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AN EMPRICAL STUDY UPON INDIVIDUALS' INTENTION TO USE WEARABLE SPORTS DEVICES

ALICAN AKSOY

MASTER THESIS

DEPARTMENT OF BUSINESS ADMINISTRATION

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Asst. Prof. ALEV KOCAK ALAN

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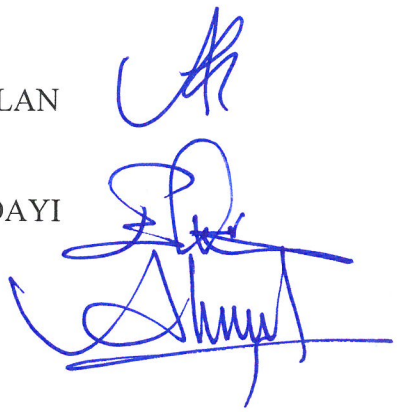

ONAY

Gebze Teknik Üniversitesi Sosyal Bilimler Enstitüsü Yönetim Kurulu'nun

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ÖZET

İçinde yaşadığımız bu dijital çağda, teknolojik gelişmeler yaşam biçimimizi değiştirmektedir. Nesnelerin interneti gibi yenilikçi teknolojiler neticesinde günlük yaşamda kullandığımız cihazlar zeka kazanmaktadır. Bunun sonucunda ise, bu cihazlar veri toplayıp bu verileri işlemekte ve insanlar adına birbirleriyle iletişim kurmaktadır. Bu akıllı cihaz kategorilerinden biri de bu çalışmanın odak noktasında bulunan giyilebilir spor cihazlarıdır. Teknolojik ve yenilikçi gelişmeler gerçekleştikçe ve bu tarz ürünler pazara girdikçe, insanların bu cihazlara nasıl tepki verdiklerini anlamak da önem kazanmaya başlamıştır. Bu çalışmanın amacı, bireylerin dijital çağın önemli bir temsilcisi olan giyilebilir cihazlar pazarını Birleştirilmiş Teknoloji Kabulü ve Kullanımı Teorisi (UTAUT) modeline dayanan bir çerçevede incelemektir. Teknofobi de önemli bir psikolojik yapı olarak, teknoloji bağlamındaki paranoya, korku, endişe, sibernetik başkaldırı ve cep telefonundan kaçınmanın etkilerini keşfetmek amacıyla araştırma modeline dahil edilmiştir. Bu teknolojinin kullanıcısı olan ve olmayan toplam 411 kişiyle bir anket uygulanmıştır ve elde edilen veri yapısal eşitlik modeli ile test edilmiştir. Çalışma bulguları; performans beklentisi, kullanım kolaylığı beklentisi, kolaylaştırıcı koşullar ve sosyal etki boyutlarının giyilebilir spor cihazlarına karşı tutum üzerindeki etkilerini desteklemektedir. Ayrıca teknofobinin, performans beklentisi ile tutum arasındaki ilişkiyi ılımlaştırıcı etkisi ispatlanmıştır. Ancak, çaba beklentisi ile tutum arasındaki ilişkide ılımlılık etkisi gözlenmemiştir. Araştırma sonuçlarına ek olarak, araştırmanın kısıtları ve gelecek çalışmalara yönelik öneriler de sunulmuştur. Sonuç bölümünden önce; çalışmanın kısıtları, gelecekteki araştırmalar ve giyilebilir spor cihazları endüstrisi için öneriler sunulmuştur.

Anahtar Kelimeler: Giyilebilir teknolojiler, giyilebilir spor cihazları, UTAUT, teknofobi

SUMMARY

In the digital age we live in, technological developments shape the way we live. Due to innovative technologies such as Internet of Things, the devices we use in everyday life gain intelligence. As a result, they can collect and process data and communicate with each other on behalf of people. One category of such smart devices are sports wearables, on which this study focuses. As developments take place and such products enter the market, it is important to understand how people react to these developments and products. The aim of this study is to examine the wearable devices market, which is an important representative of the digital age, through a framework based on the Unified Theory of Acceptance and Use of Technology (UTAUT). An important psychological construct, technophobia, was included in the research model in order to explore usage intention of individuals through the effects of paranoia, fear, anxiety, cybernetic revolt, and cellphone avoidance in the context of technology. 411 people, who are both users and non-users of this technology were surveyed online, and the obtained data were analyzed through structural equation modeling. Results support the effects of performance expectancy, effort expectancy, facilitating conditions, and social influence on attitude towards sports wearables. Besides, technophobia moderates the relationship between performance expectancy and attitude. However, the moderation effect of it on the relationship between effort expectancy and attitude was not observed. Lastly before conclusion, limitations of the study, suggestions for future research and sports wearables industry were provided.

Keywords: Wearables technologies, Sports wearables, UTAUT, Technophobia

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I would like to thank my advisor, Asst. Prof. Alev Kocak Alan, whose door was always open whenever I had trouble and needed guidance, for allowing this work to be my own but always keeping her eyes on me closely. I've been proud of having her as my advisor and teacher.

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LIST OF ABBREVIATIONS

ATCS	: Attitudes Toward Computers Scale
AVE	: Average Variance-Extracted
CARS	: Computer Anxiety Rating Scale
CFI	: Comparative Fit Index
CTS	: Computer Thoughts Survey
IDT	: Innovation Diffusion Theory
IFI	: Incremental Fit Index
IoT	: Internet of Things
NFI	: Normed Fit Index
PMT	: Protection Motivation Theory
RMSEA	: Root Mean Squares Error Approximation
TAM	: Technology Acceptance Model
TAM2	: Technology Acceptance Model 2
TAM3	: Technology Acceptance Model 3
TLI	: Tucker-Lewis Index
TPB	: Theory of Planned Behavior
TRA	: Theory of Reasoned Action
UTAUT	: Unified Theory of Acceptance and Use of Technology
WSN	: Wireless Sensor Networks

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1. INTRODUCTION

In the present age, while studying on consumption behaviors of individuals, it is seen that there are not only usual industries in the market. Technologies and innovations that lead us to define the age we live in as a *digital* age (Edelman, 2010; Baym, 2015; Goldie 2016) draw attention in today's business world. One of these technologies is the Internet of Things (IoT). The IoT basically refers to a technology where objects can communicate directly with other objects and people (Ahston, 2009). What is essential here is that the devices become more effective and gain a humane feature: *intelligence* (Sundmaeker et al., 2010; Hoffman and Novak, 2015). As a reflection of this situation, the adjective of "smart" has been added to devices, objects, constructions, cities and much more (Nguyen and De Cremer, 2016). This relatively new technology has a wide range of application areas. Wearable technologies can be shown as an example representing a crucial market for the application areas of IoT (Lee and Lee, 2015; De Cremer et al., 2017). The sports wearables, which constitute the scope of this study, represent a market that has a significant share under the wearable technologies (Canhoto and Arp, 2017).

According to Statista's (2019a) findings on "Wearable Device Sales Revenue Worldwide from 2016 to 2022", 16.07 billion U.S. dollars sales revenues in 2016 increase to 26.43 billion U.S. dollars in 2018. In 2022, on the other hand, sales revenues are forecasted to rise 73.27 billion U.S. dollars. In this respect, it is estimated that the increasing sales revenues will continue in the same way. Another report in which the wearables were analyzed based on the categories, Wearables Sales Revenue Worldwide by Category in 2015, 2018 And 2021 (Statista, 2019b), shows that 14.02 billion U.S. dollars of sales revenues in 2018 came from smart watches and 3.28 billion dollars from sports, fitness and wellness trackers. At this point, given that smart watches can also be used to track sports activities, it is seen that most of the sales revenues is derived from sports wearables. Moreover, the smart sports and fitness wearables market is expected to reach 14.9 billion U.S. dollars in 2021, without including the category of smart watches (Market Reports Hub, 2015). In this regard, this market represents a growing and important market.

Various studies on the consumption of wearable technologies are carried out in different contexts (e.g. McCann and Bryson, 2009; Chuah et al., 2016). On the other hand, it should be accepted that there is also a dark side of the topic (De Crèmer et al., 2017). It is known that such technological devices will sometimes bring some difficulties to challenge and solve for the occurrence of adoption. Concerns about privacy and security issues are noteworthy here (Weinberg et al., 2015). In this regard, this study also focuses on the effect of a psychological structure, technophobia. The aim of the study is to examine the wearable devices market, which is an important representative of the digital age, with a socio-psychological approach under the existence of a humane factor, *technophobia*. In order to achieve this aim, a research will be carried out in the category of sports wearables that the users these devices to share data like personal information with them and thus, privacy and security concerns become important issues. On the other hand, research on the intention to use sports wearables and the adaption toward sports wearables is still limited in some respects. One of these may be deficiencies in taking into account the psychological conditions of humans. From starting this point of view, the research questions of this study are as follows:

- What are the dimensions of adoption in the sports wearables industry that influence individuals' intentions to use these devices?
- What are the importance of the factors affecting the attitudes of individuals towards sports wearables and what kinds of research or marketing activities can be carried out in this context?
- If individuals have a phobia against technology, how this situation shape the adoption of technology?
- How does a psychological approach of a technology acceptance model contribute to the literature?

