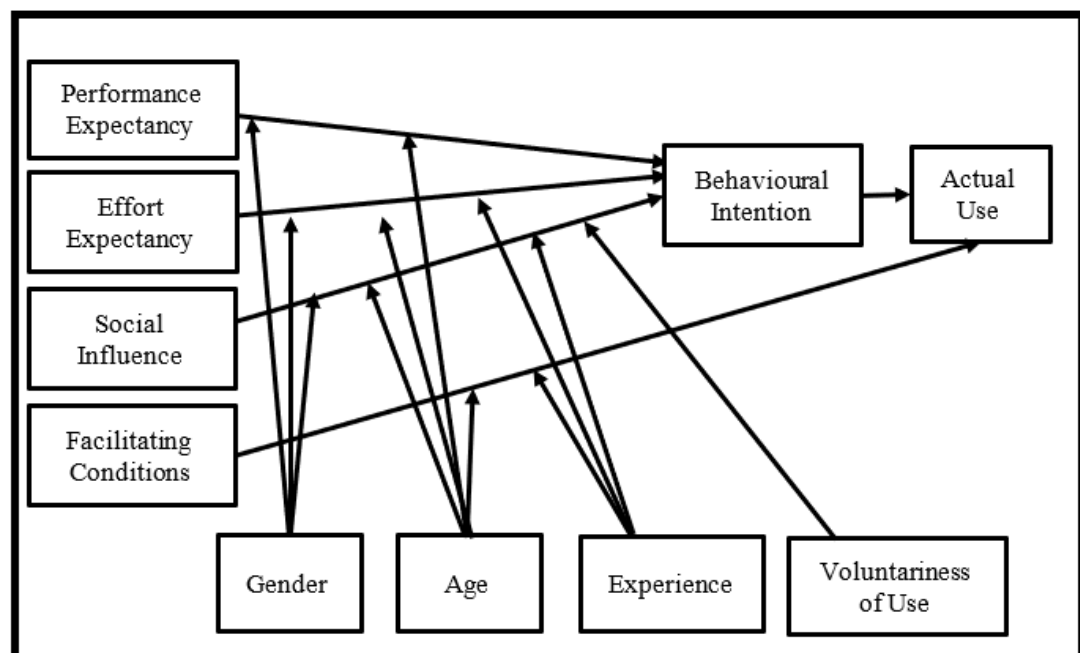


Figure 2.14 The framework of UTAUT Model (Venkatesh et al., 2003)

Moderating variables which are added such as gender and age have an impact on the PE, SI and EE. Also the experience influence on the FC, SI and EE. Finally, voluntariness of use only affects SI (Venkatesh et al., 2003).

PE: It is the degree of thinking that the individual will realize his / her work more efficiently by using technology. **EE:** Whether the individual finds the use of technology easy or not is the degree of convenience of technology. **SI:** "It is the degree to which an individual perceives that important others believe he or she should use the new technology." (Venkatesh et al., 2003). **FC:** Refers to the level of belief in the existence of the infrastructure and technical support to support the use of technology.

UTAUT gave better results than the other models with regression value explaining about 70% of the BI in organizational context (Venkatesh et al., 2012). On the other hand, the other eight models were able to explain the BI only between 17% and 53% (Indrawati & Ariwati, 2015). The definitions of **(UTAUT)** core factors have been presented on table (see Appendix-1).

2.2.11 The Extended Unified Theory of Acceptance and Use of Technology (UTAUT2)

The results of the studies conducted using UTAUT revealed the need of transformation of the individuals working in the institutions from the acceptance and use of technology to the acceptance and use of consumers.

In this context, Venkatesh et al. (2012) restructured UTAUT and developed the UTAUT-2 model by placing the consumer at the center. The purpose of the new model is examining of adoption of technology in the context of the consumer. For this reason, the voluntariness of use that is one of the moderator variables included in the first model has been removed from the developed UTAUT-2 and three new structures including the Hedonic Motivation (**HM**), Price Value (**PV**) and Habit (**H**) are added. The relationship between this model and variables are given in Figure 2.15.

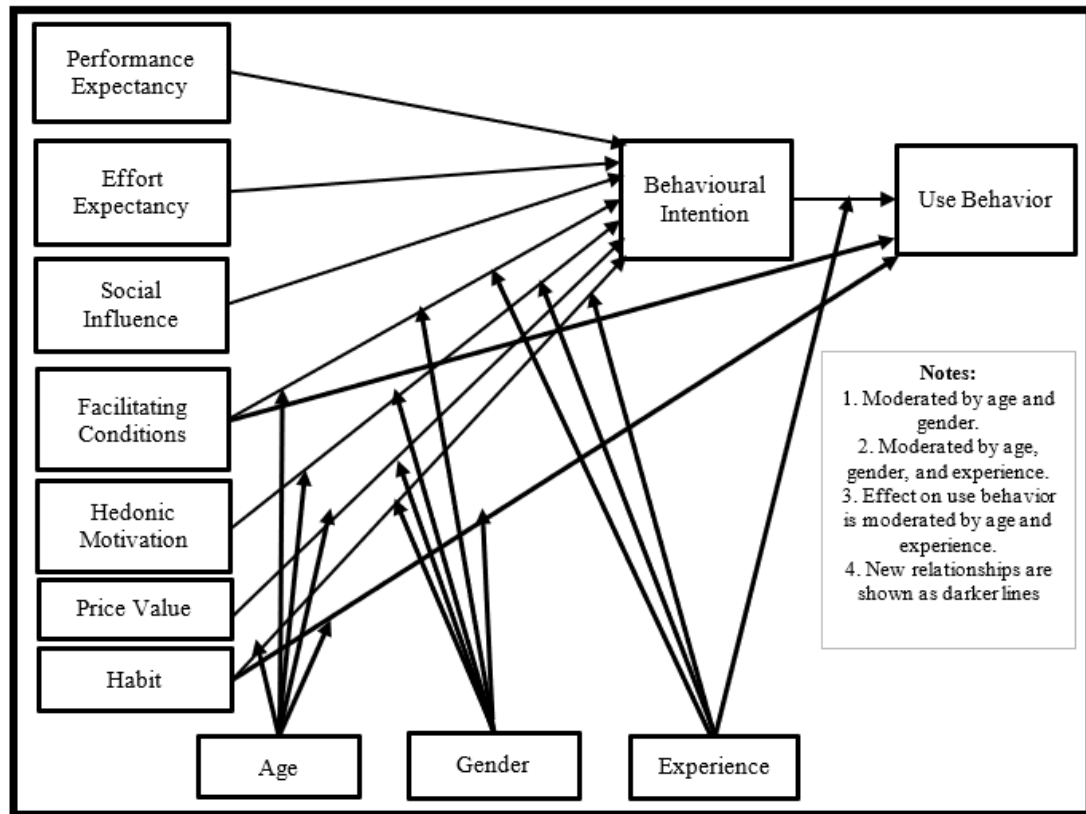


Figure 2.15 The framework of UTAUT2 Model (Venkatesh et al., 2012)

HM is defined as pleasure or enjoyment when using technology and it is stated that it plays a significant role in technology acceptance and use (Brown & Venkatesh, 2005). **PV** is defined as the trade-off between the cost of using the technology and the perceived benefit. **H** is an individual's tendency to automatically execute behaviors.

The effect of **HM** on **BI**; Age, gender and experience are influenced by moderator variables. The effect of **PV** variable on **BI**; age and gender are affected by moderator variables. The **H** variable directly and indirectly affects the use of technology. Similarly this direct and indirect effect; Age, gender and experience are influenced by moderator variables.

This new model, which is developed, explains the variance in BI and technology usage variables better than UTAUT. In terms of BI, UTAUT explained 56% of UTAUT variance in the perspective of consumer use, while UTAUT2 explained 74%. Similarly, the variance value which was 40% in terms of technology usage increased to 52% in UTAUT2 (Venkatesh et al., 2012).

The theories and models described above help researchers to specify the elements included in the process of adoption, acceptance and diffusion of an innovation. There are many researchers working in different fields from these theories and models.

2.3 Problem Definition and Proposed Model

2.3.1 Problem Definition

Although there are many studies conducted in the literature on the adoption of technological service innovation, there is a deficiency of addressing the process of adopting the technological service innovation in the retail sector in detail. This study has been put forward to reveal the factors effective in the adoption of technological service innovation by using a real case study to cover this gap in the literature.

2.3.2 Proposed Model

A large-scale systematic literature review was conducted to elucidate the factors affecting the adoption of technological service innovations. In this context, 25 articles were carefully examined to obtain deep learning about this subject. The previous research details theories and models of IS/IT acceptance and use have been shown (see Appendix-2).

In the light of the published scientific studies, to examine in detail the complex nature of the process of innovation of technological service innovation by customers, UTAUT2 model is chosen because of providing a clarification for technology acceptance and usage by consumers (Venkatesh et al., 2012).

Other factors need to be included to verify the applicability of UTAUT2 in different technologies and contexts and in particular in the context of consumer behavior. For this purpose personal innovativeness (**PI**) has been added in this study in order to bring light on the factors affecting the adoption of technological service innovation. The proposed conceptual model variables are shown in Figure 2.16.

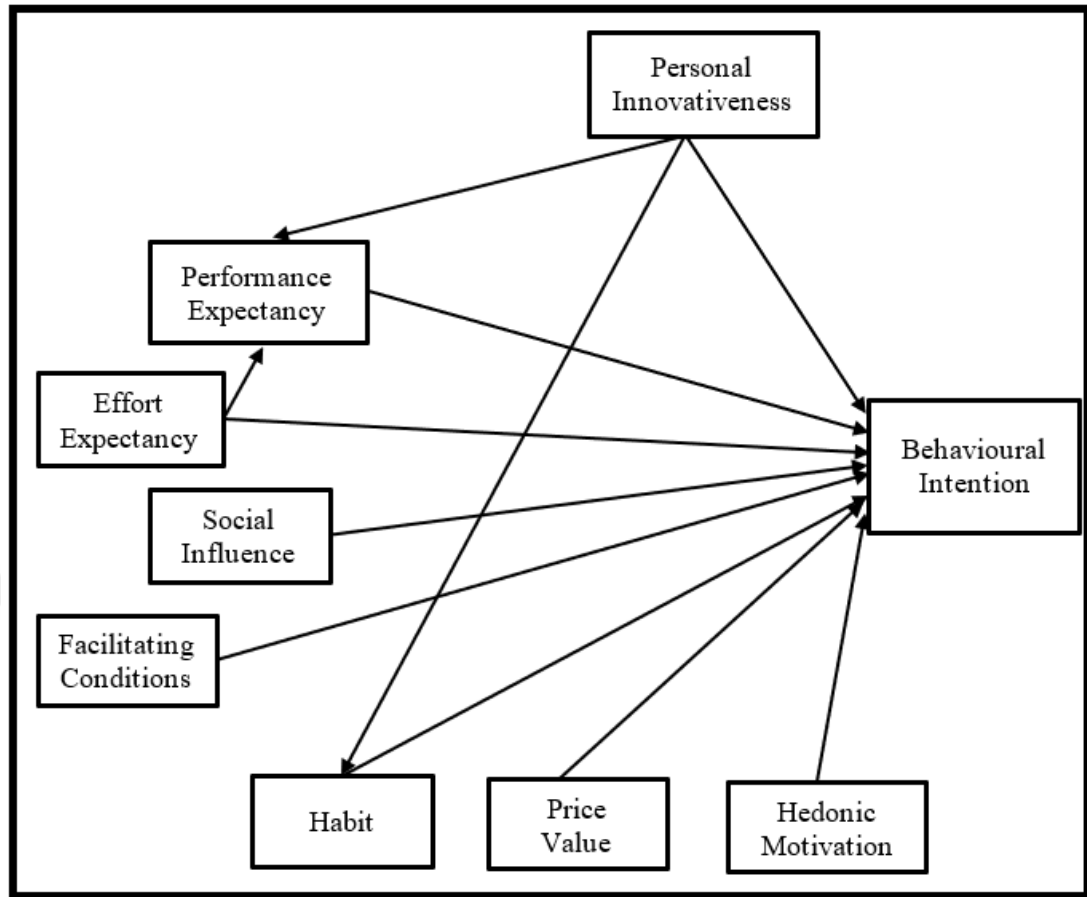


Figure 2.16 The framework of proposed conceptual model

UTAUT 2 model will be applied for a technological service innovation named “Mkolay” which is actively being used in 28 stores of a major retailer. Details of service innovation will be explained in the next chapter.

2.4 Development of hypotheses

2.4.1 Performance Expectancy (PE)

PE is the extent to which an individual's use of a particular system or technology can help improve performance and perform certain activities (Venkatesh et al., 2012).

Venkatesh et al. (2012) evaluated consumers' use of technology in the context of consumer user rather than corporate user. They have also demonstrated that it is one of the most powerful structures in evaluating user adoption.

PE is inspired by five structures derived from different models in the literature: Perceived Usefulness (TAM/TAM2 and C-TAM&TPB), Extrinsic Motivation (MM), Job-fit (MPCU), Relative Advantage (IDT) and Outcome Expectations (SCT) (Venkatesh et al., 2003). When the literature studies are examined, there are many studies showing the positive and significant effects of **PE** on **BI** (Venkatesh et al. , 2012; Helena Chiu, Fang, & Tseng, 2010; Hew, Lee, Ooi, & Wei, 2015; Der & Mutlu, 2015; Wong, Tan, Tan, & Ooi, 2015).

Many studies in the literature have shown that customers are more motivated to adopt and use these new technologies in their daily lives when they perceive that a new technology is more beneficial and advantageous than before (Alalwan, Dwivedi, Williams , & Rana, 2017; Agarwal & Karahanna, 2000; Venkatesh et al., 2003; Davis et al., 1989; Yang, 2012).

In this study, it is proposed that when customers expect to benefit from service innovation and believe that their experience becomes more productive, their intentions for the use of that service innovation will increase.

H1: PE has a direct and positive effect on the BI of using service innovation.

2.4.2 Effort expectancy (EE)

EE is defined as the degree of ease oriented to technology using. In other words, it corresponds to individuals' expectations that using a new system or technology will require less effort (Venkatesh et al., 2003).

The easier it is to learn the use of a system or technology, the more likely it is for individuals to adopt and use this new technology or system. On the other hand, if the use of this new technology requires additional effort for individuals, the likelihood of

use by the users will still be as low. This may result in users terminating their use. From this reason, it is seen that the expectation of effort affects the user satisfaction.

EE is inspired by three structures derived from different models in the literature: Perceived Ease of Use (TAM/TAM2), Complexity (MPCU) and Ease of Use (IDT) (Venkatesh et al., 2003). When it is felt that technological innovations are easily understood by individuals and can be easily used again, it is seen that it shows a more positive acceptance behavior (Venkatesh et al. , 2003; Chiu and Wang, 2008; Pai and Tu, 2011; Wang and Shih, 2009).

In studies on the acceptance of mobile technological services by users, it has been proved that EE has a significant effect on the BI of the use of the relevant technological service innovation (Moore and Benbasat, 1991; Thompson et al. , 1991; Wang, 2010). The intention to adopt a new system or technology is not only anticipated by the presence of the positive aspects of the system, but also by how easy it is to use and requires minimal effort (Davis et al. , 1989).

In addition, Davis et al. (1992) showed that the easy perception of a system will provide more benefit to its user. In many studies on mobile technologies and related fields, it is seen that the **EE** shows a positive relationship with **PE** (Zhou, Lu, & Wang, 2010).

The hypotheses created in this context are as follows.

H2: *EE has a direct and positive effect on customers' intention to use service innovation.*

H3: *EE has a direct and positive effect on the PE of customers to use service innovation.*

2.4.3 Social influence (SI)

SI is the degree to which individuals perceive their thoughts about using a new system or technology, including other individuals, which they consider important to

them and have the potential to influence their behavior as the social environment (Venkatesh et al. , 2012).

SI is inspired by three structures derived from different models in the literature: Subjective Norm (TRA, TAM2, TPB/DTPB and C-TAM-TPB), Social Factors (MPCU) and Image (IDT) (Venkatesh et al. , 2003).

When the UTAUT model was expanded to UTAUT2 for reviewing the adoption of technology on a voluntary basis rather than for corporate use, the SI was one of the unchanged protected structures of the model (Venkatesh et al., 2012).