In order to answer the research questions, firstly background information which represent background of the research model in this study will be given. The topics to be handled in this section are the technology acceptance models, the concept of internet of things, and the relationship between technology and psychology. The next chapter will be based on the explanations of theoretical predictions and the hypotheses development. In this section, detailed descriptions of the predicted relationships will be presented. In the

next section, the research methodology will be explained. Data collection, sampling, and data analysis methods will be presented in this section. In the next section, research findings will be shown. Demographic characteristics of respondents, measurement validity and reliability tests, and hypotheses tests will be presented here respectively. Subsequently, the findings will be discussed in extant literature, implications will be presented both for future research and sports wearables industry, the limitations will be given, and the conclusion section will be provided.

2. BACKGROUND

In this section, the topics which represent theoretical background of this study will be presented. First, technology acceptance models will be given. Under this topic, Theory of Reasoned Action, Theory of Planned Behavior, Technology Acceptance Model, Technology Acceptance Model 2, The Unified Theory of Acceptance and Use of Technology, The Unified Theory of Acceptance and Use of Technology 2 will be discussed. Second, the concept of Internet of Things will be explained through the detailed definition, theoretical background, benefits, challenges, applications of it. Besides, an important representative of this market, wearables devices, will be examined. Moreover, a category under wearable devices, sports wearables, will be discussed. Third, the relationship between technology and psychology will be given through two outstanding constructs, technophilia, and technophobia.

2.1. Technology Acceptance Models

The second half of the 20th century has witnessed magnificent technological developments. One of the most important areas in which these developments took place was information technologies. The 21st century has brought even bigger developments in the field. As new technologies have been introduced almost day by day, and consequently also new products for the end-user, a particular subject have gained significant importance: acceptance of these technologies. Researchers in many disciplines were interested in this subject and related theories were developed. Acceptance and non-acceptance of these technological developments by consumers reflect in their behaviors and therefore purchasing decisions. For example, success of a business-to-consumer (B2C) electronic commerce business comes through consumer acceptance of Internet technologies (Pavlou, 2003). The studies about acceptance of technology have a long history in the field of consumer behavior literature (Marshall and Heslop, 1988; Gillenson and Sherrell, 2002; Vijayasarathy, 2004; Lim and Ting, 2012). From this point of view, technology acceptance has become an area of interest for marketing and consumer behavior studies either.

In order to explain main theoretical background of this study, *The Unified Theory of Acceptance and Use of Technology*, theoretical developments of the related theories will be provided and their involvement and relevancy in the study will be examined in the upcoming chapter.

2.1.1. Theory of Reasoned Action

Predicting behavior has been a subject of common interest in psychological theories. The Theory of Reasoned Action is one that was found very useful (Chang, 1998). It was introduced by Fishbein and Ajzen in 1975. The theory received substantial attention in the field of consumer behavior (Sheppard et al., 1998). It proposes that behavioral intention is the determinant of an individual's behavior (Chang, 1998). According to this theory, behavioral intentions are information or beliefs about the possibility that performing a specific behavior will cause specific outcomes. The beliefs antecedents to behavioral intentions were divided in two, behavioral and normative. It was assumed that behavioral beliefs influence attitudes towards performing a behavior, while normative beliefs influence subjective norms about performing a behavior (Madden et al., 1992). Fishbein and Ajzen argue that a behavioral intention measure can predict the performance of any voluntary act (Sheppard et al., 1998).

The conceptual model of the theory is provided in Figure 1.

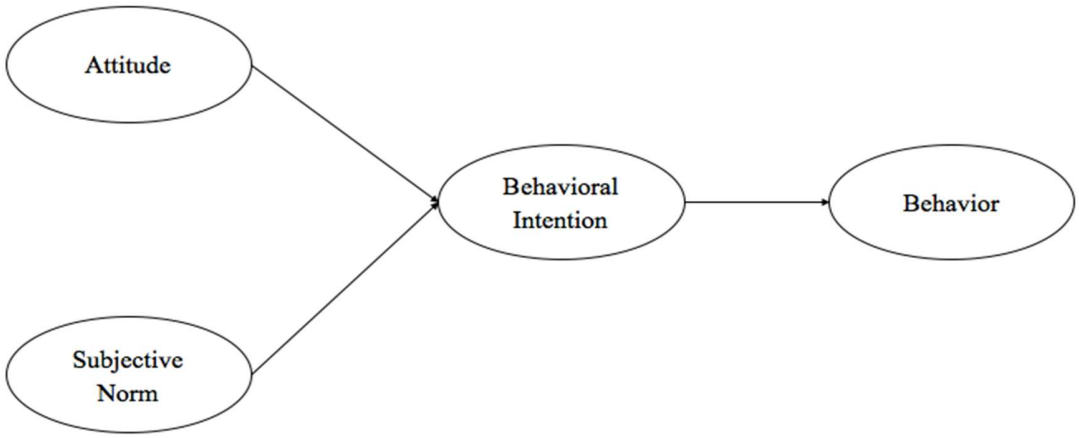

Figure 2.1: Theory of Reasoned Action

2.1.2. Theory of Planned Behavior

The Theory of Reasoned Action is only dealing with behaviors which are under the individuals' volitional control. In some cases, there may be factors beyond control and the action cannot be performed, although the intention to perform was strong (Sheppard et al., 1998). This limitation led Fishbein and Ajzen to develop a second model, an extension to the Theory of Reasoned Action. Thus, the Theory of Planned Behavior was born. The central factor in this theory is the individual's intention the perform a behavior, just as in the Theory of Reasoned Action. It is assumed that intentions show how hard an individual is willing to try to perform an action. However, a behavioral intention can result in behavior only if the individual can decide to perform or not to perform that behavior completely with his/her own will. The performance of many behaviors depends on outer factors such as availability of requisite opportunities and resources (time, money, skills, cooperation of others etc.) (Ajzen, 1991). In this regard, beliefs about the possession of requisite opportunities and resources were considered. The more resources and opportunities individuals think they hold, the more behavioral control they will think they have. Therefore, perceived behavioral control was added to the model as an exogenous variable. It has a direct effect on behavior and also an indirect effect through intentions (Madden et al., 1992).

The conceptual model of the theory is shown in Figure 2.

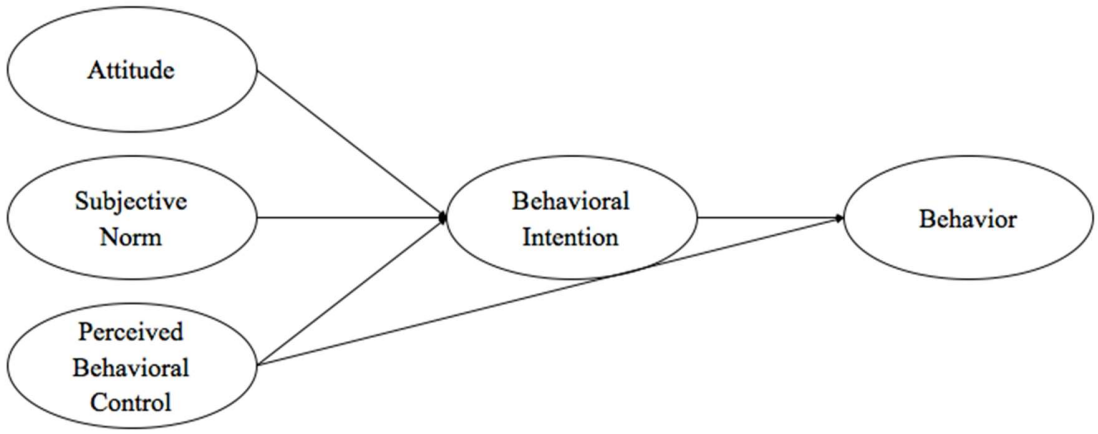

Figure 2.2: Theory of Planned Behavior

2.1.3. Technology Acceptance Model

Acceptance and use of information technology have been receiving attention of researchers for many years (Venkatesh, 2000). Information technologies offer improvements in productivity and white-collar performance (Davis, 1989; Venkatesh, 2000). Among many theoretical models, the Technology Acceptance Model, which was adapted from the Theory of Reasoned Action, is the most applied one. According to the theory, two specific beliefs, namely perceived ease of use and perceived usefulness, determine an individual's intention to use a technology (Venkatesh, 2000). Perceived usefulness is the degree to which an individual believes using a technology would improve his/her performance. On the other hand, perceived ease of use is the degree to which an individual believes using a technology would be effortless (Davis, 1989). One of the most important objectives of this theory is to provide a basis that can help track the influence of external variables on internal beliefs, attitudes, and intentions (Legris, 2003).

The conceptual model of the theory is presented in Figure 3.

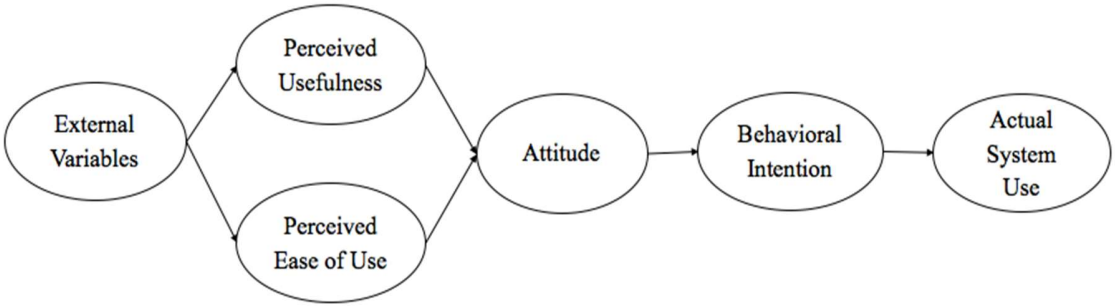

Figure 2.3: Technology Acceptance Model

2.1.4. Technology Acceptance Model 2

After it was developed in 1989, the Technology Acceptance Model (TAM) has become a strong model to predict user acceptance. In light of many empirical tests, perceived usefulness has been a strong determinant of usage intentions. A better and more extensive understanding of perceived usefulness would enable the researchers to increase user acceptance and use of new technologies. That led Venkatesh and Davis to extent

TAM to add key determinants of perceived usefulness and usage intention constructs and create TAM2. TAM is the starting point of TAM2 and the aforementioned additional theoretical constructs are social influence processes and cognitive instrumental processes (Venkatesh and Davis, 2000).

The conceptual model of the theory can be seen in Figure 4.

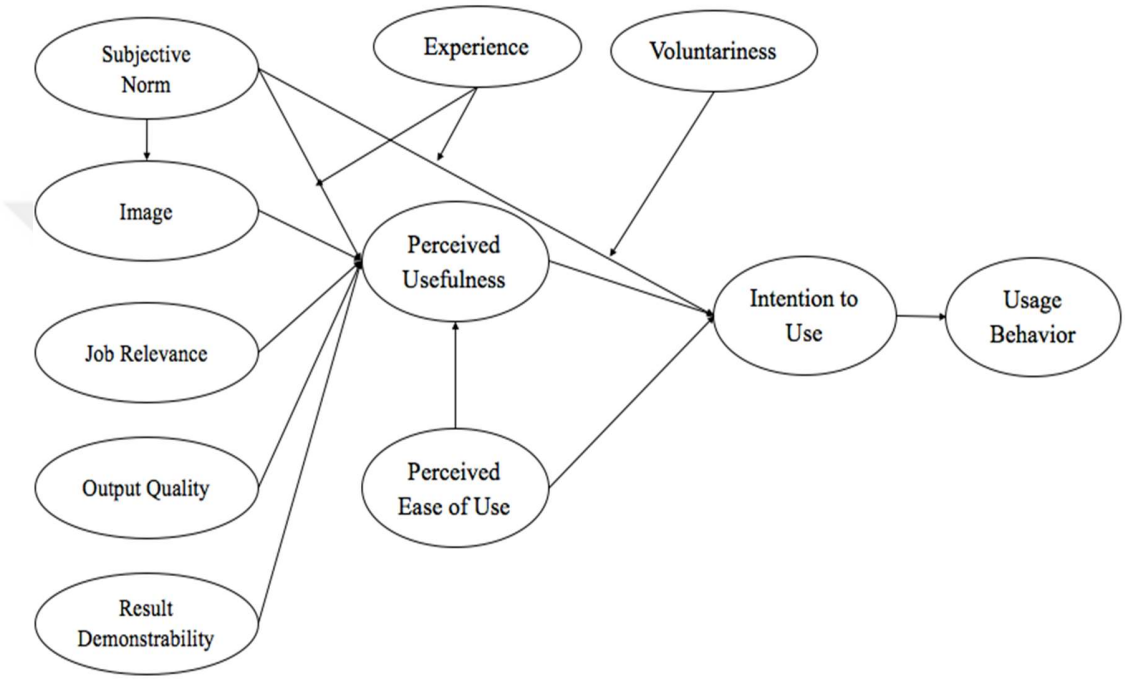

Figure 2.4: Technology Acceptance Model 2

2.1.5. The Unified Theory of Acceptance and Use of Technology

As stated before, user acceptance of new technologies is considered to be a mature research area in the information systems literature (Hu et al., 1999). As a result of research in this area, many theoretical models in relation to information systems, psychology, and sociology were developed. Researchers face with a necessity to choose a construct among several options. Sometimes they choose a favorite model and ignore the rest. This situation established a need for a review and synthesis to go through a unified view of user acceptance. Venkatesh et al. validated and compared eight models and formulated the Unified Theory of Acceptance and Use of Technology (UTAUT). These eight well-known

theories are Diffusion Theory (Rogers, 1962), the Theory of Reasoned Action (Fishbein and Ajzen, 1975), the Social Cognitive Theory (Bandura, 1986), the Technology Acceptance Model (Davis, 1989), the Model of PC Utilization (Thompson et al., 1991), the Theory of Planned Behavior (Ajzen, 1991), the Motivational Model (Davis et al., 1992), and the Combined TAM and TPB (Taylor and Todd, 1995; Venkatesh et al., 2003). An empirical comparison of these eight models was made through longitudinal field studies which were conducted among individuals being introduced to a new technology in the workplace at four organizations. Seven constructs were found to be significant direct determinants of intention or usage. It was theorized that four of these seven constructs will play an important role as direct determinants of user acceptance and usage behavior, which are performance expectancy, effort expectancy, social influence and facilitating conditions. Besides, it was argued that behavioral intention has a strong influence on technology usage (Venkatesh et al., 2003)

Performance expectancy is defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003). Performance expectancy is the strongest predictor of intention in each model. Perceived usefulness from TAM and TAM2 is related to performance expectancy. Moreover, it is expected that gender and age will moderate the relationship between performance expectancy and intention. In light of research on gender differences, men are more likely to be task-oriented, and performance expectancy will be more important because task accomplishment is its focus.

Effort expectancy is defined as "the degree of ease associated with the use of the system" (Venkatesh et al., 2003). Perceived ease of use from TAM/TAM2 captures effort expectancy. It was theorized that gender, age, and experience will moderate the relationship between effort expectancy and intention. According to prior research, effort expectancy will be a stronger determinant for women and older people. As the age increases, processing complex stimuli gets more difficult.

Social influence is defined as "the degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh et al., 2003). Social influence was expressed as subjective norm in TAM and TAM2. In spite of different names, both constructs contain the idea that the individuals' behavior will be

influenced by how others will think of them as a result of using technology. According to the theory, women care more about others' opinions and therefore social influence is more effective on the intention to use technology. This effect decreases with experience. On the other hand, affiliation needs are higher for older people and they are likely to give more importance to social influence. Therefore, it is suggested that gender, age, experience, and voluntariness will moderate the relationship between social influence and behavioral intention.

Facilitating conditions are defined as the degree of belief that an individual will get help or support from an organizational and technical infrastructure when using the system. (Venkatesh et al., 2003). Venkatesh et al. argued that facilitating conditions will not have a significant influence on behavioral intention. According to empirical results, facilitating conditions have a direct influence on usage.

The model has a global and integrative approach and involves a wide range of variables from the main theoretical models which were developed with the aim of explaining technology acceptance and use (Martin and Herrero, 2012). With such characteristics, it is highly important for the field of consumer behavior. Furthermore, it has been efficient in various technology-adoption environments (Martin and Herrero, 2012).

The conceptual model of the theory is as in Figure 5.