The thoughts of users' relatives and peers have an effect on **BI** of the person (Lopez-Nicolas, Molina-Castillo, & Bouwman, 2008). Yang, Lu, Gupta, Cao, & Zhang (2012) stated that SI has a positive and direct effect on the intention of adopting mobile technology service. Unni and Harmon (2007) found that SI has a strong impact on the intention of using mobile services.

SI, which is a direct determinant of **BI**, has a high effect on **BI** when a new technology or system is used, but it decreases when usage becomes more frequent (Venkatesh & Davis, 2000). In this context, Gu, Suh, & Lee (2009) found that SI does not have a significant effect of **BI** for mobile application use.

In this study, it is proposed that the recommendations of other people who are considered to be important for the customer in the use of new service will have a positive effect on the adoption of the relevant technology.

The hypothesis created in this context is as follows.

H4: *SI has a direct and positive effect on the BI of using service innovation.*

2.4.4 Facilitating conditions (FC)

FC express individuals' perception of believing that there are available resources and support to put forward a behavior (Venkateshet al., 2012). Individuals may not continue to use technology when they cannot access this resource or not supported when they need it (Zhou, 2011). On the other hand, individuals will be willing to use

the relevant technology if they have the necessary support and resources (Venkatesh et al. , 2012).

In other words, when individuals believe that there are support and resource opportunities such as internet infrastructure supporting the relevant system or technology, information needed for use and getting help from other people, their behavior about using system or technology is expected to be more positive (Wong et al. , 2015).

FC are inspired by three structures derived from different models in the literature: PBC (TPB/DTPB and C-TAM-TPB), **FC** (MPCU) and Compatibility (IDT) (Venkatesh et al. , 2003).

When the studies in the literature are examined, it is seen that **FC** have positive and significant effects on **BI** (Venkatesh et al. , 2003; Gupta, Dasgupta, & Gupta, 2008; Chiu and Wang, 2008; Pai and Tu, 2011; Wang and Shih, 2009; Im, Hong, & Kang, 2011 and Hew et al., 2015). Using mobile applications requires resources and capabilities such as using a mobile phone or tablet, connecting to the internet, installing various applications and calling for technical support when needed (Yang et al., 2012).

In the study, it is proposed that **FC** will have a positive effect on **BI**.

The hypothesis created in this context is as follows.

H5: *FC have a direct and positive effect on customers' intention to use service innovation.*

2.4.5 Habit (H)

H is defined as the automatic display of certain behaviors by individuals as a result of learning (Venkatesh et al. , 2012; Limayem, Hirt & Cheung, 2007). Based on this definition, the increase in the experience of using a technology indicates that individuals will continue to use this technology as a **H** (Venkatesh et al. , 2012).

When the studies on the subject are examined, it is seen that the people's behaviors that they have done frequently in the past are done automatically in the future (Aarts, Verplanken, & Knippenberg, 1998). This shows that it is possible to predict the future behaviors of individuals with their habits (Ouellette & Wood, 1998).

The **H** factor is described in Venkatesh et al. (2012) is one of the factors added to the model when the UTAUT model is extended to UTAUT2. When the studies in the literature are examined, it is seen that **H** has positive and significant effects on **BI** (Kim, 2012; Venkatesh et al. , 2012 ; Baptista and Oliveira, 2015; Hew et al., 2015). For example, Amoroso and Lim (2017) argued that individuals' use of mobile phones positively correlated with **H**. The stronger an individual's **H** of using technology, the stronger his /her intention to use that technology, has been shown (Cordiglia & Belle, 2017). In this study, it is proposed that the **H** has a positive effect on **BI** of using service innovation.

The hypothesis created in this context is as follows.

H6: *The H has a direct and positive effect on the customers' intention to use service innovation.*

2.4.6 Hedonic motivation (HM)

HM is defined as the fun or pleasure arising from the use of technology, which has been shown to play an important role in determining acceptance and use of technology (Venkatesh et al. , 2012; Brown & Venkatesh, 2005).

Venkatesh et al. (2012) added the **HM** factor to the UTAUT model used to examine task-oriented designed systems and expanded it to include entertainment and pleasure values in the adoption behavior of the system or technology as UTAUT2. They also argued that **HM** would be more effective for voluntary systems. In the consumer context, **HM** has been found to be an important determinant of technology acceptance and use. Davis et al. (1992) found that both external (utilitarian) and internal (hedonic) motivation were effective in adopting a system.

In the literature study, there are many studies that prove that hedonic factors are critical factors in the use of mobile technologies and affect on **BI** (Davis et al. , 1992; van der Heijden, 2004; To, Liao, & Lin, 2007; Yang, 2010; Magni, Taylor, & Venkatesh, 2010). Within the scope of this study, **HM** has been tried to be measured by how fun it is to use service innovation in customers' experience. **HM** has been proposed to have a significant effect on the intention to use it easily.

The hypothesis created in this context is as follows.

H7: *HM has a direct and positive effect on customers' BI to use service innovation.*

2.4.7 Price value (PV)

PV is defined as the trade-off between the perceived benefit of individuals in using the system or technology and the monetary cost incurred while using them (Dodds, Monroe, & Grewal, 1991; Venkatesh et al., 2012). PV is disclosed in Venkatesh et al. (2012) is one of the factors added to the model when the UTAUT model is extended to UTAUT2.

In this study, **PV** is considered as paid but non-monetary value compared to the obtained benefit. For example, a customer who wants to do shopping with Mkolay, especially goes to the store where Mkolay is active, it is a price she/he pays to use Mkolay. In addition, to download the application to use Mkolay and does not delete this application despite the space on the phone, is another example of the price paid by the customer. Dodds et al. (1991), Venkatesh et al. (2012) and Liu, Zhao, Chau and Tang (2015) showed that PV had a significant effect on **BI**.

Depending on whether the perceived benefit exceeds monetary costs in the use of technology, the PV may have a positive or negative effect (Venkatesh et al. , 2012). The positive value of the price is realized when the benefit of the individuals from the use of technology is perceived to be higher than the cost they are exposed to and the positive effect of this value on **BI**. In line with this assumption, it is thought that customers would be more willing to adopt a new technology in case of positive PV. In this study, it is proposed that customers are more likely to use service innovation if the

benefit which they receive are greater, despite the cost they are exposed while using that service innovation in their experience.

The hypothesis created in this context is as follows.

H8: *PV has a direct and positive effect on the BI of customers to use service innovation.*

2.4.8 Personal Innovativeness (PI)

PI is defined as the degree of openness to innovation. The fact that individuals make innovation decisions regardless of the experiences of others is an indicator of personal innovation (Midgley & Dowling, 1978).

PI, which can also be expressed as an individual's willingness to experiment with any new system or technology, **PI** has been added by Wong et al. (2015), in order to increase the efficiency of UTAUT model within the scope of adoption of technologies. Studies have shown that **PI** is an important factor in the adoption of mobile technologies (Agarwal & Prasad, 1998; Goldsmith & Foxall, 2003; Tan, Ooi, Chong, & Hew, 2014). As one of the factors effective in the adoption and acceptance of new technologies, **PI** was also considered in this study. It is proposed that customers, who want to have a new technology - integrated experience, have a high level of **PI** unlike other customers.

The hypothesis created in this context is as follows.

H9: *PI has a direct and positive effect on the BI of customers to use service innovation.*

Also, personal level of innovativeness is effective on the trying and adoption of technology as well as it is also effective on getting more benefits from the relevant technology (Shaw & Sergueeva, 2019). In this respect, it is proposed that the level of innovativeness of personal has an impact on PE.

The hypothesis created in this context is as follows.

H10: *PI has a direct and positive effect on the PE of customers to use service innovation.*

When the innovative features of personal are taken into consideration, it is seen that people who are more curious, open to change and experiment tend to try new technologies and systems. It is thought that H will emerge as this tendency repeats itself over time. According to Liao, Palvia, & Lin (2006), a good experience of a behavior increases the likelihood of that behavior turning into H. From this point of view, it is proposed that **PI** also has a significant effect on **H**.

The hypothesis created in this context is as follows.

H11: *PI has a direct and positive effect on the H of customers to use service innovation.*

2.4.9 Behavioral Intention (BI)

BI is one of the factors that determine the use of a technology and is defined as the individual's willingness to use a technology and then continue to use it (Venkatesh et al. , 2012).

Intention is influenced by individuals' attitudes and beliefs, and BI arises when the individual expresses his/her intention to use a technology. In studies on the adoption of a new system or technology, **BI** has been found strong effect on actual use (Ajzen, 1991; Venkatesh et al., 2003, 2012; Dabholkar & Bagozzi, 2002; Lucas & Spitler, 1999; Vijayasathy, 2004).

CHAPTER THREE

SERVICE INNOVATION CONSIDERED IN THIS THESIS

In this chapter, first of all, general information will be given about the type of service innovation considered in the scope of the thesis, and then detailed information about the specific example of the service innovation to be analyzed in this thesis will be presented. In the next chapter, the design of the questionnaire will be discussed in order to collect the data needed when testing the model. Then, the data collection stage will be mentioned with the survey. In addition, information will be given about the tool (method) to be used in analyzing the data to be collected.

3.1 A new shopping experience in brick and mortar store- Scan&Go

3.1.1 What is the Scan&Go?

As brick-and-mortar retailers are trying to improve their in-store customer experience to compete with e-commerce giants and combat unprecedented challenges such as increased costs and reduced revenue. However, this presents tremendous opportunities for those who invest wisely in the right digital initiatives. In this context, transformative technologies such as mobile scanning and go solutions are closely monitored throughout the world (Wallis, 2018). Scan & Go is a time-saving concept by allowing customers to scan items and skip traditional checkout lines when shopping in the store (Thomas, 2016).

3.1.2 How Does Scan&Go Work?

Scan & Go technology is designed to make shopping experience simpler, faster and more convenient for customers (Wallis, 2017). Customers can make scan & go purchases via the application on their phones or with the help of scanners positioned in a part of the store. Even though retailers have implemented scan and go in slightly different ways, there are similarities between the implementation steps. For example,

in Kroger stores, these steps are followed by scan, bag & go. Walmart is followed by download, scan and pay & go, and Amazon Go is followed by download, open app, just walk out and check receipt steps. Figure 3.1 shows the steps of scan & go in Walmart stores.

Customers can collect and scan items or scan the shelf label. After scanning them, put them in a bag. If they buy products that need to be weighed, they can scan the product label or shelf label, go to the scale, scan or sign and place the barcode on the scale. The quantity is determined, appears on the scale and added to the sum. Customers can remove and delete an item at any time. When they're done shopping, go to the automatic payment section, scan the Scan, Bag, Go barcode and all orders are shown on the screen. They select a payment credit card, cash payment or check and check out. There is a shelf to return the scanner or they can be returned to the original screen (Selasky, 2018).



Figure 3.1 The process of Scan & Go at Walmart (Andknowunow, 2018)

3.1.3 Advantage of Using Scan&Go in Store

The increasing number of customers who are eager to adopt technological innovations drives the percents to improve the customer's purchasing experience. In this context, scan & go technology is seen as an opportunity by retailers.

Retail giants such as Kroger Co. , Walmart and its Sam's Club stores, Amazon, B.J Wholesale Club, etc. are tend to use scan & go technologies in their stores. Because Scan & go technology only requires the use of an application or scanner. For this reason, retailers choose the cheaper scanning and travel technology for their stores instead of investing in self-checkout lanes (D'innocenzio, 2018).

Like many changes in retail, the expansion of scan & go comes from retailers trying to make store shopping more convenient and hang on to customers. Scan & go allows you to skip payment lines and long payment transactions completely. There is no unloading everything onto a conveyor belt, waiting for the cashier to scan and bag it all, and reloading it into customer's cart. This concept saves a lot of time. At the end of the shopping, instead of performing the lengthy process of scanning items, customers can scan each product while putting it in their basket. This allows them to pack while they shop and arrive at the checkout with a pre-scanned list of items, both of which accelerate the payment process (Wallis, 2017).

Scan and go technology can also contribute to an increase in average spending per visit. It is easier to track their spending because they can see the cumulative sum when shopping. Scan & go saves retail IT and equipment costs. Scan & go replaces handheld scanning devices with the customer's own phone, eliminating the need for more expensive hardware.

3.1.4 Disadvantage of Using Scan&Go in Store

Customers are still required to go to the cash register at the end of the shopping process in many retail stores where they shop with Scan & go, or leave the portable scanners back to the area they buy. It is difficult to encourage customers to use another application instead of the familiar shopping experiences. It is difficult to have the application downloaded and used by customers.

3.2 Service innovation example considered in this thesis: A new shopping experience at Migros' store- MKOLAY

3.2.1 What is Mkolay?

Mkolay is a new shopping experience which is offered by Migros in Turkey for the first time. Mkolay allows customers to shop with their smartphone in the physical store; technological effect on shopping habits; innovative, comfortable experience.

Migros is steady to grab fill-in trips and to provide that shoppers view its stores as a convenient, time-saving opportunity. Currently, Migros serves in 28 stores with Mkolay application. This number is planned to increase in the coming periods. It is an application that increases the sales capacity of the store with the available resources because it shortens the payment period in the car with offering the opportunity to easily follow the discounts and savings that the customers pay during shopping.

3.2.2 How Does Mkolay Work?

Mkolay is designed to make consumers' shopping experience simpler, faster and more convenient. Mkolay shopping experience is basically composed of 3 steps; Download & Check in, Scan & Go, Pay & Go (see also Figure 3.2).



Figure 3.2 The process of Mkolay at Migros

3.2.3 Advantage of Using Mkolay in Store

Migros presenting consumers who want a fast and smooth buying experience, a safe and trustworthy way to shopping with MKolay. With the Mkolay service, customers scan products with their smartphone while they wander the store. When they have completed shopping trip, customers can go “check out” in Mkolay pay point and then leave the store. By using the Mkolay app, customers really do save quite a bit of time when shopping at Migros, especially if the store is crowded.

Mkolay technology presents customers to direct their shopping experience and allows retailers real-time big data predictions. Mkolay application minimize (or even eliminate) the need for a physical payment point because consumers can make payments through the mobile application. Mkolay technology can accomodate with increasing average expenditure per visit. Customers can keep track of their expenses more easily as they can monitor the total amount of spending instantly during their shopping. This allows customers to keep their spending under control if they have a limited budget for shopping.

Mobile Mkolay solutions can ensure to minimize the cost per transaction by most likely reducing overall cash usage and by encouraging to use of alternative payment methods such as store cards or account-based transactions. Just like with other automation technologies employees are directed to different areas that can create high added value for customers. This situation is critical for the stores that are trying to cope with the rising wages to make their employees more productive.

3.2.4 Potential Problem in Using Mkolay in Store

In general, the problems arising from the processes are due to the network connection. In some cases, the amount of light in the area that is being read or in excess is prohibitive to read the barcode. Since the product range on smart scales is not specific to the store, the customer does not find some products on the scales screen. Instead of the product purchased in fruit and vegetable products with more than one kind, customers can choose other kinds of that product on the screen (cheaper etc.).

CHAPTER FOUR

DATA AND METHODS

In this chapter, a survey study will be introduced to collect the research data necessary to test the model developed within the scope of the study. Information will be given about the application of the questionnaire to the users after pilot. Then, information will be given about the method to be used in the analysis of the research. After this chapter, demographic and model data collected by questionnaire will be analyzed. Then the hypotheses generated will be tested.

4.1 Questionnaire Design and Data Collection

In this study, the data required to test the predicted relationships in the model established was obtained online through the questionnaire method created in Turkish on Google Forms. Firstly, the questionnaire was pilot tested among a group of 10 respondent. Questionnaire was revised according to the feedback received from the respondents. *(Since the language of the thesis is English, questionnaire questions were translated from Turkish into English and mentioned in the study (see Appendix-3)).*

The questionnaire prepared by Google Forms consists of two main sections. At the beginning of the questionnaire, the respondents were informed about the purpose of the questionnaire and the results that will not be used elsewhere. Taking into consideration the respondents who did not use the technological application previously discussed within the scope of the survey, a link containing the application video was placed on the questionnaire form. Thus, the respondents were informed in more detail about the operation of the application.

In the first part, demographic features were questioned and in the second part, the items related to the model were included. The questionnaire was sent to the participants who have used Mkolay and who are likely to use it via e-mail and whatsapp. A total of 217 people participated in the survey. Since the survey was designed in such a way that one question could not be passed from one answer to the other, the risk of lost data was eliminated. The scales used in the research were adapted to the application use

from previous studies in order to determine the factors that were effective in Mkolay use. All variables were measured using multiple-item, five-point scales with anchors ranging from Strongly Disagree (= 1) to Strongly Agree (= 5).

4.2 Sample Size

According to Kline (2005) in order to obtain reliable results in SEM, the sample size required is 100-150. In addition, it accepts 100 and less samples as “small”, 100-200 samples as “medium” and over 200 samples as “large”. Also according to the critical N principle of Hoelter (1983), the sample size should be at least 186 for 0.01 significance level. In this context, with 217 samples were met both conditions. Besides, Lee & Song (2004) argued that the sample number of the sample should be at least fivefold. In this regard, the research model with 38 indicators fulfilled this requirement ($38 * 5 = 190$ and $190 < 217$).

4.3 Operationalization of Constructs

In this study, the items used to measure the relationships between variables in the conceptual model proposed in section 2.3.2 were adapted from previous studies and used for Mkolay. Table 4.1 demonstrated the questionnaire variable and references and also the items used to measure each variable in the study will be given sequentially, in this section.

Table 4.1 Questionnaire reference in the literature

Variable	Type	Number of Items	Reference (Adapted From Following Sources)
PE	Independent & Dependent Likert Scale=5 Point	8	Davis (1989); Davis et al. (1989, 1992); Thompson et al. (1991); Moore & Benbasat (1991); Compeau & Higgins (1995b); Compeau, Higgins, & Huff (1999)

Table 4.1 continues

EE	Independent Likert Scale=5 Point	7	Davis (1989); Davis et al. (1989); Thompson et al. (1991); Moore & Benbasat (1991)
FC	Independent Likert Scale=5 Point	4	Thompson et al. (1991); Venkatesh et al. (2003)
SI	Independent Likert Scale=5 Point	3	Azjen & Fishbein (1975); Davis et al. (1989); Thompson et al. (1991); Ajzen (1991); Taylor & Todd (1995a, 1995b)
H	Independent & Dependent Likert Scale=5 Point	3	Limayem & Hirt (2003); Venkatesh et al. (2012)
PV	Independent Likert Scale=5 Point	4	Dodds et al. (1991); Venkatesh et al. (2012)
HM	Independent Likert Scale=5 Point	3	Venkatesh et al. (2012)
PI	Independent Likert Scale=5 Point	3	Agarwal & Prasad (1998)
BI	Dependent Likert Scale=5 Point	3	Venkatesh et al. (2012)

PE is considered as the expectation of using Mkolay in shopping of customers to have a better shopping experience. Within the scope of the study, 8 items were used to measure the effect of **PE** on intention to use Mkolay.

PE1: Mkolay application allows me to track the products in my basket during shopping.

PE2: Mkolay application allows me to see the total discount and payment amount before reaching the cashier point.

PE3: I spend less time at the checkout using Mkolay.

PE4: Earning money points while shopping use with Mkolay encourages me to use Mkolay again.

PE5: I can put my products directly in the bag using Mkolay.

PE6: I'm packing my products before I get to the checkout point using Mkolay.

PE7: The ability to see the basket amount at any moment when I use Mkolay prevents me from encountering a surprise amount at the cash register.

PE8: Using Mkolay I create a good image of the use of technology in the people around me.

7 items were used to measure the effect of **EE** on intention to use Mkolay, in this study.

EE1: I find Mkolay application easy and understandable.

EE2: It is easy for me to add or remove products to my basket during the Mkolay shopping.

EE3: It is easy for me to create my shopping list by scanning the barcodes of the products using Mkolay.

EE4: Mkolay total shopping time is longer than using normal or self service cash register(checkpoint). (Reverse)

EE5: When shopping with Mkolay, it takes a lot of time to scan the barcodes of the products one by one. (Reverse)

EE6: For me, there is no difference between scanning the biscuit barcode and weighing the vegetables fruits and scanning the barcode of them.

EE7: When I consider the whole process, it is easy for me to use Mkolay in general.

Mkolay is an easy and understandable new shopping experience due to its features that customers can easily add and remove items to the basket, spend less time than normal and self service cash register usage, and so on. While customers using Mkolay

in their shopping, when they see that learning to use Mkolay does not require much effort, they are more likely to adopt Mkolay. From the customers' point of view, if the customer thought that Mkolay is easy and to using Mkolay requires little effort is proposed that it can be resulted in the intention and adoption of Mkolay.

3 items were used to measure the effect of **SI** on intention to use Mkolay, in this study.

SI1: When I see customers who shop with their smart phones, I wonder what they do.

SI2: The fact that my friends use Mkolay encourages me to use Mkolay.

SI3: People around me think it's a good idea to use Mkolay.

4 items were used to measure the effect of **FC** on intention to use Mkolay, in this study.

FC1: I do not want to use Mkolay again if I encounter any technical problems while shopping. (Reverse)

FC2: The information about Mkolay in the store is remarkable.

FC3: Knowing that I can get support from store staff while shopping with Mkolay encourages me to use Mkolay.

FC4: If I finish my Mkolay shopping with mobile payment, I am motivated.

In this study, an example can be given to the **FC** for customers to use their smart phones, internet connection at their smart phones, sufficient operator attraction power and in-store personnel support in Mkolay shopping.

3 items were used to measure the effect of **H** on intention to use Mkolay.

H1: I prefer to use Mkolay while shopping for myself.

H2: I mostly use Mkolay when there's a queue at cash register.(at checkpoint.)

H3: Shopping with Mkolay has become a habit for me.

If we deal with this issue in Mkolay's case, it is not a coincidence that the process is designed to use the customers' own smart phones while shopping with Mkolay. It is thought that having a new shopping experience with a device that customers are used to will increase the likelihood of using Mkolay.

3 items were used to measure the effect of **HM** on intention to use Mkolay.

HM1: Shopping with Mkolay is entertaining.

HM2: Shopping with Mkolay is fun.

HM3: Shopping with Mkolay is enjoyable.

4 items were used to measure the effect of **PV** on intention to use Mkolay.

PV1: Just to shop using Mkolay; I prefer the store where this app is valid.

PV2: I download Migros application to use Mkolay and I do not intend to delete it.

PV3: It doesn't bother me that the cashier checks my shopping from time to time.

PV4: Even if I spend time to read the product barcodes, Mkolay is worth experiencing.

3 items were used to measure the effect of **PI** on intention to use Mkolay.

PI1: I'm usually the first person to try a new app among my friends or family.

PI2: I like to try new mobile apps.

PI3: Before testing a new product or brand, I get the opinion of people who have already tried it.

In this study, the **BI** was measured with the possibility of using Mkolay in the shopping of individuals who participated in the questionnaire. In addition, 3 items were used to measure the effect of **BI** on actual using Mkolay in this study.

BI1: I plan to use Mkolay in the coming days.

BI2: I'm going to suggest my friends to do the shopping with Mkolay.

BI3: I prefer to use Mkolay first instead of using a normal or self service cash register (checkpoint).

4.4 Method of Analysis

In order to test the proposed hypotheses, Structural Equation Modelling (SEM) method is used in this thesis. SEM is a statistical method based on the testing of the relationships between the variables in the created theoretical model by means of the data obtained from the research.

The SEM systematically and comprehensively addresses complex research problems involving causal and correlation relationships between observed variables and latent variables. Observed variables are the variables directly measured or observed by the researcher during the data collection process. Latent variables are variables that can be measured by connecting to one or more observed variables because of they cannot be directly observed or measured (Civelek, 2018).

In fact, regression analysis is the first generation analysis technique that reveals how much of the change in the dependent variable is explained by the independent variable. SEM is the second generation data analysis technique and takes into account the measurement errors that occur in the analysis of the data. At the same time, SEM reveals both direct and indirect relationships between variables simultaneously in the research model, where there are many dependent and independent variables compared to first generation analysis techniques such as regression (Anderson & Gerbing, 1988).

SEM is a set of multivariate statistical techniques that use variance, covariance analysis, factor analysis and multiple regression to predict dependency relationships. SEM is also defined as a combination of factor analysis and path analysis (Dursun & Kocagöz, 2010). SEM consists of two main components: measurement model and structural model. The measurement model reveals the extent to which latent variables are represented by the observed variables. It is actually a CFA and reflects the construct validity of the indicators. Therefore, if the fit index of the measurement model is low, testing the structural model will not make sense (Dursun & Kocagöz,

2010). The structural model is the model that investigates the relationship between the variables in the model whose accuracy is demonstrated by the measurement model.

SEM is used in the evaluation of relationships between variables in various fields such as political science, economics, management, psychology, marketing, sociology, health and education, and testing of theories (Polat, 2018). SEM has two types: Covariance Based Structural Equation Modeling (CB-SEM) and Partial Least Square Structural Equation Modeling (PLS-SEM) (Doğan, 2019).

While PLS-SEM makes a variance-oriented evaluation on the research model, CB-SEM makes a covariance-oriented evaluation. That is, PLS-SEM can simultaneously evaluate the reliability and validity of the indicators used in the measurement of each latent variable and the degree and significance of the relationship between these latent variables in the model (Yılmaz, Çelik, & Ulukapı, 2015; Bal, Ada, & Çelik, 2012). Table 4.2 summarizes the differences between the PLS-SEM and CB-SEM methods.

Table 4.2 Comparison criteria for differences between PLS-SEM and CB-SEM (Olya, 2017)

Criteria	PLS-SEM (Variance Based Modeling)	CB-SEM (Covariance Based Modeling)
Objective	Prediction oriented	Parameter oriented
Distribution Assumptions	Non-parametric	Normal distribution (parametric)
Required sample size	Small (min. 30 -100)	High (min.100 - 800)
Model complexity	Large models OK	Large models problematic (50+ indicator variables)
Parameter Estimates	Potential Bias	Stable, if assumptions met
Indicators per construct	One- two OK Large number OK	Typically 3-4 minimum to meet Identification requirements
Statistical tests for parameter estimates	Inference requires Jackknifing or Bootstrapping	Assumptions must be met
Measurement Model	Formative and Reflective indicators OK	Typically only Reflective indicators

Table 4.2 continues

Goodness-of-fit measures	None	Many
Related Software	e.g. Smart-PLS, PLS Graph	e.g. LISREL, AMOS, Mplus

As seen in Table 4.2, the most striking difference between these two methods is that the PLS-SEM approach can be used on the non-parametric data set. Nonparametric data means that it does not show normal distribution. However, in the PLS-SEM approach, it is possible to work with smaller sample groups than the CB-SEM approach (Polat, 2018). The fact that it is suitable for working with small sample size is first place of the reasons why PLS-SEM approach is preferred in the related literature. This is followed by the absence of a prerequisite for normal distribution (Ringle, Sarstedt, & Straub, 2012).

PLS-SEM is based on the prediction of relationship coefficients that maximize the R^2 value of the dependent variable. In other words, it is aimed to maximize the explained variance of the dependent variable which is the focal point of the researcher and to minimize the error variance (Hair, Hult, Ringle, & Sarstedt, 2014). PLS SEM is used in the early stages of the new theory development process, rather than testing models related to existing theories (Henseler, Ringle, & Sinkovics, 2009).

This is one of the reasons for using the PLS-SEM approach in this study. On the other hand, another reasons for preferring PLS-SEM method in this study; provide acceptable results despite working with small samples, it enables simultaneously linear regression with CFA, there is no normal distribution prerequisite for data and it is based on the bootstrapping method. In addition, while the data is interpreted in PLS-SEM approach, goodness of fit values such as Chi-square, RMSA, NFI are not considered. This approach, first developed by Wold (1975, 1982, 1985), was enriched by Lohmöller (1989) (Sarstedt, Ringle, & Hair, 2017).

PLS-SEM approach is used in many fields, such as; management information systems (Ringle et al., 2012; Hair, Sarstedt, Ringle, & Mena, 2012b), strategic management (Hair, Sarstedt, Pieper, & Ringle, 2012a), business strategy (Hulland,

1999), marketing (Hair et al., 2012b); (Henseler et al., 2009), human resource management (Ringle, Sarstedt, Mitchell, & Gudergan, 2018), international business (Richter, Sinkovics, Ringle, & Schlägel, 2016), operations management (Peng & Lai, 2012). For PLS-SEM, more SmartPLS program is preferred and for CB-SEM approach, LISREL program is used more (Polat, 2018). In this study, a package software called SmartPLS 2.0 was used.



CHAPTER FIVE

ANALYSIS AND RESULTS

In this chapter, firstly the demographic characteristics of the respondents will be analyzed by using the data collected by online survey method. Then, reliability and validity analyzes will be performed. After testing the measurement model, the structural model will be examined. Then the hypothesis tests will be finalized. In the next chapter, the information obtained after the analysis in general will be interpreted and theoretical and practical implications of the study will be mentioned. Then, in terms of shedding light on future studies, the limitations of the study and the aspects open to development will be emphasized and then will conclude the research.

5.1 Demographic information of respondents'

Demographic information such as age, gender, education programme, occupation, monthly income and marriage status was collected with questionnaire from respondents. Demographic information of the respondents showed Table 5.1.

Table 5.1 Demographic information of respondents'

Demographic Details	Categories	Frequency (n=217)	Percentage (%)
Age			
	16-26	27	12.4%
	27-37	121	55.8%
	38-48	55	25.3%
	49-59	13	6.0%
	60 and above	1	0.5%
Gender			
	Female	119	54.8%
	Male	98	45.2%
Education Programme			
	Primary Education	5	2.3%

Table 5.1 continues

	High School and Equivalent Schools	47	21.7%
	College	11	5.1%
	University	105	48.4%
	Master's Degree	45	20.7%
	Phd	4	1.8%
Occupation			
	Management and related fields	55	25.3%
	Computers, Computing and Telecommunications	18	8.3%
	Banking, Investment and Finance	8	3.7%
	Medical and Health Services	3	1.4%
	Logistics Services	3	1.4%
	Education and Training	16	7.4%
	Engineering	36	16.6%
	Business	9	4.1%
	Law and Consulting	3	1.4%
	Student	8	3.7%
	Retired	1	0.5%
	Not working	1	0.5%
	Other	76	35.0%
Personal Monthly Income			
	Less than TL 2020	24	11.1%
	TL 2021-3500	87	40.1%
	TL 3501-5000	44	20.3%
	Above TL 5001	62	28.6%
Marriage Status			
	Single	92	42.4%
	Married	125	57.6%

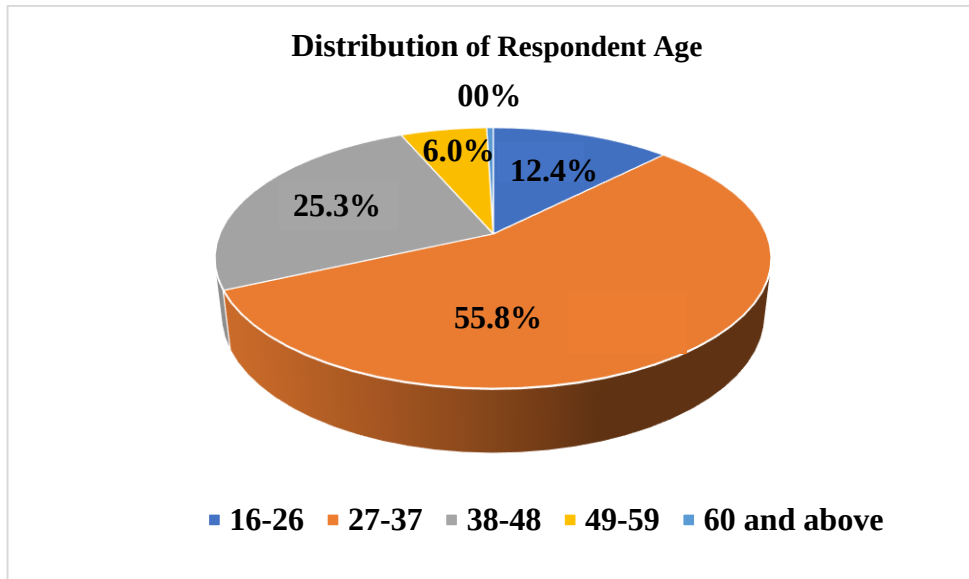


Figure 5.1 Pie chart pointing out the distribution of respondent age

It is seen that 55.8% of the respondents are in the 27-37 age range. Therefore, the majority of the respondent are young individuals.