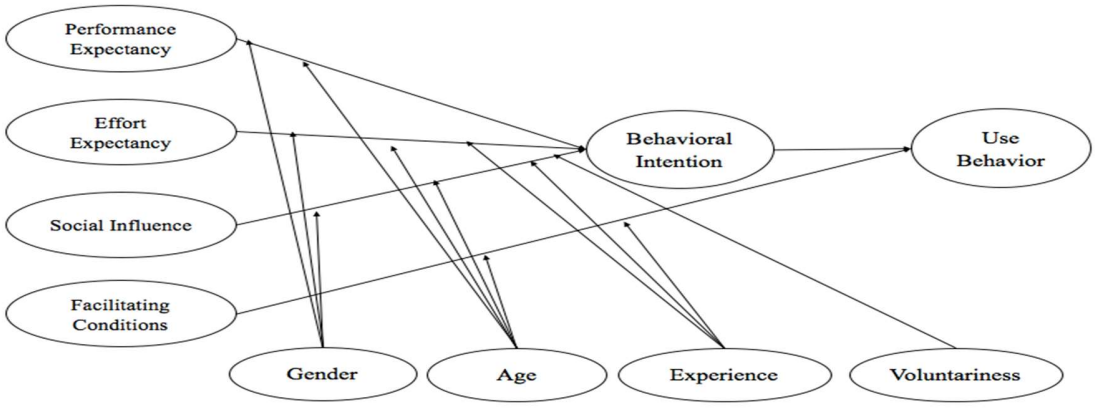

Figure 2.5: Unified Theory of Acceptance and Use of Technology

2.1.6. The Unified Theory of Acceptance and Use of Technology 2

After UTAUT was published, it has been a baseline model and applied to many studies in both organizational and non-organizational settings. While doing so, there has been some extensions and integrations of the theory, such as examination of the theory in new contexts (new technologies, new populations, new cultural settings), adding new constructs to expand the scope of the theory, and including exogenous predictors of the UTAUT variables. However, most studies using UTAUT dropped moderators. In light of these, a need for a theory that could apply to consumer technology use has been obvious. Thus, UTAUT2 was developed by adding additional key constructs and relationships to UTAUT, tailoring it to a consumer use context. Four key constructs in UTAUT, performance expectancy, effort expectancy, social influence, and facilitating conditions were adapted to the context of consumer technology acceptance and use. Performance expectancy is the degree to which use of a technology will bring benefits to consumers in certain activities. Effort expectancy is the degree of ease related to technology use. Social influence is how consumers perceive that important others believe that they should use a specific technology. Facilitating conditions are the expectancy of available resources and support to perform a behavior. Age, gender, and experience are moderators on various relationships. Voluntariness of use, which was also a moderator in the original UTAUT, was dropped here. In UTAUT2 three more key constructs were added, namely hedonic motivation, price value, and habit (Venkatesh et al., 2012). Hedonic motivation has been handled as a key predictor in much consumer behavior research (Holbrook and Hirschman, 1982). A cost-related factor, such as price is also important here because consumers have to pay for the technology to use, unlike employees (Venkateshet al., 2012). The last construct added to the theory, habit, is defined as the extent to which people tend to perform behaviors automatically as a result of learning. Habit has both a direct effect on technology use and an indirect effect through behavioral intention (Venkatesh et al., 2012).

The conceptual model of the theory is illustrated in Figure 1.

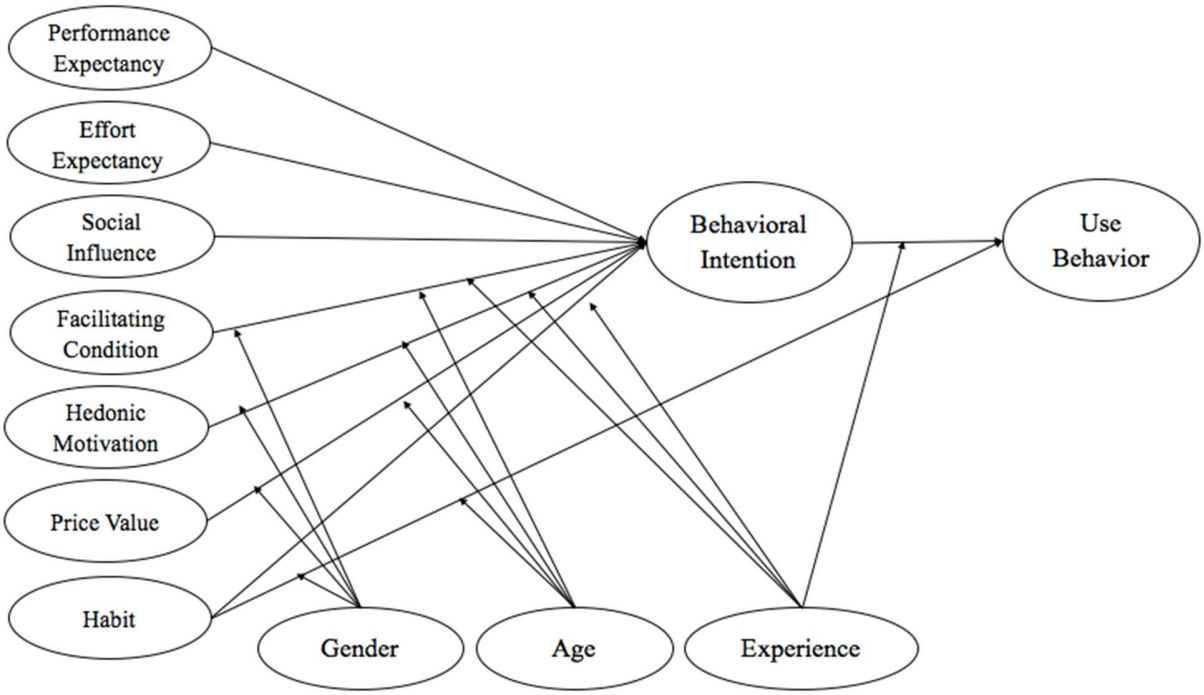

Figure 2.6: Unified Theory of Acceptance and Use of Technology 2

2.2. Internet of Things

In this section, the concept of the Internet of things, the main focus of this study as the context, will be investigated. First, the concept will be explained. Then, detailed information will be given about benefits, and challenges. After that, the application areas and IoT devices will be examined. Thus, sports wearables representing the application area of this study will be emphasized with a holistic approach.

Until the recent past, a big majority of Internet connections were between devices used directly by humans, such as computers, mobile handsets, etc. The main form of communication was human to human. Today, devices, in other words, “things” can exchange information themselves on behalf of people. The number of “things” connected to the Internet will be larger than people in the future (Tan and Wang, 2010). In this new era, a new paradigm called “Internet of Things” (IoT) was born. The term was first used by Kevin Ashton in 1998. This paradigm is a continuum of things communicating with each other, forming a worldwide dynamic network (Borgia, 2014). The subject has

received much attention from both academia and industry. It is considered to be one of the most important fields of future technology (Lee and Lee, 2015). IoT has a high impact in daily life, with application fields like smart homes, assisted living, e-health, or enhanced learning (Bandyopadhyay and Sen, 2011).

It is common for such technologies to be studied by IT-based disciplines. However, Work System Theory (Alter, 2013) offers theoretical support that research in the social sciences can also work on such concepts. The reason for this is that each product or service should reach a buyer, a customer at the end of the production process, even if it consists mostly of IT-based technologies. Therefore, the aim is to deliver the product or service to the buyer ultimately. Figure 2.2 presents schematized version of the process Alter (2013) highlight.

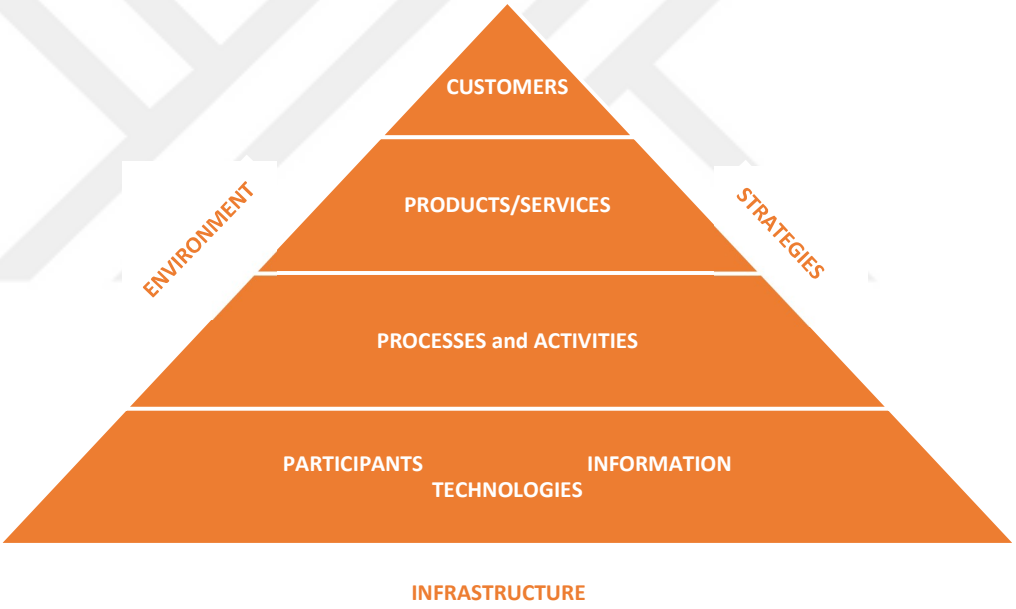

Figure 2.7: The Framework of Work System Theory (Alter, 2013)

The number of connected devices is increasing, such as computers, smartphones, tablets etc. A network of such devices can lead to magnificent applications which can bring personal, professional and economic benefits (Khan et al., 2012). On the other hand, this relatively new technology comes with challenges also. Nonetheless, the importance of IoT lies here: more devices will be connected to the internet and this will change how we live, play, and work. (Chen,2012).

2.2.1. Benefits

Internet of Things is such a technology that offers solutions and provide benefits to many parties like manufacturers, service providers, organizations, societies, cities, governments (Alan et al., 2018). There are application areas for IoT technologies in a wide range of sectors, such as environmental monitoring, health-care, inventory and product management, workplace and home support, security and surveillance (Miorandi et al., 2012).

IoT technologies makes it possible for services to answer users' needs support them in daily activities (Miorandi et al., 2012). It brings monitoring and control opportunities. Smart home technology is one of them. Benefits of this technology are family and property protection and energy saving. Another monitoring opportunity is about cars. Drivers can get personalized experience and satisfaction. Owing to IoT, life quality of people who suffer from variety of diseases can be increased. Another benefit for consumers is that their habits and tendencies can be tracked through IoT and a control mechanism in accordance with individuals' daily lives can be developed (Ju et al., 2016).

When the subject is approached from industry perspective, it is seen that the most important benefit of IoT is obtaining data (Alan et al., 2018). Devices and machines equipped with IoT technologies gather huge number of data with embedded sensors and transfer it to business intelligence and analytics tools. Humans make decisions based on these data by using it to discover and resolve business issues (Lee and Lee, 2015). As a result of this, processes which used to be impossible to conduct, can now be conducted, thus new business models are born (Ju et al., 2016).

2.2.2. Challenges

IoT brings many benefits and improvement areas in many fields. But at the same time, there are some challenges to face with (Khan et al., 2012). Security and privacy are two of the most important challenges. Devices will have control over personal information and physical location. IoT systems are connected automatically and connected devices share information at the maximum level (Alan et al., 2018). These information must be

safe and secure (Bandyopadhyay and Sen, 2011). In order to make use of this technology, consumers use various applications of IoT. The process of gathering information begins while the consumer is not even aware of it and it is argued that this spread of information is uncontrollable (Atzori and Morabito, 2010). Security and privacy lie at the heart of consumers' feelings of trust. Therefore, these issues can be a threat (Weinberg et al., 2015). Another challenge is identity. Billions of devices will connect with each other through IoT technologies. Each of them should have a unique identity over the Internet. This large number of objects should be managed well (Khan et al., 2012).

As mentioned before, huge amounts of data will be generated through IoT technologies. This brings issues about processing and storage of the data. New technologies will be needed in order to process and store data. On the other hand, who will own this data? This is another issue, because there will be lots of data created together by various parties. Social media has been experiencing this issue, where data is generated or shared via third-party agents (Weinberg et al., 2015).

2.2.3. Internet of Things Applications

IoT offers many potential development areas, like smarter homes and offices, smarter transportation systems, smarter hospitals, smarter factories etc. Important developments can take place in industries such as aerospace and aviation, automotive, telecommunication, medical and healthcare, pharmaceutical, retail, logistics and supply chain management, manufacturing, environment monitoring, transportation, agriculture, media and entertainment, insurance, and recycling. A lot of security problems can be solved through verification processes. By collecting data and through the exchange of that information between smart devices, people's lives can be assisted and their health can be monitored. Environment-friendly programs can be developed by monitoring environment (Bandyopadhyay and Sen, 2011). Even natural disasters can be predicted and precautions can be taken in advance (Khan et al., 2012). Regardless of the application area, the purpose of all applications is to increase the quality of daily life and economy and society will be effected (Borgia, 2014).

By means of IoT technologies, physical objects can hear, see, think and perform jobs. IoT makes these objects smart. For example, smart-homes can prepare your coffee before you come home, can control climate and TV or other appliances (Al-Fuqaha et al., 2015).

An important example to application fields of IoT can be logistics and supply chain management. Materials and goods can be identified and this can simplify warehouse and inventory management. In the field of agriculture and breeding, it is possible to monitor animals and their movements, making it easier to detect infected animals and isolate them from others. Health certification processes can be enhanced with such control (Borgia, 2014).

Through IoT technologies, cities can turn into "smart cities" through a network of sensors, cameras, screens, speakers. These technologies can be used to enhance mobility and tourism in a city (Borgia, 2014).

The number of devices with Internet connection is increasing high. The ability to connect and communicate over the Internet offers a wide range of opportunities (Khan et al., 2012). Devices become smart as they are added to the internet and they gain game-changing abilities. They can do things that humans cannot do, like detecting and collecting information beyond humans' capabilities (Chen, 2012). Some applications of IoT are already being used by people, some others are in experimental stages and some more futuristic ones are at very early stages (Borgia, 2014).

2.2.4. Wearable Devices

Through wireless sensor networks (WSNs), IoT technologies can be used to collect and manage data. When a WSN (smartphones, watches, tablets, etc.) is connected to other smart elements, it can also improve the user experience in IoT. At this point, if the smart devices are wearable, the users need to wear the technology (Castillejo et al., 2013). The term "wearable technology" refers to a garment or accessory that is worn on the body and created or enhanced using technology (King, 2011). They provide information or entertainment to the user as a service. What distinguishes them from other portable devices, like smartphone, is that it is designed to be indistinguishable from everyday life

so that it can go on unnoticed (Page, 2015). While a watch-type wearable devices are able to receive phone notifications, emails, text messages, wristband-type devices are usually used to track health and fitness activities (Yang et al., 2016).

The first wearable computer was developed in 1966 by Thrope and Shannon. It was a small, analogue computer with four buttons, measuring the speed of a roulette wheel. The concept has a long history, but the market was dominated by smartphones over the last decade. Smartphones are capable of many things, which makes them more preferable. However, wearable technology is different from other portable devices like mobile phones in the way that wearable devices are meant to be indistinguishable from everyday life. Generally, there are two categories of wearable technology, wearable computers and smart textiles. Wearable computers refer to fashion accessories, such as watch or bracelet, equipped with electronics. Such devices can increase productivity and enjoyment in a socially acceptable way. In smart textiles, on the other hand, electronics are woven in fabric. User interaction is usually limited in these products. In wearable computers, the focus has become "activity recognition systems" using sensors to determine users' activities. The sports industry can make benefit of this technology. With activity tracking systems, athletes have the chance to keep the record of their performances and review their technique (Page, 2015).

2.2.5. Sports Wearables

In modern society, aiding systems are needed not only to monitor people's health, but also to generate efficient ways to perform sports or single exercises for the purpose of improving the level of fitness and health (Castillejo et al., 2013). Performing sports activities and exercising regularly is essential for a healthy lifestyle (Tholander and Nylander, 2015) and measuring these activities and results is the best way to assess performance (Anzaldo, 2015). Wearable devices can be very beneficial for professional athletes, amateur athletes, fitness consumers, and wellness programs. Some examples of these benefits are player safety assessment, workout injury prevention, and metrics of physical conditioning and performance.

Sports technologies include sports watches, wristbands, heart rate monitors, which are designed to collect and present data in order to generate a log of performed activities. Improved practice is the focus of these logs (Tholander and Nylander, 2015). As an example to these devices, a wristband activity tracker can monitor and keep track of fitness-related metrics, like distance walked or run, calorie consumption, heartbeat, and quality of sleep. Owners of sports wearables are prompted by these devices to perform fitness activities (Anzaldo, 2015). Such devices have a hybrid characteristic, embedding electronic technologies in clothing and at the same time, being such accessories which can be worn comfortably (Song et al, 2018). Wearable devices such as activity trackers are developed to collect personal or environmental data for the user and improve daily life experience, health, and performance with feedback (Havlucu, 2017). Sports wearables not only assist with tracking fitness activities, collect and process data, they also offer training plans. Fitbit can be given as an example to sports wearable brands, which have released fitness bands with mobile applications to track and monitor metrics related to fitness activities like steps made, running distance, calories burned, heartbeat and even sleeping quality (Kim et al., 2018). A linear relationship was found between usage of sports wearables and the frequency of training. As training frequency increases, usage increases too (Havlucu, 2017).

Sports wearables, which is in the center of the present study, is being used by all sectors of the sports industry, like athletes, coaches, organizations. In this respect, these devices have gained a critical importance for the sport industry (Song et al., 2017).

2.3. Technology and Psychology

As the study also focuses on the socio-psychological evaluation of the technology, the relationship between technology and psychology will be examined in this section. In this regard, two important constructs, one of which represents a critical dimension of this study, will be discussed, technophilia and technophobia.

Technological developments in various fields in the twentieth century led to psychological ambivalence, because modern technologies cause both comfort and

disasters. According to Clegg (1994), when a new technology is introduced and applied in a workplace, it will have high potential impacts. Beside economic, social and organizational issues, there will be also psychological issues and ignoring them can result in failure in implementing new technologies. Some psychologists argue that new technologies shouldn't be handled only by engineers and marketers, they are much more important than that (Clegg, 1994).

Two extreme forms of the relationship between technology and humankind, and society also, were born, namely technophilia and technophobia. Technophilia refers to attraction to technology, while technophobia stands for rejection of technology. Between these two extreme positions, various issues emerged about the psychological and social impact of modern technology (Osiceanu, 2015).

Technology is at work, at home, and in leisure time, it is everywhere (Osiceanu, 2015). Many people are overwhelmed by the complexity of technology (Sinkovics et al., 2012). In the literature, technophobia was associated with computer phobia mostly, computer was considered an anchoring product. Sinkovics et al. (2012) thought it had a limited extent, because in many countries computer was used for mostly business purposes and people might have too little experience. That's why they used ATM machines when developing their scale, which was used as base in this study.