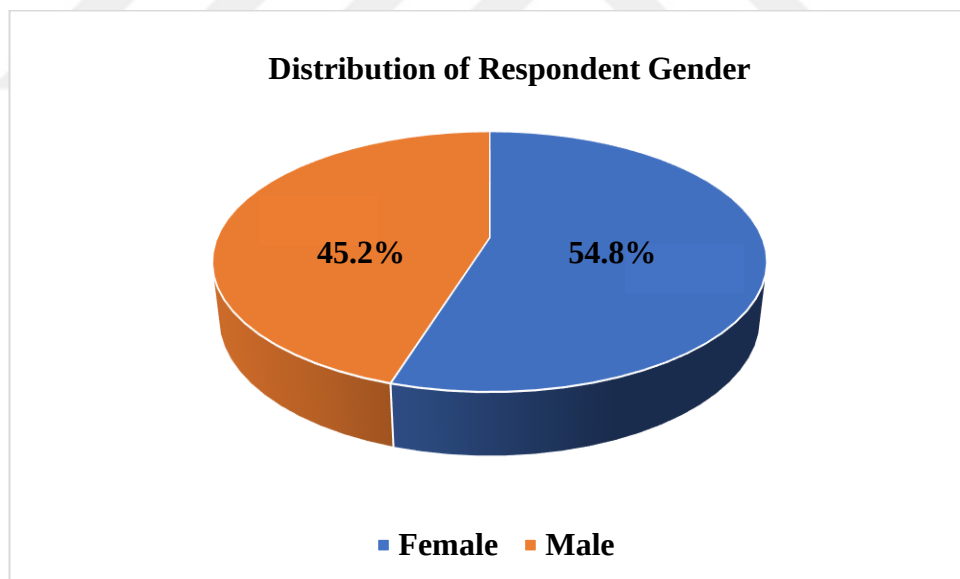


Figure 5.2 Pie chart pointing out the distribution of respondent gender

According to the research findings, 54.8% of the respondents are female and 45.2% are male.

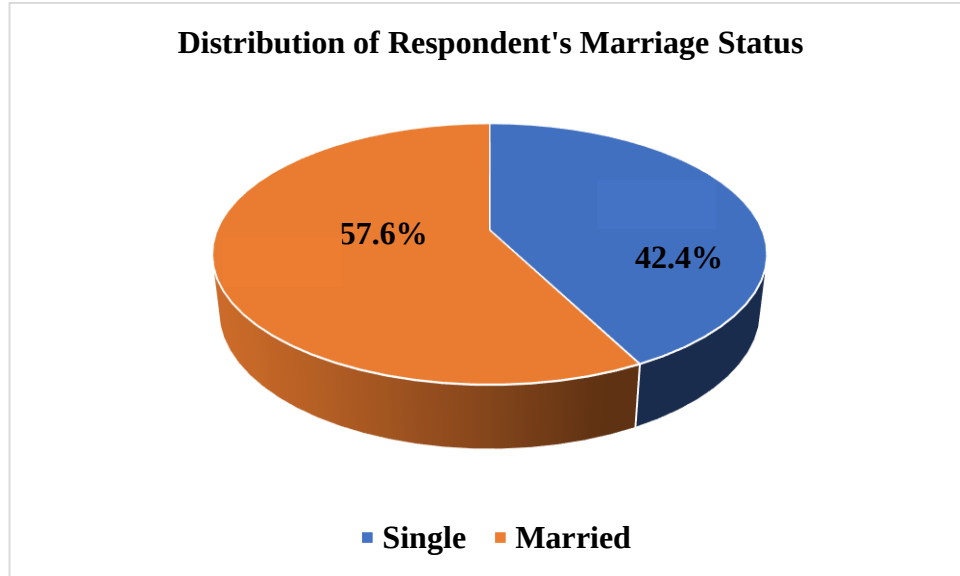


Figure 5.3 Pie chart pointing out the distribution of respondent marriage status

On the other hand, the percentage of married people is equal to 57.6%. 51.2% of married respondents are male and 63% of single respondents are female.

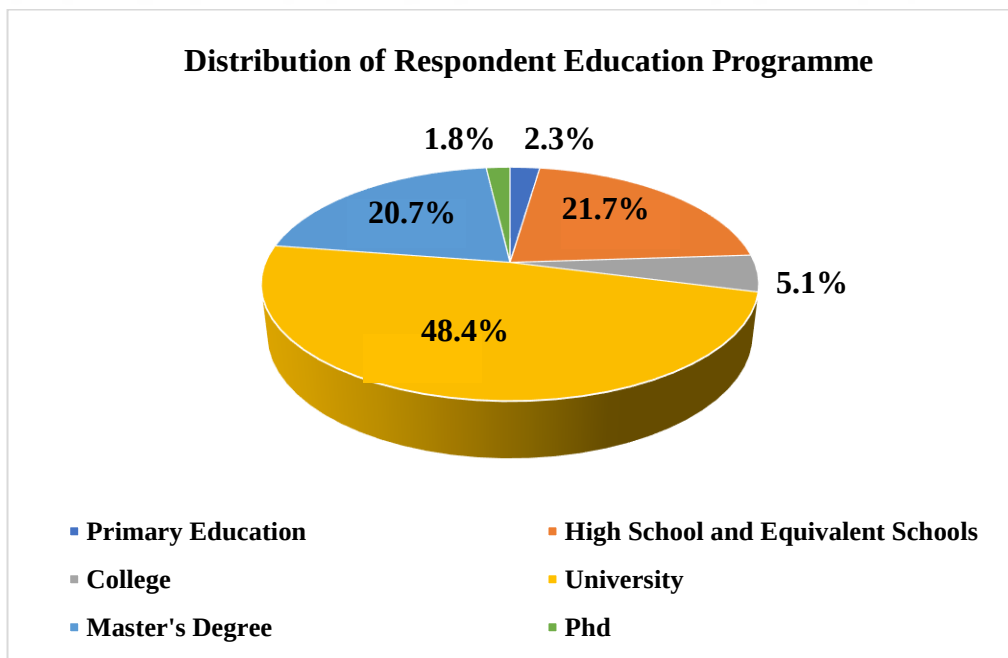


Figure 5.4 Pie chart pointing out the distribution of respondent education programme

It is seen that 48.4% of the respondents are university graduates and followed by high school graduates with 21.7%. The percentage of respondents who graduated from the graduate program is 20.7%. The percentage of the respondents who are college graduates are 5.1%, primary education graduates are 2.3% and doctorate graduates are 1.8%.

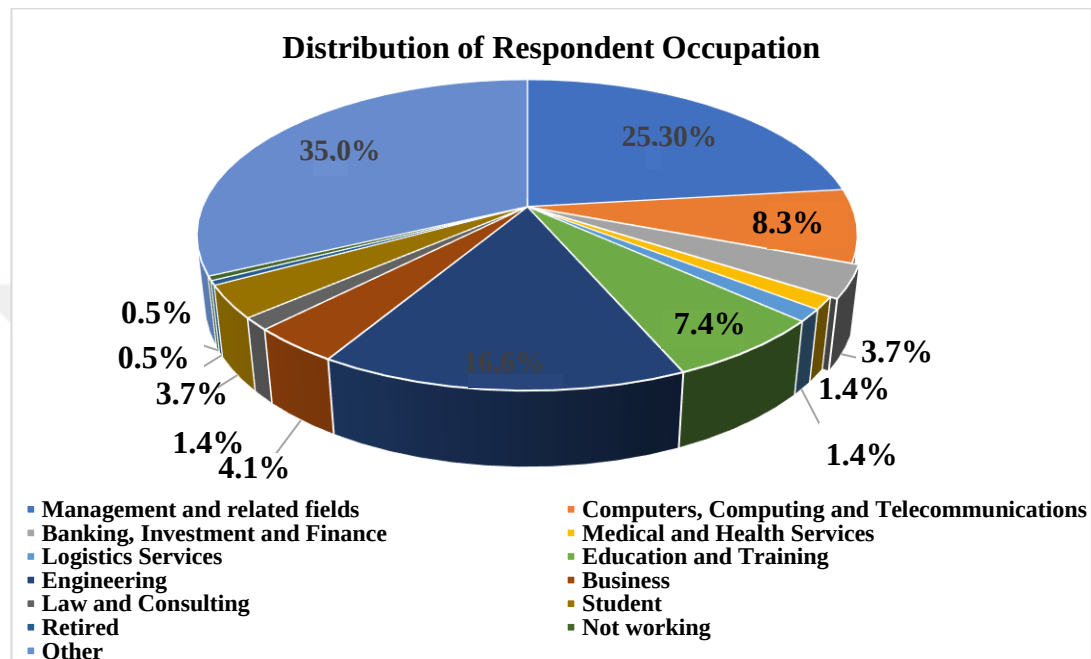


Figure 5.5 Pie chart pointing out the distribution of respondent occupation

According to the research findings, 35% of the respondents were included in the “Other” group to represent occupations other than the occupational groups included in the survey. This rate is followed by 25.30% of the respondents in the management and related fields, and 16.60% of the engineers. According to these ratios, the majority of the respondents were “Other” occupational groups.

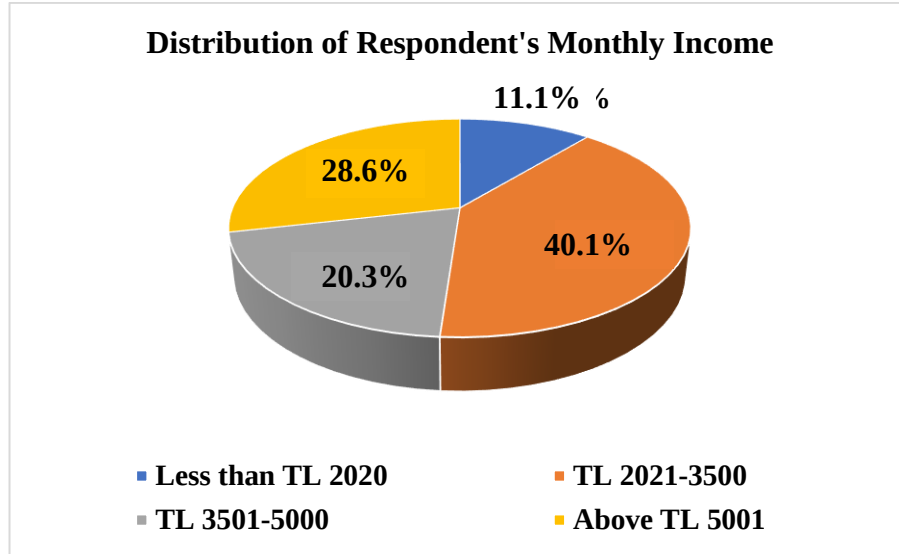


Figure 5.6 Pie chart pointing out the distribution of respondent monthly income

The monthly income of 40.1% of the respondents are between 2021-3500 Turkish Liras (TL). This rate is followed by the respondents with monthly income of TL 5000 and over with 28.6%. The percentage of respondents with income between TL 3501-5000 is 20.3%, while the percentage of respondents with minimum wage and lower income (TL 2021 and below) is 11.1%. The results of the research show that the majority of the respondents were middle-income.

In order to determine whether the data supports the proposed model, the data were evaluated by two-stage method namely the measurement model and the structural model. In the measurement model, factor loadings, reliability and validity of the indicators in the model were tested. In the structural model that take its final form after the measurement model, the relationships between latent variables were tested.

5.2 Measurement Model

The measurement model tests how well the latent variables are explained by the observed variables. Aforementioned observed variables are measurable variables. Latent variables are variables that are measured through observed variables because they cannot be measured directly.

After completing the drawing of the model created using SmartPLS 2.0, factor analysis was performed for the model. In SmartPLS, factor loadings are called outer loadings of the outer model. Figure 5.7 reflects the measurement model.

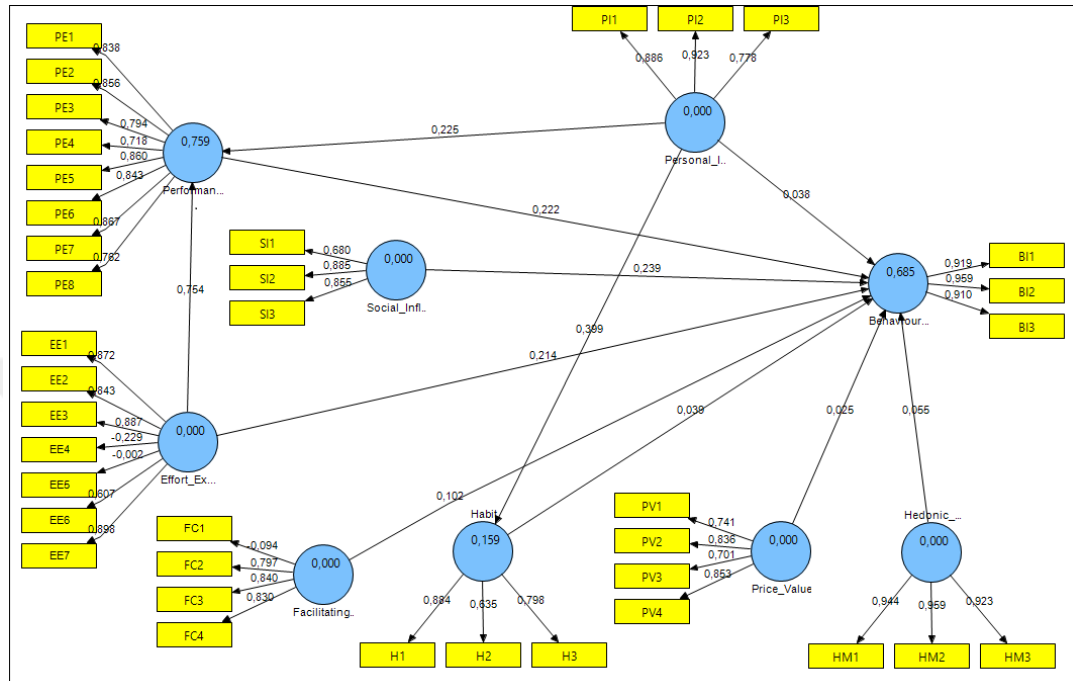


Figure 5.7 PLS-SEM measurement model

Factor loadings in PLS-SEM based analysis methods should be between 0.700 and 0.900 (Chin, 2010). However, values over 0.600 can be accepted in the newly developed scales (Hair et al., 2014).

Table 5.2 First model factor loadings

	(BI)	(EE)	(FC)	(H)	(HM)	(PE)	(PI)	(PV)	(SI)
BI1	0.919	0	0	0	0	0	0	0	0
BI2	0.959	0	0	0	0	0	0	0	0
BI3	0.910	0	0	0	0	0	0	0	0
EE1	0	0.872	0	0	0	0	0	0	0
EE2	0	0.843	0	0	0	0	0	0	0
EE3	0	0.887	0	0	0	0	0	0	0
EE4	0	-0.229	0	0	0	0	0	0	0
EE5	0	-0.002	0	0	0	0	0	0	0
EE6	0	0.607	0	0	0	0	0	0	0

Table 5.2 continues

EE7	0	0.898	0	0	0	0	0	0	0
FC1	0	0	-0.094	0	0	0	0	0	0
FC2	0	0	0.797	0	0	0	0	0	0
FC3	0	0	0.840	0	0	0	0	0	0
FC4	0	0	0.830	0	0	0	0	0	0
H1	0	0	0	0.884	0	0	0	0	0
H2	0	0	0	0.635	0	0	0	0	0
H3	0	0	0	0.798	0	0	0	0	0
HM1	0	0	0	0	0.944	0	0	0	0
HM2	0	0	0	0	0.959	0	0	0	0
HM3	0	0	0	0	0.923	0	0	0	0
PE1	0	0	0	0	0	0.838	0	0	0
PE2	0	0	0	0	0	0.856	0	0	0
PE3	0	0	0	0	0	0.794	0	0	0
PE4	0	0	0	0	0	0.718	0	0	0
PE5	0	0	0	0	0	0.860	0	0	0
PE6	0	0	0	0	0	0.843	0	0	0
PE7	0	0	0	0	0	0.867	0	0	0
PE8	0	0	0	0	0	0.762	0	0	0
PI1	0	0	0	0	0	0	0.886	0	0
PI2	0	0	0	0	0	0	0.923	0	0
PI3	0	0	0	0	0	0	0.778	0	0
PV1	0	0	0	0	0	0	0	0.741	0
PV2	0	0	0	0	0	0	0	0.836	0
PV3	0	0	0	0	0	0	0	0.701	0
PV4	0	0	0	0	0	0	0	0.853	0
SI1	0	0	0	0	0	0	0	0	0.680
SI2	0	0	0	0	0	0	0	0	0.885
SI3	0	0	0	0	0	0	0	0	0.855

Within the scope of this study, although 3 indicators, EE6 (0.608), H2 (0.635) and SI1 (0.680) were under 0.7, they were considered sufficient since they were above 0.600 based on this information in the literature (see Table 5.2). However, the indicators EE4, FC1 and EE5 were removed respectively. When each indicator was removed from the model, each new model formed was re-analyzed. Finally, all indicators with factor loading less than 0.60 were removed from the model. Figure 5.8 presents the revised measurement model.