2.3.1. Technophilia

Technophilia describes the enthusiasm that occurred because of the use of technology, especially new technologies like computers, Internet, mobile phones. Easy adaptation to social changes which technological innovations brought, is an expression of technophilia. Technophiles are not afraid of technological developments on society. They enjoy technology and focus on its benefits (Osiceanu, 2015). Technophilia leads to usage of technology (Ronit, 2011). It is the expression of how technology arouses strong positive futuristic feelings. Technophilia helps to adapt easily to changes caused by technological innovations (Osiceanu, 2015).

2.3.2. Technophobia

Technophobia refers to fear or discomfort when using new technologies and complex devices (Osiceanu, 2015). Having trouble with new technologies is not something seen only in organizations, some consumers are less open to innovative, new technology-related products. For some, resistance is much higher, enough to develop anxiety toward new technologies and technology-related products. This behavior can be called “technophobia”.

Resistance and anxiety toward technology were first described with computer phobia, “the resistance to talking about computers or even thinking about computers, the fear or anxiety toward computer and hostile or aggressive thoughts about computers” (Jay, 1941). Later, computer phobia was defined as a three dimensional construct by Rosen, Sears, and Weil (1993), anxiety about present or future interactions with computers, negative attitudes toward computers, and specific negative sentiments during interactions with computer. Technophobia refers to a negative psychological reaction toward technology. When people feel nervous because of a lack of information or experience, technophobia doesn’t apply to them. Because those issues can be overcome with training. Rosen, Sears, and Weil (1987) contributed to the field with The Attitudes Toward Computers Scale (ATCS), The Computer Anxiety Rating Scale (CARS), and CTS scales. ATCS measures negative attitudes toward computers, CARS deals with present or future interactions with computers, and CTS is focused on negative cognitions during interaction with computers. These scales yield a proper base for developing a broader technophobia scale. In light of these, a technophobia scale was developed by Sinkovics et al. (2002). According to them, the success of technology-related products is highly influenced by the degree of consumers’ technophobia. It can be an indicator that how likely it is for consumers to purchase such products (Sinkovics et al., 2002).

3. HYPOTHESIS DEVELOPMENT

The research model of the present study was developed based on UTAUT. The reason behind this choice is its capability of explaining what is needed to be explained in this study. One of the best models that can explain acceptance and use of technology is UTAUT. The nature of this model provides a strong base that enables researchers to understand and explain the effects of external variables on behavioral intention and actual usage. UTAUT is more effective than previous models (Gu et al., 2016). Besides, it is a model that was used widely in order to understand organizational and individual adoption behaviors (Li et al., 2019). Moreover, it is a recent approach in the field of technology acceptance (Venkatesh, 2003). The model is still valid and in use today (Gan et al., 2019; Khechine and Augier, 2019; Yang et al., 2019;).

The model is suitable for adapting to different disciplines, which is another reason of its usage in the study. Many researchers used UTAUT as the base model in their studies (Zhou et al., 2010; Van Heek et al., 2014; Wu et al., 2016; Adapa et al., 2018). It was first developed for workplace context, but it has been applied regarding consumers either (Goulao, 2014; Gao et al., 2015; Yuan et al., 2015; Cimperman et al., 2016,). It was first applied to employees, to understand their adaption to new systems to be used in workplace (Venkatesh et al., 2003). Then it was used in a user context, to examine adaption of mobile devices and services (Carlsson et al., 2006). Later in another study, it was used to explain mobile banking adaption (Zhou et al., 2010). It was also used to explain consumers' acceptance intentions towards smartwatches (Wu et al., 2016). These studies using UTAUT in different contexts and disciplines indicate that it is a model which can fit in many various areas and can be the right base model for this study.

According to UTAUT, four constructs play significant role as direct determinants of technology acceptance and usage behavior, namely performance expectancy, effort expectancy, social influence and facilitating conditions. Performance expectancy is defined as the degree to which an individual believes that use of a system will be helpful for a better job performance. Effort expectancy is defined as the degree of ease regarding usage of a system. Social influence is defined as the degree of perception that important others think he or she should use the system. Lastly, facilitating conditions are defined as

the degree of belief that an individual will get help or support from an organizational and technical infrastructure when using the system (Venkatesh et al., 2003).

The present study aims to investigate individuals' usage intention of wearable devices which are being used for sports tracking purposes. Usage intention was examined through attitude. Previous research show that attitude has a significant effect on intention to use. Four constructs were determined which were believed to have influence on attitude. These four constructs are performance expectancy, effort expectancy, facilitating conditions, and social influence. These constructs were adapted from UTAUT model. Attitude was included because sports wearable devices, which are the focus of the study, are not widely studied by researchers and represents a growing industry. In such a growing sector, attitudes of people towards the product representing an underdeveloped contract with a holistic approach is particularly important. In addition, the impact of a psychological concept, technophobia, was also included in this study in order to explain the behaviors of the individuals better by considering the effect of human psychology on the consumption behavior.

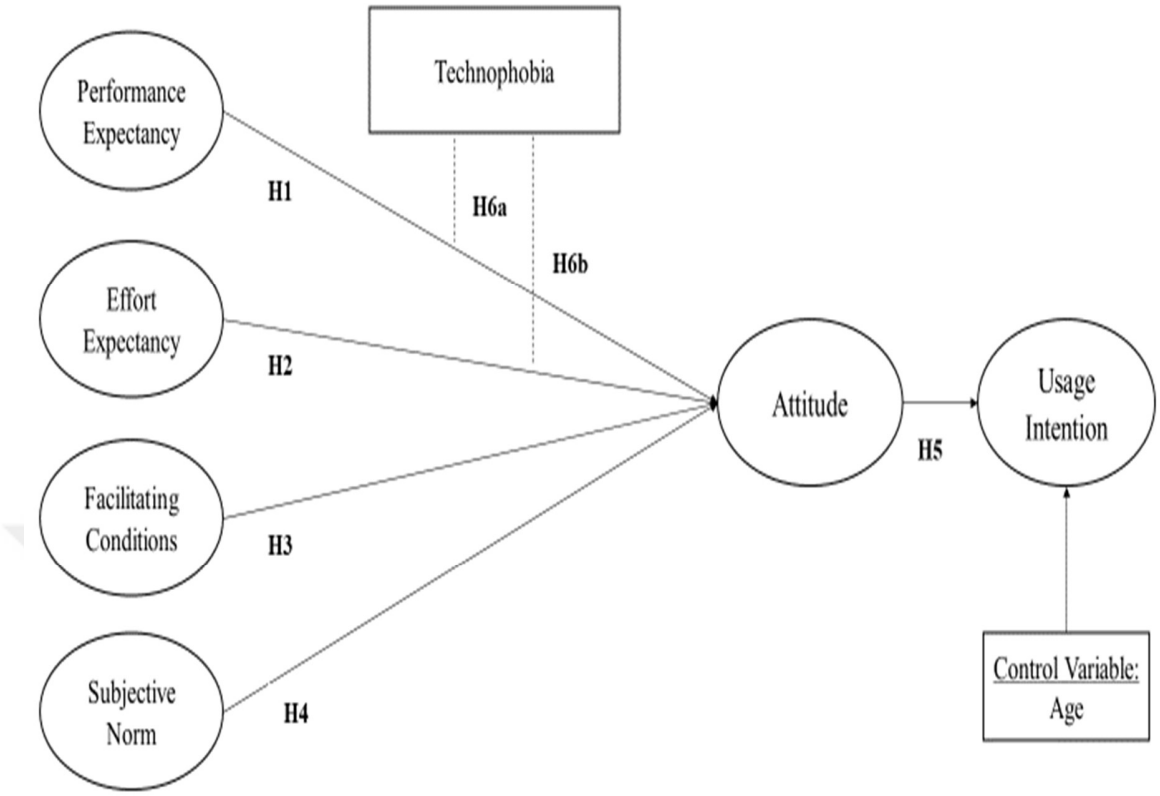

Figure 3.1: The Research Model

Intensions are the indication of people's will to try, they indicate how hard people want to try, how much effort they are willing to put to perform a behavior. Normally, as the strength of the intention increases, the likelihood of performing the behavior increases too. But a behavior intention can result in behavior only if the behavior is under volitional control. That means, the individual can decide with his/her will to perform the behavior or not. Some behaviors may depend on non-motivational factors such as availability of requisite opportunities and resources (Ajzen, 1991). In this regard, this construct has a critical importance for the literature of consumer behavior.