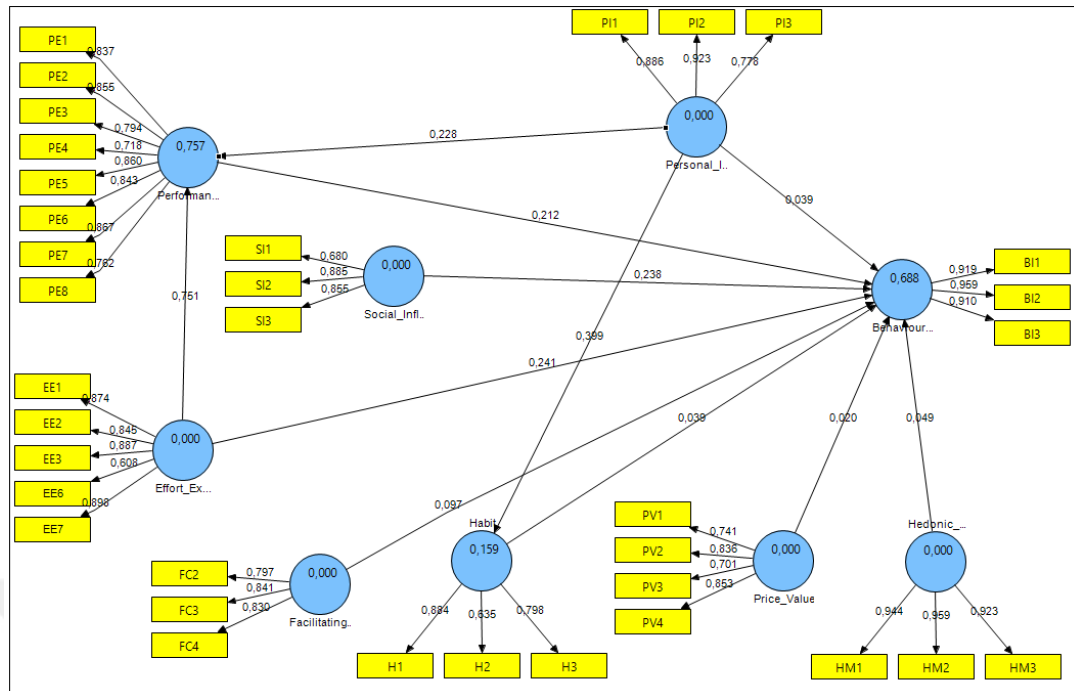


Figure 5.8 Revised measurement model

In Table 5.3, loading values, t value values, average explained variance (AVE), composite reliability (CR) and cronbach alpha values of the final measurement model were also shared. There were a total of 9 latent variables in the research model (PE, EE, SI, FC, H, PV, HM, PI, BI).

The factor loading ranges of the indicator values of these variables were 0.72 to 0.87 for PE; 0.61 to 0.90 for EE; 0.80 to 0.84 for FC; 0.68 to 0.89 for SI; 0.64 to 0.88 for (H); 0.70 to 0.85 for PV; 0.92 to 0.96 for HM; between 0.78 and 0.92 for PI and 0.91 to 0.96 for BI.

Hair et al. (2014) recommends that indicators with factor loadings between 0.40 and 0.70, be removed from the model if indicators' AVE or CR values increase when they are removed from the model. In other words, if these values do not increase when the indicators are removed from the model, there is no point in removing the indicators. For this reason, not only factor loads but also theoretical importance was taken into consideration while removing the indicators from the model. In structural equation model, it is recommended to connect at least three observed variables (indicators) to a latent variable (Civelek, 2018). Although the **H2** indicator has a factor loading of 0.635

due to its theoretical significance, it has not been removed from the model since there are only two indicators left to measure the H structure when removed.

Reliability and validity analysis of the indicators used in the model was performed to ensure that the measurement errors were at minimum level. Validity indicates whether the indicator actually measures what it is intended to measure. Reliability is the ability of the indicators to give the same results under the same conditions. With these analyzes, it is checked whether the indicator is fulfilling its duty. The internal consistency reliability of the variables was first examined.

As the research model was reflective, for construct reliability, the cronbach alpha and CR values were firstly examined in the measurement model. Afterwards, convergent validity and discriminant validity values were tested.

5.2.1 Construct Reliability

5.2.1.1 Cronbach's alpha

The Cronbach's alpha values used in the research model to test goodness of fit were 0.93 for PE; 0.88 for EE; 0.76 for FC; 0.74 for SI; 0.67 for H; 0.79 for PV; 0.94 for HM; 0.82 for PI and 0.92 for BI. Cronbach's Alpha values are expected to be above the critical value of 0.70 (Doğan, 2019). In this case, the results show that Cronbach's alpha values were consistent with the limits set in the literature.

5.2.1.2 Composite Reliability(CR)

CR is considered to be the most important criterion of reliability in PLS-SEM analysis. For CR, factor loadings should be investigated first. Bagozzi & Yi (1988) showed that CR values of the measurement model should be 0.60 and above. Fornell & Larcker (1981) argued that this value should be over 0.7. In many studies tested in the literature, these values are expected to be in the range of 0.70 to 0.90, whereas for newly developed scales, this value is acceptable between 0.60 and 0.70 (Doğan, 2019).

CR values varying between 0.82 and 0.96 for the research model provided this requirement for reliability.

5.2.2 Construct Validity

Convergent validity and discriminant validity values were used to test the construct validity.

5.2.2.1 Convergent Validity

After reliability, convergent validity values were evaluated. Factor loading limits were examined for convergent validity and then average variance extracted (AVE) values were checked for each variable. It is seen that factor loadings were over 0.60 in the Table 5.3. AVE values are obtained by dividing the sum of the squares of factor loadings of a latent variable by the number of indicators. In the research model, AVE values ranged from 0.61 to 0.89. Since all AVE values are above the critical value of 0.50, it is seen that the validity of the merger is achieved (Chin, 1998).

5.2.2.2 Discriminant Validity

It is used to measure that the related variable is really different from other variables. The discriminant validity shows whether the relationship between the variables are due to the causality or the high correlation resulting from the similarity of the variables (Henseler, Ringle, & Sarstedt, 2015).

In this study, Cross Loadings values were examined to measure discriminant validity. According to the cross-loading criterion, the factor load in one variable is expected to be higher than the other variables. The fact that each indicator in Table 5.4 has the highest correlation with the latent variable to which it relates is an indication that this condition is met.

5.2.2.3 Bootstrapping

Finally, to test the statistical significance of factor loadings, $n = 500$ was selected and bootstrapping was performed. This step is the last step of the reliability and validity analysis. The output of the structural measurement model obtained after bootstrapping was presented in Figure 5.10. The obtained t value values showed that the relationship between all indicators and the variables were statistically significant (see Table 5.5). As a result, measurement model results showed that the model structure fits well with the collected data.

Table 5.3 PLS-SEM results for the measurement model

Indicator Name	Indicator	Std. Factor Loadings	T-value*	AVE	CR	Cronbach Alpha
PE	PE1	0.84	16.57	0.67	0.94	0.93
	PE2	0.86	25.86			
	PE3	0.79	18.53			
	PE4	0.72	11.37			
	PE5	0.86	28.66			
	PE6	0.84	27.92			
	PE7	0.87	30.36			
	PE8	0.76	21.03			
EE	EE1	0.87	28.27	0.69	0.92	0.88
	EE2	0.85	25.62			
	EE3	0.89	44.34			
	EE6	0.61	10.39			
	EE7	0.90	54.74			
FC	FC2	0.80	23.03	0.68	0.86	0.76
	FC3	0.84	21.89			
	FC4	0.83	34.30			
SI	SI1	0.68	9.16	0.66	0.85	0.74
	SI2	0.89	51.52			
	SI3	0.86	34.85			

Table 5.3 continues

H	H1	0.88	48.67	0.61	0.82	0.67
	H2	0.64	7.36			
	H3	0.80	22.17			
PV	PV1	0.74	17,33	0.62	0.86	0.79
	PV2	0.84	28.56			
	PV3	0.70	12.11			
	PV4	0.85	39.14			
HM	HM1	0.94	99.78	0.89	0.96	0.94
	HM2	0.96	122.21			
	HM3	0.92	50,79			
PI	PI1	0.89	42.63	0.75	0.90	0.83
	PI2	0.92	66.61			
	PI3	0.78	16.54			
BI	BI1	0.92	49.69	0.86	0.95	0.92
	BI2	0.96	133.91			
	BI3	0.91	62.44			

Table 5.4 Cross-Loading results for discriminant validity

Indicator	BI	EE	FC	H	HM	PE	PI	PV	SI
BI1	0.919	0.724	0.658	0.588	0.655	0.739	0.390	0.616	0.619
BI2	0.959	0.729	0.725	0.654	0.708	0.744	0.410	0.664	0.704
BI3	0.910	0.700	0.696	0.697	0.659	0.665	0.337	0.691	0.700
EE1	0.678	0.874	0.676	0.644	0.657	0.701	0.305	0.651	0.630
EE2	0.592	0.845	0.611	0.599	0.575	0.662	0.300	0.640	0.599
EE3	0.723	0.887	0.730	0.687	0.776	0.807	0.399	0.687	0.652
EE6	0.392	0.608	0.501	0.484	0.450	0.490	0.223	0.524	0.394
EE7	0.746	0.898	0.711	0.721	0.813	0.791	0.439	0.704	0.709
FC2	0.555	0.614	0.797	0.673	0.663	0.644	0.354	0.645	0.593
FC3	0.588	0.699	0.841	0.665	0.659	0.707	0.360	0.672	0.639
FC4	0.685	0.627	0.830	0.632	0.672	0.676	0.343	0.634	0,651
H1	0.624	0.689	0.714	0.884	0.776	0.738	0.396	0.648	0.580
H2	0.365	0.484	0.478	0.635	0.430	0.524	0.325	0.449	0.426
H3	0.604	0.592	0.643	0.798	0.591	0.516	0.213	0.680	0.585
HM1	0.672	0.755	0.738	0.728	0.944	0.794	0.406	0.640	0.599
HM2	0.681	0.763	0.776	0.770	0.959	0.798	0.448	0.698	0.637
HM3	0.697	0.757	0.767	0.730	0.923	0.784	0.399	0.755	0.693

Table 5.4 continues

PE1	0.579	0.652	0.637	0.583	0.648	0.837	0.476	0.496	0.513
PE2	0.617	0.638	0.652	0.601	0.663	0.855	0.529	0.508	0.491
PE3	0.677	0.731	0.618	0.654	0.704	0.794	0.334	0.579	0.611
PE4	0.562	0.622	0.681	0.612	0.641	0.718	0.359	0.713	0.670
PE5	0.598	0.662	0.638	0.577	0.657	0.860	0.490	0.556	0.476
PE6	0.677	0.736	0.708	0.617	0.715	0.843	0.485	0.699	0.641
PE7	0.679	0.738	0.690	0.638	0.679	0.868	0.453	0.551	0.556
PE8	0.640	0.737	0.749	0.742	0.793	0.762	0.382	0.685	0.658
PI1	0.340	0.348	0.368	0.366	0.368	0.450	0.886	0.319	0.255
PI2	0.396	0.415	0.417	0.381	0.431	0.521	0.923	0.314	0.248
PI3	0.317	0.293	0.315	0.279	0.344	0.415	0.778	0.258	0.265
PV1	0.472	0.511	0.559	0.656	0.533	0.432	0.125	0.741	0.578
PV2	0.629	0.650	0.664	0.619	0.584	0.628	0.313	0.836	0.721
PV3	0.472	0.536	0.518	0.516	0.488	0.538	0.328	0.701	0.443
PV4	0.622	0.714	0.714	0.630	0.704	0.668	0.302	0.853	0.709
SI1	0.403	0.382	0.527	0.409	0.408	0.408	0.158	0.476	0.680
SI2	0.669	0.636	0.658	0.574	0.592	0.625	0.287	0.640	0.885
SI3	0.650	0.710	0.669	0.655	0.633	0.645	0.251	0.782	0.855

5.3 Structural Model

All variables included in the final research model were subjected to measurement model analysis and the reliability and validity values of the variables were tested. Since these values meet the criteria in the literature, the relationship between the variables was analyzed.

The structural model is the model that the accuracy of which is determined by the measurement model and the relationship between the variables is investigated. After the analysis of the measurement model, the values of the structural model obtained with the help of SmartPLS are shown in Figure 5.9.

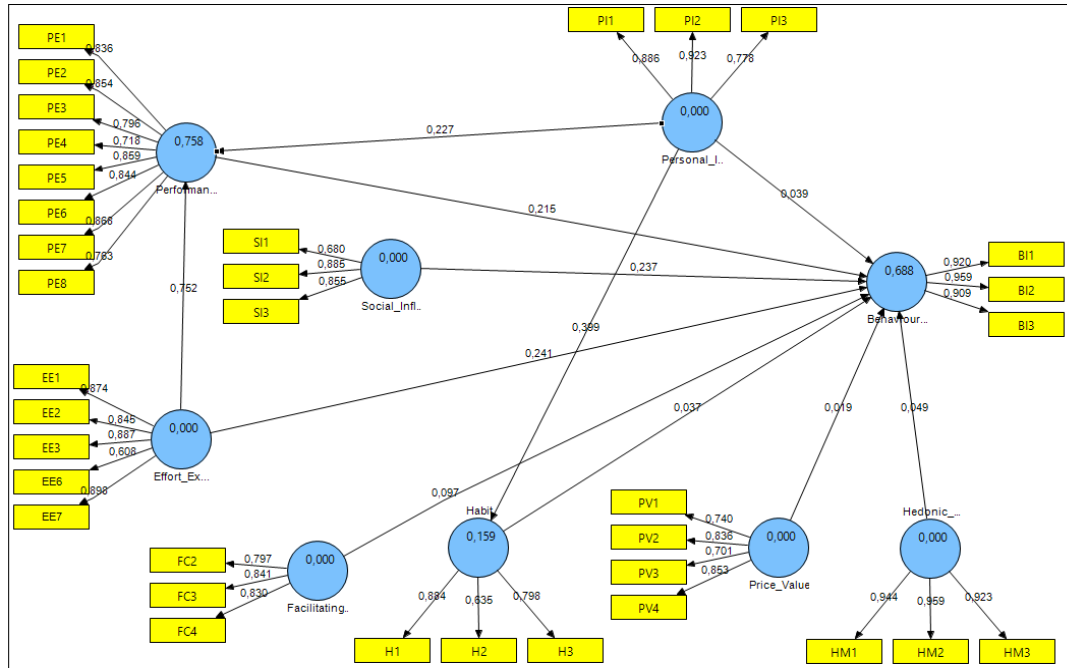


Figure 5.9 Structural model

While evaluating the structural model, the results of path coefficient (β), t-statistic value, determination coefficient (R^2) were examined.

5.3.1 Path Coefficient (β)

Relation coefficients were shown in Table 5.5 and Figure 5.9. When these results were examined, the correlation coefficient between PE and BI was 0.215, the correlation coefficient between EE and BI was 0.241, the correlation coefficient between EE and PE was 0.753, the correlation coefficient between SI and BI was 0.237, the relationship between FC and BI coefficient was 0.097, the correlation coefficient between H and BI was 0.037, the correlation coefficient between HM and BI was 0.049, the correlation coefficient between PV and BI was 0.019, the correlation coefficient between PI and BI was 0.039, the correlation coefficient between PI and H was seen 0.399.

The variables were positively correlated with each other, but whether these relationships were statistically significant or not were tested by means of the bootstrapping test.

5.3.2 Bootstrapping

Bootstrapping is called to obtain a large number of similar samples of the current sample by computer. Since PLS-SEM does not assume that the data constituting the sample is normally distributed, it uses the bootstrapping method to test the significance of the path coefficients.