The importance of behavioral intention comes from the fact that intentions will shape technology usage. Behavioral intention is the indicator of actual usage. The literature shows that intention is the most powerful predictor showing that intention will turn to action. Therefore, intention is a widely studied concept (Smith et al., 1996; McKnight et al., 2002; Malhotra et al., 2004). It is very important to examine intention

because it leads to usage (Venkatesh et al., 2003). Thus, exploring behavioral intention for a growing industry such as sports wearables is particularly important. The sports wearable products may not be used as widely as a fast-moving consumer good, but the market is growing (Reyes-Mercado, 2018). In a growing sector which consists of products with innovative technologies, acceptance and use of technology is a critical issue. Since usage derives from behavioral intention, behavioral intention gains much importance and since it is influenced by attitude, it is very important to examine all these constructs. Attitude towards a behavior is substantially defined as the degree of an individuals favorable or unfavorable evaluation of a behavior. Attitude is assumed to be a determinant of behavioral intention and are influenced by individuals' beliefs (Davis, 1989; Venkatesh et al., 2003). For this reason, analyzing the attitudes of individuals towards products and services is important. This can be even more important if a relatively new product group, such as wearable devices, is mentioned, because one way of observing individuals' behavior that is not yet transformed into action is through investigating their attitudes (Holbrook et al., 2005).

There's been many studies examining effects of performance expectancy, effort expectancy, social influence and facilitating conditions on attitude, behavioral intention and use of technology. Performance expectancy effects attitude and behavioral intention (Davis, 1989; Venkatesh et al., 2003). It has been studied widely and it was verified that it has a significant effect on attitude toward wearable technologies and behavioral intention to use them. It's been studied in different contexts such as smartwatches (Kim andcShin, 2015; Choi and Kim, 2016; Wu et al., 2016), augmented reality smart glasses (Rauschnabel et al., 2016; Kalantari and Rauschnabel, 2017), smart clothing (Chae, 2009; Spagnolli et al., 2014; Hwang et al., 2016), mobile fitness devices (Wu et al., 2011; Jang Yul, 2014), and wearable commerce (Gu et al., 2016).

Gu et al. (2016) handled performance expectancy in the context of wearable commerce. They focused on initial trust in wearable commerce and their basis was UTAUT2. The research model had five external variables, one of them was performance expectancy. The others are facilitating conditions, privacy concern, trust propensity, and hedonic motivation. In UTAUT, it is considered that performance expectancy is the strongest predictor of usage intention (Gu et al., 2016). In wearable devices, it is expected

to influence users' initial trust and intention to use. Therefore, it was predicted that performance expectancy would have a positive influence on intention to use wearable commerce. A questionnaire was used in their study. Items were adapted from existing literature. The survey was conducted online and offline and undergraduate, graduate students, and some of the young IT workers in China were surveyed. They used convenience sampling method to collect data. Young university students were surveyed because they represented majority of Chinese internet users. In China, the largest group of internet users is student group. After removing invalid or incomplete answers, a total of 266 valid questionnaires remained. It was more than required according to statistic standards. The empirical results have indicated that performance expectancy has a significant effect on initial trust in wearable commerce and behavioral intention to use them. A limitation of the research was given as the lack of objective data.

Wu et al. (2016) have examined intention to use a smartwatch from consumer perspective. They combined UTAUT with TAM and the innovation diffusion theory (IDT) to understand the factors influencing people to accept a smartwatch. IDT offers an extensive and effective examination of the factors influencing the spreading of a technology in an organization. But the theory was criticized because of its limited consistency across different disciplines (Wu et al., 2016). TAM provides a strong structure to explain considerations of information system acceptance (Davis, 1993). However, the ability of the model is limited in explaining electronic system usage and important variables such as social influence was excluded (Wu et al. 2016). Wu et al. (2016) included six constructs in their research model. These are relative advantage, ease of use, compatibility, result demonstrability, enjoyment, and social influence. Definitions of relative advantage and perceived usefulness are very much alike, thus they are interchangeable. On the other hand, perceived usefulness of TAM was expressed as performance expectancy in UTAUT (Venkatesh et al., 2003) They hypothesized that perceived relative advantage has a significant effect on attitude toward using smartwatch. They adapted a questionnaire survey with 40 items from the literature. A total of 245 respondents were surveyed, 200 of them were online and the rest paper-based. 33 invalid responses were removed. In light of the results, it was confirmed that perceived relative advantage has a significant influence on attitude towards smartwatches. It was discussed

that producers should improve functionalities of smartwatches and develop various applications in order to attain popularity, because attitude has a significant improvement on intention (Wu et al., 2016).

Gao et al. (2015) handled performance expectancy in health information technology context, with the purpose of exploring factors related to consumers' intention to adopt wearable technology in healthcare. In order to understand consumers' adoption of healthcare wearable devices broadly, an integrated framework was developed, which combines technology acceptance, health behavior, and privacy calculus theories. UTAUT2, protection motivation theory (PMT), and privacy calculus theory were chosen as the theoretical foundations of proposed model. PMT was chosen among all theories explaining health behavior because it's the best at examining individuals' behaviors toward health information technology. In the context of healthcare, reflection of performance expectancy can be monitoring daily physical conditions, making health-related plans, reducing threats etc. A survey was conducted in three large social network groups related to healthcare wearable devices. All items in the survey were adapted from previously published studies. In order to make sure that respondents are actual users of healthcare wearable devices, they were asked whether they've used wearable devices related to healthcare and the product type they have used. 483 participants were qualified to take the survey and 462 responses were used. Search results supported that there is a positive association between performance expectancy and behavioral intention.

In sports wearables context, Lunney et al. (2016) used TAM as the base model in their study to explore wearable fitness technology use. Three constructs included in the study are perceived ease of use, subjective norm, and performance expectancy. Performance expectancy was expressed as perceived usefulness in TAM (Davis, 1989). A survey was conducted to U.S. participants. A total of 230 respondents received survey, 206 completed it. The research found that perceived usefulness of wearable fitness technology is positively related to wearable fitness technology use.

Kim and Shin (2015) handled perceived usefulness through TAM framework, in order to recognize psychological determinants of smartwatch adoption. They conducted an online survey, of which items were adopted from validated TAM studies. The survey was administered by a professional consulting agency in South Korea. Participants

consisted of 363 smartwatch users. Empirical results supported the positive effects of perceived usefulness on attitudes toward smartwatches.

From this point of view, it is predicted that the performance expectations of individuals have an effect on their attitudes towards sports wearables used to track the sports activities:

H1. *Performance expectancy is positively related to attitude toward sports wearables.*

Effort expectancy, another influential construct, has been studied often in the wearable technology literature (Gao et al., 2015; Kim and Shin, 2015; Lunney et al., 2016). Gao et al. (2015) dealt with effort expectancy too in their study. In the context of healthcare wearables, effort expectancy represents perceived ease of using healthcare wearable devices. According to some recent studies, ease of use is not a barrier in front of technology acceptance of today's users because they have adequate experience with technology (Wang et al., 2014). However, using healthcare wearable devices are more complex. They need to be worn all the time and users need to use another device like a cell phone simultaneously. In this sense, effort expectancy was found to be positively related to intention to adopt healthcare wearable devices.

In the study of Lunney et al. (2016), perceived ease of use from TAM was examined, which equals to effort expectancy. The study was conducted wearable fitness technology usage context. It was supported that perceived ease of use has a significant influence on wearable fitness technology usage.

Kim and Shin (2015) also dealt with perceived ease of use in their aforementioned study. It was confirmed that perceived ease of use has positive effects on attitude.

For these reasons, it is believed that individuals' effort expectations have an effect on their attitudes towards sports wearables used to track the sports activities:

H2. *Effort expectancy is positively related to attitude toward sports wearables.*

Another factor, which was found to have effect on behavioral outcomes in previous research is facilitating conditions (Venkatesh et al., 2003; Zhou et al., 2010; Gu et al.,

2015;). Gu et al. (2015) examined effects of facilitating conditions on intention to use wearable commerce. They have found that it influences behavioral intention.

Gao et al. (2015) approached the subject differently regarding healthcare wearable devices. They examined the factor of self-efficacy to measure the effects of consumers' abilities on effective usage of the device for self-monitoring and self-managing physical conditions from facilitating conditions perspective. They argued that it is more likely for individuals with higher level of self-efficacy to adopt wearable devices in healthcare. It was supported in the study that self-efficacy has positive influence on intention to adopt wearable devices in healthcare.

Facilitating conditions is similar to perceived behavioral control under TPB. It influences both intentions and behaviors of individuals. In the sports wearables context, Song et al. (2017) handled facilitating conditions in their study, which was based on TPB. In TPB models, facilitating conditions serve as a proxy of actual behavioral control (Ajzen, 1991). It was found in the study that facilitating conditions have a positive influence on behavioral control. Behavioral control is defined as individual's perception of how easy or difficult it is to perform a behavior (Ajzen, 1991). In the study it was also found that behavioral control has a positive influence on users' attitudes toward sports wearables.

Therefore, the facilitating conditions offered to individuals are expected to have an impact on their attitudes towards sports wearables used to track the sports activities:

H3. *Facilitating conditions is positively related to attitude toward sports wearables.*

All the technology acceptance models that came after TAM, such as TAM2, TAM3, the UTAUT model, have included social aspect of adopting new technologies (Kalantari, 2017). Many researchers have also incorporated social factors in their studies in the field of technology adoption (Buenaflor and Kim, 2013; Yang et al., 2016; Wu et al., 2016). Wu et al. (2016), have involved social factors, especially those that are relevant to individuals' peers and close family members in their study examining intention to use a smartwatch. Empirical results supported the impact of social influence on behavioral intention to use smartwatch.