Bootstrapping is the process of re-shooting by taking random sub-samples from the original sample and leaving the sample that was taken each time. That is, the sample always contains the same space, but the derivative of a large number of existing samples is reached. Bootstrapping method avoids the risk of deviation from normality if the sample is small. Even if the main sample is small, non-parametric PLS-SEM can be used to achieve normal distribution by bootstrapping (Doğan, 2019). In the scope of the study, bootstrapping analysis was performed by selecting $n = 500$. Bootstrapping analysis results are presented in Figure 5.10.

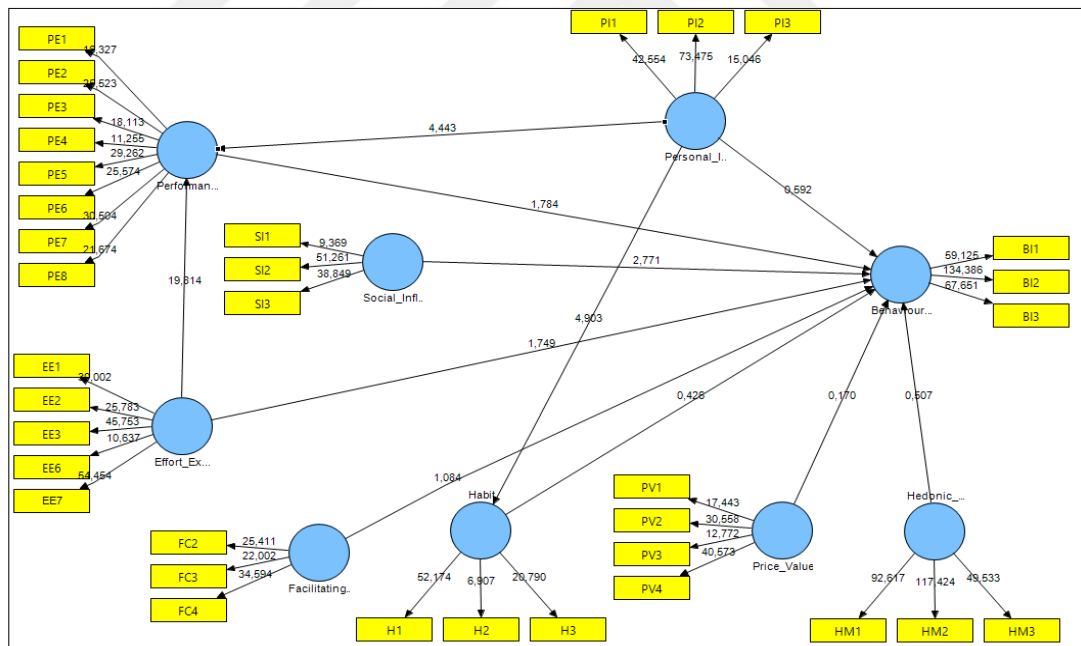


Figure 5.10 Bootstrapping analysis results output

The results obtained for the hypotheses after the analysis were shown in Table 5.5 and Figure 5.11.

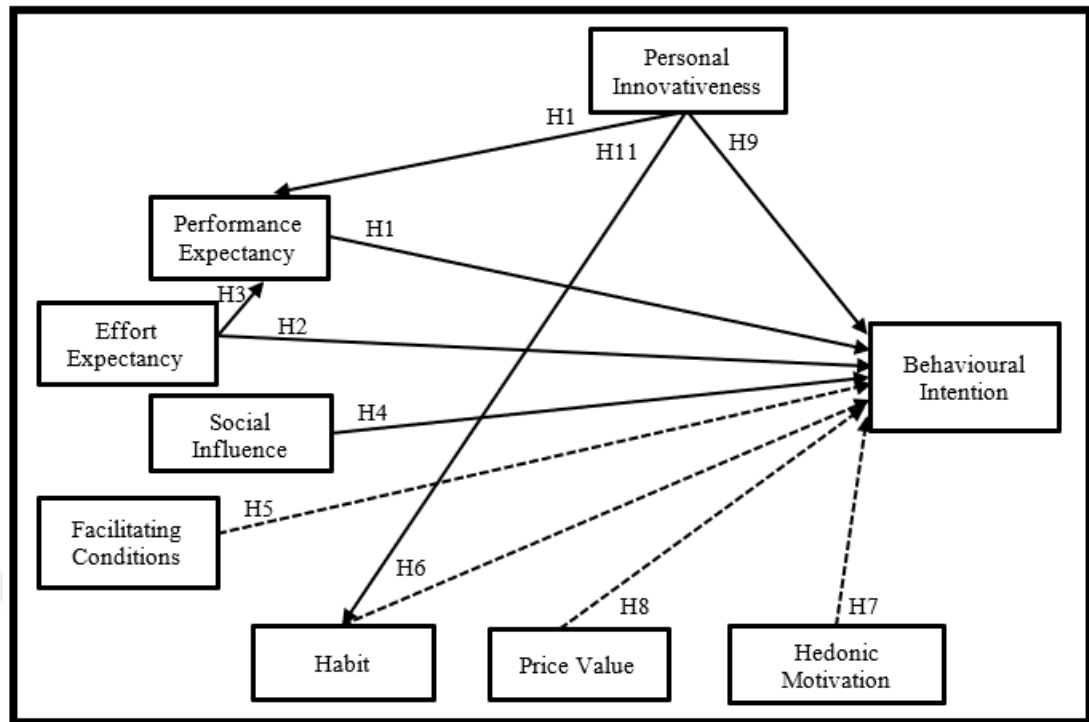


Figure 5.11 Hypotheses results on the conceptual model

----- represents rejected hypotheses

— represents accepted hypotheses

Table 5.5 Hypotheses testing results for the proposed model

Hyp.	Relationship	Path Coef.(β)	T-value	Significance	Decision
H1	PE $\rightarrow$ BI	0.215	1.784	*	Supported
H2	EE $\rightarrow$ BI	0.241	3.043	**	Supported
H3	EE $\rightarrow$ PE	0.753	19.814	***	Supported
H4	SI $\rightarrow$ BI	0.237	2.771	**	Supported
H5	FC $\rightarrow$ BI	0.097	1.084	NS	Rejected
H6	H $\rightarrow$ BI	0.037	0.426	NS	Rejected
H7	HM $\rightarrow$ BI	0.049	0.507	NS	Rejected
H8	PV $\rightarrow$ BI	0.019	0.170	NS	Rejected
H9	PI $\rightarrow$ BI	0.039	1.586	$\wedge$	Supported
H10	PI $\rightarrow$ PE	0.227	4.443	***	Supported
H11	PI $\rightarrow$ H	0.399	4.903	***	Supported

$\wedge$ t critical=1.283 (p=0.1, df=499, one-tailed)

* t critical=1.648 (p=0.05, df=499, one-tailed)

**t critical=2.33 (p=0.01, df=499, one-tailed)

*** t critical=3.107 (p=0.001, df=499, one-tailed)

NS: Not Significant

The analysis results obtained by examining the interrelations of the variables in the research model were as follows;

* The relationship between PE and BI ($\beta = 0.215$, $t = 1.784$, $p < 0.05$) was positive and significant. **H1 hypothesis was supported.**

* EE has a positive and significant effect on BI ($\beta = 0.241$, $t = 3.043$, $p < 0.01$). According to this, **H2 hypothesis was supported.** In the results of the analysis, a positive and significant relationship was found between EE and PE ($\beta = 0.753$, $t = 19.814$, $p < 0.001$) and **H3 hypothesis was supported.**

* **H4 hypothesis was supported** by a positive and significant relationship between SI and BI ($\beta = 0.237$, $t = 2.771$, $p < 0.01$).

* FC did not significantly affect BI ($\beta = 0.097$) and ($t = 1.084$) with the value of "1.28" is below the value. The p value was ($p > 0.10$). **H5 hypothesis was rejected.**

* There was no significant relationship between H and BI ($\beta = 0.037$) and ($t = 0.426$) with the value of "1.28" is below the value. The p value was ($p > 0.10$). **H6 hypothesis was rejected.**

* Since there was no significant relationship between HM and BI ($\beta = 0.049$), $t = 0.507$, $p > 0.10$). **H7 hypothesis was rejected.**

* Since the relationship between PV and BI was meaningless ($\beta = 0.019$, $t = 0.170$, $p > 0.10$). **H8 hypothesis was rejected.**

* It was found that PI had a positive and significant relationship on BI ($\beta = 0.039$, $t = 1.586$, $p < 0.01$). **H9 hypothesis was supported.**

* The relationship between PI and PE ($\beta = 0.227$, $t = 4.443$, $p < 0.001$) was found to be positive and significant. **H10 hypothesis is therefore supported.**

* The relationship between PI and H ($\beta = 0.399$, $t = 4.903$, $p < 0.001$) is also found to be positive and significant. **H11 hypothesis was therefore supported.**

5.3.3 Determination Coefficient (R^2)

Before mentioning the determination coefficient (R^2), it is useful to give information about endogenous and exogenous variables. On SEM, some variables can act as both dependent and independent variables. Variables that can be both dependent and independent at the same time or that are only dependent variables are called endogenous variables. Only variables that are independent variables are called exogenous variables (Doğan, 2019).

The R^2 value reflects the percentage of expression of the endogenous variable of the exogenous variables in the model. The fit of the model to the assumed relationships are evaluated by the R^2 value of each endogenous variable. The value of R^2 is accepted in many different disciplines, so the relevant literature should be considered when making the evaluation.

According to Cohen (1988), R^2 has a small effect of 0.02, 0.13 has a moderate effect and 0.26 has a large effect. In this context, according to the results of the structural model in Figure 5.9, it is seen that EE has a big effect on PE ($R^2 = 0.757$). On the other hand, it was seen that PE, EE, SI and PI variables also explained BI ($R^2 = 0.688$) in a large effect level.

CHAPTER SIX

DISCUSSION AND CONCLUSION

This chapter sheds light on the whole study and is presented in five sections. In the first section, all hypotheses established will be interpreted. In the second section, the theoretical contribution of this thesis to the literature will be mentioned. In the third section, critical points for the practitioners will be discussed and in the fourth section, the limitations of the thesis and suggestions for the future studies will be mentioned. The last section, will conclude the research.

6.1 Outcome of Hypotheses

6.1.1 *Effort expectancy (EE)*

The results obtained from the research findings show that, EE has the strongest effect on BI among all other factors affecting BI. In other words, the EE variable can be said to be the strongest determinant of BI to use technological service innovations.

The intention to adopt a new technology or system is influenced not only by the positive aspects of the relevant system or technology, but also by how easy it is to learn and how little effort it requires.

The data obtained from the questionnaire showed that, if the relevant technological service innovation is easy to use and requires minimum effort while using it, from the perspective of potential users, it will use and adopt the relevant technological service innovation. EE has been proven to support the hypothesis result by researchers (Moore and Benbasat, 1991; Thompson et al. , 1991; Wang, 2010), that there is a significant effect on BI of the use of the relevant technological service. **(H2 supported- EE → BI)**

According to the results obtained from the hypothesis tests, potential users will benefit more from the related innovation when they perceive that the relevant technological service innovation is easy to use. Davis et al. (1992) likewise argued that

easy perception of a system would provide more benefit to its user. As in many studies related to mobile technologies and related fields in the literature, it has been proved that EE has a positive relationship with PE in this study (Zhou et al. , 2010). **(H3 supported- EE → PE)**

6.1.2 Social influence (SI)

In the light of the analyzes, it has been shown that after the EE, SI) is the second most important factor in predicting BI to use technological service innovations. This suggests that potential technological service innovation users may be influenced by the thoughts of their friends' relatives about innovation (Lopez-Nicolas et al. , 2008). **(H4 supported- SI → BI)**

Wu, Tao, & Yang (2008) found that women were more affected by the attitudes and thoughts of the people around them. The fact that the questionnaire respondents consisted of women with 54.8% confirms the effect of SI on BI.

6.1.3 Personal innovativeness (PI)

The findings of the research have demonstrated the decisive effect of PI on BI to use technological service innovations. Potential users with a high level of PI is more likely to be curious, open to change, and willing to try, so they will be more likely to use a new system or technology than other users (Agarwal & Prasad, 1998; Goldsmith & Foxall, 2003; Tan et al. , 2014). **(H9 supported- PI → BI)**

Potential users need to be competent to know how to use it in order to maximize benefit from the relevant innovation. According to Shaw & Sergueeva (2019) the level of personal innovativeness is effective in the testing and adoption of technology, as well as in making greater use of the relevant technology. Since their level of conscious acceptance will be higher than other users, they will be aware of how and how much they can benefit from the relevant technology. Therefore, it is inevitable that innovative individuals will benefit more from the relevant technological service

innovation than other users. The results obtained after the analysis proved that the level of personal innovativeness (PI) had an effect on the PE. **(H10 supported- PI → PE)**

In general, satisfactory experiences have been found to increase the tendency to repeat a behavior. It can also be concluded that individuals of this nature will continue to use this innovation because of the benefit it derives from the use of the relevant innovation. According to Liao, Palvia, & Lin (2006), a good experience of a behavior increases the likelihood of that behavior turning into habit. In other words, with this study, it has been revealed that innovative individuals who repeat the use of a new system or technology will eventually gain a habit for the related use. **(H11 supported- PI → H)**

6.1.4 Performance expectancy (PE)

The third variable influencing BI to use technological service innovations is PE. This result indicates that the potential users' intention to use these innovations will increase when they find relevant technological service innovation useful and think they will increase their efficiency.

Like many other studies in the literature (Alalwan, Dwivedi, & Rana, 2017; Agarwal and Karahanna, 2000; Venkatesh et al., 2003; Davis et al., 1989; Yang, 2012), this study showed that potential users (customers) are more willing to adopt and use these new technologies in their daily lives when they perceive that a new technology is more beneficial and advantageous than before. In other words, it has been shown that PE is one of the factors affecting BI. **(H1 supported- PE → BI)**

6.1.5 Facilitating conditions (FC)

Contrary to studies in the literature (Venkatesh et al., 2003; Gupta et al., 2008; Chiu & Wang, 2008; Pai & Tu, 2011; Wang & Shih, 2009 and Im et al., 2011), it was found that FC were not statistically significant on BI for the use of technological service innovations.

The results of the study showed that EE was the strongest determinant of BI to use technological service innovations, while FC had no significant effect. This situation that rather than having the necessary resources and support to use the relevant innovation for potential users, ease of using related innovation is more critical by them.

Considering that 48.4% of the questionnaire respondents are university graduates, it is not a coincidence that these potential users with certain knowledge and competence expect to use the relevant innovation with minimum effort rather than meeting their support or resource needs. **(H5 rejected- FC → BI)**

6.1.6 Hedonic motivation (HM)

The hypothesis established in the light of many studies proving (Davis et al., 1992; van der Heijden, 2004; To et al., 2010; Magni et al., 2010) that hedonic factors in the literature are critical factors in the use of mobile technologies and affect BI was not supported in this study. That is, HM has not been shown to play an important role on BI for the use of technological service innovations. Rather than hedonic factors on the intention of potential users to use such innovations, it can be interpreted that it is more important that the relevant technological service innovation be easy to use and to benefit the user. **(H7 rejected – HM → BI)**

6.1.7 Price value (PV)

In this study, PV is considered as paid but non-monetary value compared to the obtained benefit. In contrast to many studies in the literature (Dodds et al., 1991; Venkatesh et al., 2012; Liu et al., 2015) that demonstrate that PV has a significant effect on BI, this study found that PV was not statistically significant on BI for the use of technological service innovations.

This result was supported by the study put forward by Hew et al. (2015). The results showed that PV factor did not affect BI of using technological service innovations. **(H8 rejected – PV → BI)**

6.1.8 Habit (H)

The stronger an individual's habit of using technology, the stronger his/her intention to use that technology, but the result of the research revealed that H, unlike previous studies (Kim, 2012; Venkatesh et al., 2012; Baptista and Oliveira, 2015; Hewet al., 2015), had no effect on BI. **(H6 rejected – H→ BI)**

The use of this technological service innovations that are being actively tested in a limited number of stores in Turkey for the first time or the lack of similar applications in Turkey, for potential users may have been an obstacle in the using this innovation and gaining a habit.

6.2 Theoretical Implications

Although there are many studies conducted in the literature on the adoption of technological service innovation, there is a deficiency of addressing the process of adopting the technological service innovation in the retail sector in detail. This study has been put forward to reveal the factors effective in the adoption of technological service innovation by using a real case study to cover this gap in the literature.

The results obtained theoretically contribute to reveal the factors affecting BI in the use of technological service innovations and to analyze the complex structure of the adoption process.

Research findings show that the potential users (customers) intention to use technological service innovation was influenced by PE, EE, SI and PI. In contrast, unlike hypotheses based on previous literature, it has been demonstrated that variables such as H, HM, FC and PV do not affect the intention to use. In this study based on the current UTAUT2 model to determine the factors affecting the complex adoption process of technological service innovations.

Since smart technologies provide retail customers with the opportunity to personalise all process steps that are effective in delivering superior shopping performance (Inman & Nikolova, 2017; Pantano, Rese, & Baier, 2017; Wunderlich,

Heinonen, Ostrom, & Patrício, 2015), PI factor has been integrated into the existing UTAUT2 model to reveal the factors that are effective in the adoption of technological service innovations. With the addition of this factor is contributed to the current literature on the adoption of technological service innovations.

This study demonstrates that UTAUT2 extended form with PI can adequately explain the BI for technological service innovations. It was seen that PE, EE, SI and PI variables explained BI ($R^2 = 0.688$) at a large impact level (Cohen, 1988). This finding shows that this proposed research model is useful and has a good predictive value in evaluating BI towards technological service innovations.

Also, in this study, the theoretical contribution has been made by establishing new relations on original UTAUT2 model. The effect of EE on PE, and the impact of PI on both PE and H were analyzed in the light of a real service innovation example in the retail sector. The hypotheses established in this direction were supported.

The findings of the research provide guidance for the practitioners who will make improvements in this field by revealing the factors affecting the technological service innovations.

6.3 Practical Implications

This research not only contributes to the literature theoretically but also shows important results that should be paid attention in practical life. In terms of practical implications, service providers need to ensure that the relevant innovation meets the EE, SI, PE and PI factors in order to increase the adoption and use of technological service innovations. Research findings show that these factors were critical.

EE was found to be the most important factor in influencing the intention to use technological service innovation. Therefore, when application developers design technological service innovations as simple and easy to use, it will be easier for users to benefit with minimum of physical and mental effort.

That is, if the companies (the developers) and the application developers present the relevant technological service innovation to their users with more simple, clear,

understandable and user-friendly design, the probability of adopting and using this innovation will become so high by the users .

The fact that companies (practitioners) concentrate their activities at the design stage for technological service innovations will increase the likelihood of future success. Furthermore, the impact of SI on the adoption of relevant technological service innovation should not be overlooked. In this context, firms need to identify people with a high ability to influence other people and encourage them to use and make use of the relevant innovation. For example, it may be beneficial to publish advertisements where people trusted and loved by society use the relevant innovation, also may use youtubers, or effectively use social media channels in this sense. They may be references to spread to a wider audience.

Firms (practitioners) need to make clear their difference from existing technology when deploying a new service innovation. Work should be done to encourage users to have a different experience. For example, to make it possible for potential users to perceive that the current shopping journey is easier and faster with the use of Mkolay, will create a new and holistic user experience on the customer.

Firms (practitioners) should also use new technologies in different ways to attract and surprise such customers (users), taking into account the technological profile of potential users. In this direction, early adopters of more innovative individuals can be targeted, so that in the next wave of adoption, they can be used as ambassadors to reach others. Firms (practitioners) need to focus not only on which technological service innovation they will invest in, but also on how to encourage the adoption of the relevant innovation by potential users.

The key to the success of such innovations is to provide the customers with a comprehensive and holistic shopping experience by examining the whole process from the customer's point of view.

6.4 Limitations and Future Research

This study has some limitations that may be addressed in future research.

In contrast to the UTAUT2 model, which was referenced in the scope of the study, the effect of moderator variables such as age, gender and experience on other variables was not examined in this study. To complement the current model, moderator variables such as age, gender, income, education, marital status and occupation can be added to investigate the impact of these socio-demographic variables.

In this research, there is a cross-sectional approach. However, customers' perception of technological service innovations may vary over time. In this case, more useful information can be obtained when the study is carried out by exhibiting a longitudinal approach in future researches. Within the scope of the study, no sharp distinction was made as a customer and store manager or employee. Future research may take this distinction into account in the evaluation of survey studies and in analyzing the results.

The data required to analyze the research model was collected by questionnaire method. Participants also include individuals who have never experienced Mkolay before. For those who have not tried the relevant service innovation, there is a possibility that they may be inadequate to understand the Mkolay process, even if a video link is provided that describes the implementation process before starting the questionnaire. Therefore, similar research to be conducted in the future can be performed on the customers who use Mkolay and the results obtained from this study can be confirmed.

In future studies, the model can be expanded by adding new variables that may directly or indirectly affect BI to use a technology in the research model, which is based on the UTAUT2 model. After the reliability and validity analysis, the proposed research model proved to be valid and reliable for technological service innovations.

Therefore, it may be the subject of research for future studies to determine whether this research model, which aims to solve the complex structure of the adoption process of technological service innovations, will yield similar results in other innovations in the retail sector or in different service sectors.

6.5 Conclusion

In this chapter, a summary of the findings of the study will be presented.

Although there are many studies on the subject in the literature, there is a lack of a detailed consideration of the adoption process of technological service innovation in the retail sector.

This study has been put forward to reveal the factors effective in the adoption of technological service innovation by using a real case study and cover this gap in the literature. At the end of the comprehensive literature study, it was decided to use UTAUT2 model extended with personal innovativeness (PI). In order to collect the necessary data to measure the validity of the theoretical model, an electronic questionnaire was sent to participants who using and likely to use Mkolay, via e-mail and whatsapp. Then, survey data of 217 participants were examined.

Demographic factors such as age, gender, educational background, occupational group, monthly net income and marital status of the participants were examined and the profiles of the participants were analyzed. The model was tested with the answers obtained from the items in the second part of the questionnaire.

The reliability and validity of the proposed research model was confirmed by statistical analysis. With the reliability and validity analysis, the measurement model was tested and the indicators that did not meet the required conditions were removed from the model. Then, 11 hypotheses were analyzed on the revised model with Smart PLS 2.0 package program using PLS-SEM method. After the analysis, it was proved that a total of 7 hypotheses were supported and 4 were rejected. Of these 7 hypotheses, 4 hypotheses directly affected the BI of using Mkolay, an example of technological service innovation.

In other words, PE, EE, SI and PI variables were found to have a direct effect on BI towards using Mkolay ($R^2 = 0.688$). It is seen that PI variable has less effect on the BI explanation than the other 3 variables. Further research can be done on this subject. EE has a strong effect on PE, which can be confirmed by many studies in the literature.

In contrast, unlike hypotheses based on previous literature, it has been demonstrated that variables such as H, HM, FC and PV did not affect the intention to use technological service innovation. This study demonstrates that UTAUT2's extended form with PI can adequately explain the BI.



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APPENDICES

APPENDIX-1: Models and theories of individual acceptance

Models and Theories	Core Constructs	Definitions
TRA	Attitude Toward Behavior	is the positive or negative attitude of the individual towards performing specific the behavior (Fishbein & Ajzen, 1975).
	Subjective Norm	is related to the idea that one gets positive or negative reactions by his / her environment when he / she performs the behavior (Fishbein & Ajzen, 1975).
TAM	Perceived usefulness	is expressed as the belief that the individual will improve his work performance after using the technology (Davis et al. , 1989).
	Perceived ease of use	is the belief that one will not make much effort to use the technology in question (Davis et al. , 1989).
	Subjective Norm	Adapted from TPB and TPA. Only available on TAM2.
MM	Extrinsic Motivation	is the behavior exhibited in order to achieve and complete a specific purpose (Davis et al. , 1992).
	Intrinsic Motivation	is the behavior exhibited in order to emphasize the pleasure or satisfaction from a special activity-situation (Davis et al. , 1992).

APPENDIX 1 continues

Models and Theories	Core Constructs	Definitions
TPB	Attitude Toward Behavior	This construct is adapted from TRA.
	Subjective Norm	This construct is adapted from TRA.
	Perceived Behavioral Control	refers to the state of the person having internal and external control (skill, physical competence, information, money, equipment and human) related to performing a particular behavior (Taylor & Tood, 1995b).
C-TAM-TPB	Attitude Toward Behavior	This construct is adapted from TRA and TRB.
	Subjective Norm	This construct is adapted from TRA and TRB.
	Perceived Behavioral Control	This construct is adapted from TRA and TRB.
	Perceived usefulness	This construct is adapted from TRA.

APPENDIX-1 continues

Models and Theories	Core Constructs	Definitions
MPCU	Job-fit	the degree to which an individual believes that using (a technology) can improve the performance of his or business (Thompson et al. , 1991).
	Complexity	is expressed as the degree of perception that innovation is relatively difficult to understand and use (Thompson et al. , 1991).
	Longterm Consequences	output expresses the results to be achieved in the long term (Thompson et al. , 1991).
	Affect Towards Use	Based on Triandis, affect toward use is "feelings of joy elation, or pleasure,or depression, disgust ,displeasure, or hate associated by an individual with a particular act" (Thompson et al. , 1991, p.127).
	Social Factors	Derived from Trandis, social factors are "the individual's internalization of the reference group's subjective culture and specific interpersonal agreements that the individual has made with others,in specific social situations" (Thompson et al. , 1991, p.126).
	FC	is expressed as the objective factors that observers accept as to facilitate the realization of an action (Thompson et al. , 1991).

APPENDIX-1 continues

Models and Theories	Core Constructs	Definitions
IDT	Relative Advantage	is to evaluate whether the new is more advantageous than before (Moore & Benbasat, 1991).
	Ease of Use	is expressed as the perception that innovation is difficult to use (Moore & Benbasat, 1991).
	Image	is expressed as the degree to which the use of innovation improves the position of the person in his social system (Moore & Benbasat, 1991).
	Visibility	"the degree to which one can see others using the system in the organization (adapted from Moore & Benbasat, 1991).
	Compatibility	is the level of harmony between the values, past experiences and needs of those who adapt to innovation and innovation (Moore & Benbasat, 1991).
	Result Demonstrability	is the degree to which the results of innovation can be observed and communicated to other individuals (Moore & Benbasat, 1991).
	Voluntariness of Use	is expressed as the degree of perception of innovation use as voluntary or free will (Moore & Benbasat, 1991).

APPENDIX-1 continues

Models and Theories	Core Constructs	Definitions
SCT	Outcome Expectations-Performance	Performance-related consequences of behavior. In particular, PE is related to business results (Compeau & Higgins, 1995b).
	Outcome Expectations-Personal	Personal consequences of behavior. It is particularly concerned with personal expectations, individual respect and a sense of accomplishment (Compeau & Higgins, 1995b).
	Self-efficacy	is the individual's own thoughts about the individual's capacity to perform that job for a particular performance.
	Affect	is expressed as the individual likes a certain behavior.
	Anxiety	is expressed as anxious or emotional reactions when it comes to performing behavior.

APPENDIX-1 continues

Models and Theories	Core Constructs	Definitions
UTAUT	EE	is expressed as the degree of convenience associated with the use of the system (Venkatesh et al. , 2003).
	PE	is expressed as the degree of belief that using an system will help an individual gains business performance (Venkatesh et al. , 2003).
	SI	is expressed as the degree of perception that the others believes that individual should use the new system (Venkatesh et al. , 2003).
	FC	are expressed as the degree to which the individual believes that an organizational and technical infrastructure is available to support the use of the system (Venkatesh et al. , 2003).
	Gender	Their contents vary depending on the models used (Venkatesh et al., 2003: 447-453).
	Experience	
	Age	
	Voluntariness	

APPENDIX-2: Prior research on theories and models of IS/IT acceptance and use

Study	Year	Usage Field	Conceptual Model	Analysis Method	Respondent's Information	Independent variables in the model	Dependent variables in the model
Park, Yang, & Lehto (2007)	2007	Mobile communication technology	UTAUT	*Cronbach's alpha *SEM - Amos 6.0	221 respondents in China	PE, EE, FC, SI, Attitude on using Mobile Technology	Using Intention Mobile Technology
Wu, Tao, & Yang (2008)	2008	3G mobile telecommunication	UTAUTwith Education	*Cronbach's alpha * SEM - Amos 7.0 *Principal Component Analysis *Reliability Analysis	394 respondents in Taiwan	PE, EE, FC, SI	BI and Use of behavior
Venkatesh, Thong, & Xu (2012)	2012	Mobile Internet technology	Comparing UTAUT and UTAUT2 without moderators and moderators	*SEM - Smart PLS * CFA *Common Method Variance (CMV)	1,512 respondents in Hong Kong	UTAUT= PE, EE, FC, SI and UTAUT2= UTAUT + PV, HM, H	BI and Use of behavior
Alwahaishi & Snášel (2013)	2013	ICT application (Information and Communication Technology)	UTAUT Model and Flow Theory	*Cronbach's alpha *CFA - (AVE) *SEM	238 respondents in Saudi Arabia	PE, EE, FC, SI, Perceived Value, Perceived Playfulness, Attention Focus	BI and ICT use
Oktal (2013)	2013	Information System	UTAUT	*Cronbach's alpha *SEM	298 respondents in manufacturing companies in Turkey (Ankara and Eskişehir)	PE, EE, FC, SI	BI and Use of Behavior

APPENDIX-2 continues

Study	Year	Usage Field	Conceptual Model	Analysis Method	Respondent's Information	Independent variables in the model	Dependent variables in the model
Rauniar, Rawski, Yang, & Johnson (2014)	2014	Social Media Usage (eg. Facebook)	Revised TAM	*Factor Analysis-Spss20 *SEM-AMOS-5.0	398 respondents in USA	Perceived Ease of Use (EU), Critical mass (CM), Social networking site Capability (CP), Perceived Playfulness (PP), Trustworthiness (TW), and Perceived Usefulness (PU)	Intention to Use, Actual Use
Nart & Okutan (2015)	2015	Mobile Shopping- M - trade concept	UTAUT with innovativeness and hedonic PE	*Factor Analysis *Regression Analysis	224 respondents in Turkey (Sakarya)	SI, Utilitarian PE, Ease of Use Expectancy, Hedonic PE, Innovativeness, Attitude	BI, Attitude Towards Mobile Technologies
Indrawati & Ariwati (2015)	2015	E-Commerce	Modified UTAUT2 with Content and Trust	*Cronbach's alpha *SEM - (PLS)	857 respondents in Jakarta, Bandung and Surabaya (Indonesia)	PE, EE, FC, SI, PV, Content and Trust	BI of Indonesian's MSMEs to adopt e-commerce (Micro, Small and Medium-sized Enterprises)
Miladinovic & Xiang (2016)	2016	M-shopping fashion apps	UTAUT2 Model with Trust	*Cronbach's alpha *Multiple Regression Analysis-ANOVA *Pearson Correlation Analysis *Reliability Analysis	106 respondents in Sweden	PE, EE, FC, SI, HM PV, H and Trust	BI to use M-shopping fashion apps
Uğur & Turan (2016)	2016	Mobile application	Mobile Application Acceptance Model = TAM, Uses and Gratifications Theory and TPB	*CFA *Principal Component Analysis *Cronbach's alpha	1654 students in Turkey	Perceived Usefulness PE, Subjective Norms, Attitude Toward Using	BI

APPENDIX-2 continues

Study	Year	Usage Field	Conceptual Model	Analysis Method	Respondent's Information	Independent variables in the model	Dependent variables in the model
(Abrahão, Moriguchi, & Andrade, 2016)	2016	Mobile Payment	Revised UTAUT with Perceived Risk and Perceived Cost	*SEM - (PLS)	605 respondents south-eastern in Brazil	PE, EE, FC, SI, Perceived Risk and Perceived Cost	BI
Dwivedi, Rana, Jeyaraj, Clement, & Williams, 2017; Dwivedi, Rana, Jeyaraj, Clement, & Williams (2017)	2017	IS and IT innovations	UTAUT with Attitude	*Meta-Analytic SEM (MASEM) *Meta Analysis *SEM - Amos.21	1600 observations on 21 relationships coded from 162 prior studies	PE, EE, FC, SI and Attitude	BI and Use behaviour
Yaman (2018)	2017	Mobile Shopping Usage	Revised TAM	*Cronbach's alpha *Factor Analysis *Pearson Correlation Analysis	241 respondents in Turkey	Perceived Usefulness, Perceived Ease of Use, and Perceived Pleasure	BI
Zengin & Özkil (2017)	2017	Mobil reklam kullanımı- Mobile Advertising Usage	UTAUT with PI in Information Technology, Perceived Enjoyment and Mobile Skillfulness	*Cronbach's alpha-Spss24 *SEM *Factor Analysis	309 respondents in Turkey	PE, EE, SI, PI, Perceived Enjoyment and Mobile Skillfulness	Intention to use mobile advertising
Bendary & Al-Sahouly (2017)	2017	Mobile Shopping	Based on TAM+UTAUT2	*SEM - Amos.20 * CFA	200 respondents in Egypt	Perceived usefulness and Ease of use, HM, Convenience, SI	Mobile shopping users' adoption

APPENDIX-2 continues

Study	Year	Usage Field	Conceptual Model	Analysis Method	Respondent's Information	Independent variables in the model	Dependent variables in the model
Mutlu & Der (2017)	2017	Mobile Messaging (Application)	UTAUT2	*Cronbach's alpha *SEM *Pearson Correlation Analysis	344 respondents in Turkey	PE, EE, FC, SI, HM, H, PV	BI and Use of behavior
Cordiglia & Belle (2017)	2017	Retailing Tecnology (Bluetooth Low Energy (BLE))- Proximity sensors within a retail store	Extendend UTAUT2 Model with Privacy Concern	*Cronbach's alpha *Factor Analysis *Multiple Regression Analysis-ANOVA	468 respondents in South Africa	PE, EE, FC, SI, HM, H, PV, Privacy Concern	BI
Yılmaz & Kavanoz (2017)	2017	Instructional technologies	UTAUT2	*Cronbach's alpha *SEM -(PLS) *Exploratory Factor Analysis * CFA	723 respondents in Yıldız Technical University	PE, EE, SI, FC, HM PV, H	BI and Use of behavior
Boonsiritomachai & Pitchayadejanant (2017)	2017	Mobile banking	Based on TAM and UTAUT with Security, Self-Efficacy, HM	*SEM *Exploratory Factor Analysis (EFA)	480 respondents in Thailand	PE and EE = (MBE=Mobile Banking Expectancy), SI, FC, Security, Self-Efficacy, HM	BI to adopt mobile banking among generation Y
Rahi, Ghani, Alnaser, & Ngah (2018)	2018	Internet banking	UTAUT Model	*Cronbach's alpha *SEM - (PLS) *Importance Performance Matrix Analysis (IPMA) *Lateral Collineratity test	398 respondents in Pakistan	PE, EE, FC, SI	Users' intention to use adopt internet banking

APPENDIX-2 continues

Study	Year	Usage Field	Conceptual Model	Analysis Method	Respondent's Information	Independent variables in the model	Dependent variables in the model
Bertolini, Bottani, Esposito, Rizzi, & Romagnoli (2018)	2018	RFID technology in fashion and apparel retail sector	UTAUTwith Self Efficiency, Anxiety, Attitude Toward Using	*Cronbach's alpha *ANOVA *Multivariate Regression	114 respondents from Diffusione Tessile's (DITE) customers in Italy	PE, EE, FC, SI, Self Efficiency, Anxiety, Attitude Toward Using	BI and Use of behavior
Chopdar, Korfiatis, Sivakumar, & Lytras (2018)	2018	Mobile Shopping	Revised UTAUT2 + Perceived Risk (Privacy Risk and Security Risk)	*Cronbach's alpha *SEM - (PLS)	366 respondents = 221 Indian and 145 American	PE, EE, FC, SI, HM, PV, H, Privacy Risk, Security Risk	BI and Use of behavior
Kazancoglu & Aydin (2018)	2018	Omni-Channel Shopping	Based on UTAUT-2+ Perceived Trust, Situational Factors, Perceived Risk, Anxiety, Need for Interaction and Privacy Concern	*Content Analysis	30 respondents in selected university students in Izmir, Turkey	PE, EE, FC, SI, HM, PV, H, Perceived Trust, Situational Factors, Perceived Risk, Anxiety, Need for Interaction and Privacy Concern	Purchase intentions of consumers in omni-channel shopping
Cao & Niu (2019)	2019	Mobile Payment (Alipay user adoption)	UTAUT with Context-awareness	*Cronbach's alpha *Factor Loading *CFA	614 respondents in China	PE, EE, SI and Perceived Risk	Alipay User Adoption
Shaw & Sergueeva (2019)	2019	Mobile Commerce	Modified UTAUT2 with Perceived privacy concerns (Perceived Privacy Risk Perceived Transaction Risk, Perceived Privacy Protection), PI and also Perceived price replaces to PV	*Cronbach's alpha *SEM -(PLS)	287 respondents in Canadian	PE, EE, FC, SI, HM, H, Perceived Value, Perceived privacy concerns (Perceived Privacy Risk, Perceived Transaction Risk, Perceived Privacy Protection)	Intention to use

APPENDIX-3: Questionnaire in Turkish

PERAKENDE SEKTÖRÜNDE TEKNOLOJİK HİZMET YENİLİKLERİNİN BENİMSENMESİ: MKOLAY ÜZERİNE DENEYSEL ÇALIŞMA

Sayın Katılımcı,

Bu çalışma Dokuz Eylül Üniversitesi Endüstri Mühendisliği Yüksek Lisans Programı çerçevesinde perakende sektöründe teknolojik hizmet inovasyonunun benimsenmesinde etkili olan faktörleri anlamaya yöneliktir.

Bu çalışmada vereceğiniz cevaplar çalışmamın temel veri kaynağını oluşturacaktır, bu nedenle anketteki tüm soruların eksiksiz bir şekilde cevaplanması çalışmamın verimliliği açısından çok önemlidir.

Seçmeli sorulardan oluşan bu anket çalışması en fazla 5 dakikanızı alacaktır. Vereceğiniz bireysel cevaplar kesinlikle gizli tutulacak ve hiçbir paylaşıma açılmayacaktır. Verilerin ortalama değerleri sadece bu çalışma için kullanılacak olup, bu çalışma haricinde başka bir çalışmada kullanılmayacaktır.

Tamamen gönüllülük esasına dayalı bu çalışmayı sizin desteğiniz olmadan yapabileceğimin imkansız olduğunu belirtir, desteğiniz için şimdiden teşekkür ederim.

Bu ankette teknolojik hizmet inovasyonu örneği olarak, süpermarkette müşterilerin kendi akıllı telefonları ile alışveriş yapabildikleri Mkolay alışveriş deneyimi ele alınmıştır.

Mkolay nedir?

Mkolay, perakende sektöründeki teknolojik hizmet inovasyonlarından biri olarak fiziksel mağazada müşterinin kendi akıllı telefonu ile alışveriş yapmalarını sağlayan yeni bir alışveriş deneyimidir.

Anketi yapmadan önce 1 kez Mkolay alışverişini yapmanızı öneririm.

* Gerekli

Ankete başlamadan önce teknolojik hizmet inovasyonlarından biri olarak seçilen Mkolay'ın sürecini anlatan aşağıdaki videoyu izlemenizi öneririm.



<http://youtube.com/watch?v=ADVZ4RMP5Uo>

APPENDIX-3 continues

1. 1-Yaşınız ^{*}

Yalnızca bir şıkkı işaretleyin.

- ☐ 16-26
☐ 27-37
☐ 38-48
☐ 49-59
☐ 60 ve üstü

2. 2-Cinsiyetiniz ^{*}

Yalnızca bir şıkkı işaretleyin.

- ☐ Kadın
☐ Erkek

3. 3-Eğitim Durumunuz ^{*}

Yalnızca bir şıkkı işaretleyin.

- ☐ İlköğretim
☐ Lise ve Dengi Okullar
☐ Yüksek Okul
☐ Üniversite
☐ Yüksek Lisans
☐ Doktora

4. 4-Mesleğiniz ^{*}

Birden fazla seçim yapabilirsiniz.

Uygun olanların tümünü işaretleyin.

- ☐ Yönetim ve ilgili alanlar
☐ Bilgisayar,Bilişim ve Telekomünikasyon
☐ Bankacılık,Yatırım ve Finansman
☐ Tıp ve Sağlık Hizmetleri
☐ Lojistik Hizmetleri
☐ Eğitim ve Öğretim
☐ Mühendislik
☐ İşletme
☐ Hukuk ve Danışmanlık
☐ Öğrenci
☐ Emekli
☐ Çalışmıyor
☐ Diğer

APPENDIX-3 continues

5. 5-Geliriniz *

Yalnızca bir şıkki işaretleyin.

- ☐ 2020 TL ve altı
☐ 2021 TL -3500 TL arası
☐ 3500 TL -5000 TL arası
☐ 5000 TL ve üzeri

6. 6-Medeni Durmunuz *

Yalnızca bir şıkki işaretleyin.

- ☐ Bekar
☐ Evli

7. 7-Yeni bir teknolojik uygulamaya yönelik aşağıdaki ifadelere ne ölçüde katılıyorsunuz? *

Her satırda yalnızca bir şıkki işaretleyin.

	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
Arkadaşlarım veya ailem arasında genellikle yeni bir uygulamayı deneyen ilk kişiyim.	☐	☐	☐	☐	☐
Yeni mobil uygulamaları denemeyi severim.	☐	☐	☐	☐	☐
Yeni bir ürünü veya markayı test etmeden önce, daha önceden denemiş kişilerin fikrini alırım.	☐	☐	☐	☐	☐

Aşağıdaki her bir soruda Mkolay alışveriş deneyimi hakkındaki düşüncelerinizi yansıtan cevabı seçiniz.

Her satırda yalnızca bir şıkki işaretleyin.

	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
8-Mkolay uygulaması, alışverişim esnasında sepetimdeki ürünleri takip etmemi sağlar.	☐	☐	☐	☐	☐
9-Mkolay kullanarak ürünlerimi doğrudan poşete atabilirim.	☐	☐	☐	☐	☐
10-Mkolay ile alışveriş yapmak eğlencelidir.	☐	☐	☐	☐	☐
11-Mkolay uygulaması ,kasa noktasına varmadan toplam indirim ve ödeme tutarını görmemi sağlar.	☐	☐	☐	☐	☐
12- Mağazadaki Mkolay hakkındaki bilgilendirmeler dikkat çekicidir.	☐	☐	☐	☐	☐
13-Kendi kendime alışveriş yaparken Mkolay kullanmayı tercih ederim.	☐	☐	☐	☐	☐
14-Mkolay kullanarak çevremdeki insanlarda teknoloji kullanımına ilişkin iyi bir imaj oluştururum.	☐	☐	☐	☐	☐
15-Mkolay ile alışveriş yapmak keyiflidir.	☐	☐	☐	☐	☐

APPENDIX-3 continues

Her satırda yalnızca bir şıkkı işaretleyin.

	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
16-Sırf Mkolay kullanarak alışveriş yapmak için; bu uygulamanın geçerli olduğu mağazayı tercih ederim.	☐	☐	☐	☐	☐
17-Benim için bisküvi barkodunu okutmak ile meyve sebzeyi tartıp barkodunu okutmak arasında fark yoktur.	☐	☐	☐	☐	☐
18-Daha çok ;kasada sıra olduğunda Mkolay kullanırım.	☐	☐	☐	☐	☐
19-Mkolay ile alışveriş yaparken mağaza personelinin destek alabileceğimi bilmek beni Mkolay kullanmaya teşvik eder.	☐	☐	☐	☐	☐
20-Akıllı telefonu ile alışveriş yapan müşteriler gördüğümde ne yaptıklarını merak ederim.	☐	☐	☐	☐	☐
21-Ürün barkodlarını okutmak için zaman harcasam bile Mkolay bu deneyimi yaşamaya değer.	☐	☐	☐	☐	☐
22-Mkolay kullanarak alışveriş yaparken Money puan kazanmak beni tekrar Mkolay kullanmaya teşvik eder.	☐	☐	☐	☐	☐

APPENDIX-3 continues

Her satırda yalnızca bir şıkkı işaretleyin.

	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
23-Mkolay kullanarak kasada daha az vakit harcarım.	☐	☐	☐	☐	☐
24-Mkolay ile alışveriş yapmak benim için alışkanlık haline geldi.	☐	☐	☐	☐	☐
25-Mkolay alışverişimi mobil ödeme ile bitirmek beni motive eder.	☐	☐	☐	☐	☐
26-Mkolay kullandığımda sepet tutarını her an görebilmek kasada süpriz tutarla karşılaşmamı önler.	☐	☐	☐	☐	☐

*

Her satırda yalnızca bir şıkkı işaretleyin.

	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
27-Mkolay kullanarak ürünlerin barkodlarını okutup sepetimi oluşturmak benim için kolaydır.	☐	☐	☐	☐	☐
28-Alışveriş yaparken herhangi bir teknik problemle karşılaşırsam Mkolayı yeniden kullanmak istemem. (T)	☐	☐	☐	☐	☐
29-Mkolay ile alışveriş yapmak zevkidir.	☐	☐	☐	☐	☐

APPENDIX-3 continues

Her satırda yalnızca bir şıkkı işaretleyin.

	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
30-Mkolay alışverişimin kasiyer tarafından arada sırada kontrol edilmesi beni rahatsız etmez.	☐	☐	☐	☐	☐
31-Mkolay kullanarak ödeme noktasına (kasaya) gelmeden ürünlerimi paketlemiş olurum.	☐	☐	☐	☐	☐
32-Mkolay kullandığımda toplam alışveriş sürem normal veya jet kasa kullanımına göre daha uzun olur.(T)	☐	☐	☐	☐	☐

+

Her satırda yalnızca bir şıkkı işaretleyin.

	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
33-Mkolay alışverişi esnasında sepetime ürün eklemek ya da çıkarmak benim için kolaydır.	☐	☐	☐	☐	☐
34-Migros uygulamasını Mkolay kullanmak için indirim ve silmeyi düşünmem.	☐	☐	☐	☐	☐
35-Mkolay uygulamasını kolay ve anlaşılır buluyorum.	☐	☐	☐	☐	☐
36-Çevremdeki insanlar Mkolay kullanmanın iyi bir fikir olduğunu düşünüyor.	☐	☐	☐	☐	☐

APPENDIX-3 continues

Her satırda yalnızca bir şıkkı işaretleyin.

	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
37-Mkolay kullanarak alışveriş yaparken ürünlerin barkodlarını tek tek okutmak çok fazla zaman alır.(T)	☐	☐	☐	☐	☐
38-Bütün süreci göz önünde bulundurduğumda genel olarak Mkolay kullanımını benim için kolaydır.	☐	☐	☐	☐	☐
39-Arkadaşlarımda Mkolay kullanıyor olması beni Mkolay kullanımına teşvik eder.	☐	☐	☐	☐	☐

Her satırda yalnızca bir şıkkı işaretleyin.

	Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
40-Önümüzdeki günlerde Mkolay kullanmayı planlıyorum.	☐	☐	☐	☐	☐
41-Arkadaşıma alışverişlerini Mkolay ile yapmalarını önereceğim.	☐	☐	☐	☐	☐
42-Alışverişlerimde normal veya jet kasa kullanmaktansa ilk olarak Mkolay kullanmayı tercih ederim.	☐	☐	☐	☐	☐

APPENDIX-4: Abbreviations

AVE	Average variance extracted
BI	Behavioral intention
BTOKT2	Birleřtirilmiř Teknoloji Kabul ve Kullanım Teorisi
CB - SEM	Covariance Based Structural Equation Modeling
CFA	Confirmatory factor analysis
CR	Composite reliability
C-TAM-TPB	Combined TAM and TPB
DTPB	Decomposed Theory of Planned Behavior
EE	Effort expectancy
FC	Facilitating conditions
H	Habit
HM	Hedonic motivation
IDT	Innovation Diffusion Theory
MM	Motivational Model
MPCU	Model of PC Utilization
PBC	Perceived behavior control
PE	Performance expectancy
PI	Personal innovativeness
PLS -SEM	Partial Least Square Structural Equation Modeling
PE	Performance expectancy
PI	Personal innovativeness
PLS -SEM	Partial Least Square Structural Equation Modeling
PV	Price value
R²	Determination coefficient
SCT	Social Cognitive Theory
SEM	Structural Equation Modeling
SI	Social influence
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UTAUT	The Unified Theory of Acceptance and Use of Technology
UTAUT2	The Extended Unified Theory of Acceptance and Use of Technology
β	Path coefficient