Weng (2016) studied acceptance of wearable devices in the healthcare context in China. Smart bands was in the focus of the study. Smart band is a wearable device which collects data in order to monitor physical activity and sleeping patterns. Weng (2016) incorporated social influence in the research model. In UTAUT, social influence effects behavioral intention through internalization, and identification, which refer to voluntary use of technology prompted by recommendation of others, product reviews, reputation etc. (Venkatesh et al., 2003, Weng, 2016). In the healthcare context, it could be a doctor's recommendation. In the research model of Weng (2016), social influence stands for internalization and identification. A questionnaire was developed and survey was conducted online. In light of the research results, it was confirmed that social influence has a significant impact on behavioral intention to use wearable devices.

Taking TAM as the base point, TAM2 included social influence processes, one of them being subjective norm. Subjective norm is defined as an individual's perception that people important to him/her think that he/she should or shouldn't perform a specific behavior (Fishbein and Ajzen, 1975). It takes place in TRA and TPB as a direct determinant of behavioral intention. Lunney et al. (2016) also handled subjective norm in the wearable fitness technology context. It was found that subjective norm is influential on wearable fitness technology usage.

From this perspective, it is expected that the social environment of individuals has an impact on their attitudes towards sports wearables used to track the sports activities:

H4. *Social Influence is positively related to attitude toward sports wearables.*

According to the literature, attitude has a significant influence in behavioral intention. Attitudes towards a behavior can be strong predictors of that behavior (Ajzen, 1991), that's the reason why it was included in the study and why its presence in this study is very important. Attitude is the degree to which an individual has a positive or negative evaluation towards a behavior. A positive or negative attitude will influence behavioral intention in the same way (Ajzen, 1991). Lunney et al., (2016) found that if an individual has a positive attitude towards wearable fitness device, he or she will probably adopt the technology.

Thus, individuals' attitudes towards sports wearables used to track the sports activities will ultimately affect their intention to use these devices:

H5. *Attitude is positively related to usage intention.*

As mentioned before, in a growing sector such as wearable devices, it is critical to understand the factors which are effective on attitude and intention to use wearable technology. All mentioned constructs so far have positive effects on attitude, intention, and actual use. It is beneficial for the industry to understand and strengthen these effects. In order to increase usage rate of wearable technology, acceptance and intention can be improved. However, looking from another perspective, we believe it is also highly important to explore negative effects. Negative constructs which are effective on non-acceptance of technology should be explored and challenged. A significant progress can be made by overcoming those negative effects. Starting from this point of view, we included technophobia in the model and tried to explore its moderating effects on the relationships between performance expectancy and attitude, and effort expectancy and attitude.

Technophobia contains emotional, behavioral, and attitudinal components (Gilbert et al., 2003). It is described as anxiety towards computers, about current or future interactions with computers or computer-related technology (Jay, 1981; Rosen and Maguire, 1990). It is the fear or discomfort felt when using new technologies and complex devices (Osiceanu, 2015). Previous research proved the strong influence of psychological factors on high-tech purchase intentions (Davis, 1993; Viardot, 1998). In the context of wearable technology, a strong negative psychological reaction can be a barrier.

Agha and Saeed (2015) examined moderating effect of technophobia in online banking context in Pakistan. They have developed an extended version of TAM. The factors included were perceived credibility, perceived usefulness, and social risk. Moderating effect of technophobia was handled on relationships between all three variables and customer acceptance. As part of research, a total of 200 questionnaires were conducted, 188 of them were valid and usable. The respondents consist of students from different universities and also employees from different organizations. Non-probability convenience sampling method was used. The items in the questionnaire were adapted

from literature. The results indicated that technophobia moderates the relationship between perceived credibility and customer acceptance.

Another study in online banking context was conducted by Floh and Treiblmaier (2006). The aim of the study was investigating antecedents of online loyalty. Five moderator variables were included in the study, gender, age, involvement, variety seeking behavior and technophobia. Overwhelming complexity of computers leads to low level of self-efficacy and this makes users less open to innovative technology-related products. They hypothesized that technophobia has a negative moderating effect on loyalty in electronic banking. A survey was conducted in collaboration with Austria's largest online bank. The bank mailed it to 7,500 customers who were selected randomly. 2,253 of them replied and a total of 2,075 remained for use. Technophobia was found to have a negative moderator effect on the relationship between satisfaction and service quality. That means service quality means more for people with low technophobia.

Moderating effect of technophobia was validated in the literature. In the context of wearable technology, which is a both new and complex technology, it was believed that such an effect will be observed on the relationships between performance expectancy and attitude, and effort expectancy and attitude. Such a psychology-based construct may not be associated with the system's own conditions to provide the users or the social environmental impact. Therefore:

H6a. *Technophobia has a negative moderating effect on the relationship between performance expectancy and attitude*.

H6b. *Technophobia has a negative moderating effect on the relationship between effort expectancy and attitude*.

In addition to these predicted relationships, this study will also focus on the effect of age as a control variable. The main reason for this is the critical importance of "age" in extant literature regarding especially technological contexts (Morris and Venkatesh, 2000; Morris and Venkatesh, 2005; Chung et al., 2010). From this point of view, the effect of this critical variable in explaining the intention to use sportswear will be examined in this study.

4. RESEARCH METHODOLOGY

To test hypotheses, primary data was used by conducting descriptive research. In this part of the study, information about the processes including data collection, sampling and analysis will be given.

4.1. Data Collection Method

In this study, which is carried out on the intention of using sports wearables, data were collected through *survey method*. The reason for using the survey method as a research instrument is that it provides a rapid and low-cost process (Gegez, 2015).

The questionnaire was created through multi-item scales. The UTAUT scale of Venkatesh et al. (2003) was utilized to measure performance expectancy, effort expectancy, and facilitating conditions. Since social influence was mostly established for an organizational setting on this scale, subjective norm scale of Chang et al. (2014) was used to measure social influence. On the other hand, the scale of Kim and Shin (2015) for the dimension of attitude, and the scale of Malhotra and Galletta (1999) for behavioral intention was adapted in this study. In order to measure technophobia, which is one of the main focuses of the study, technophobia scale of Khasawneh (2018) was used. The statements, which are measured with 5-point Likert scale, are presented in Table 4.1. In addition to the measurements related to the dimensions of the study, the respondents were also asked about their demographic characteristics and usage of sports wearables. These questions include whether they used a wearable device while doing sports, how long they used this product, and their gender, age, and income.

Table 4.1: Survey scales and the items

Dimension	Item Coding	Item	Sources where items were adapted from
Performance Expectancy (PE)	PE1	I would find this sports wearable useful in my sports activities.	*Venkatesh et al., 2003*
	PE2	Using this sports wearable enables me to accomplish tasks more quickly.	
	PE3	Using this sports wearable increases my productivity.	
	PE4	If I use this sports wearable, I will increase my chances of getting a better sports life.	
Effort Expectancy (EE)	EE1	My interaction with this sports wearable would be clear and understandable.	
	EE2	It would be easy for me to become skillful at using this sports wearable.	
	EE3	I would find this sports wearable easy to use.	
	EE4	Learning to use this sports wearable is easy for me.	
Facilitating Conditions (FC)	FC1	I have the resources necessary to use this sports wearable.	
	FC2	I have the knowledge necessary to use this sports wearable.	
	FC3	This sports wearable is compatible with other systems I use.	
	FC4	A specific person (or group) is available for assistance with the difficulties.	

Subjective Norm (SN)	SN1	People (peers and experts) important to me supported my usage of this sports wearable.	*Chang et al., 2014*
	SN2	People who influenced my behavior wanted me to use this sports wearable instead of any alternative means.	
	SN3	People whose opinions I valued preferred that I use this sports wearable.	
Technophobia (TP)- Techno Paranoia (TTP)	TTP1	I am fearful that someone is using technology to watch and listen to everything that I do.	*Khasawneh, 2018*
	TTP2	I am terrified that technologies will change the way we live, communicate, love, and even judge others.	
	TTP3	I am afraid of new technologies because one day it will make us (humans) obsolete.	
	TTP4	I am fearful that new technologies will someday take over my job.	
Technophobia-Techno Fear (TTF)	TTF1	I am afraid of new technologies because if something goes wrong with it (if it stopped working for some reason) we will go back to the Stone Age.	
	TTF2	I am afraid of new technologies because they may interfere with my life emotionally, physically, and psychologically.	
	TTF3	I am afraid to use some features in my cell phone.	
	TTF4	I am afraid of using search engines such as Google.	
	TTF5	I am terrified of being connected to the Internet, someone might be tracking me.	

Technophobia-Techno Anxiety (TTA)	TTA1	I feel restless when I have to use a new communication device.	
	TTA2	I feel restless when I have to learn a new computer operating system (for example, changing from Windows 7 to Windows 8).	
Technophobia-Cybernetic Revolt (TCR)	TCR1	I am fearful that robots may take over the world.	
	TCR2	I am afraid of websites such as Google, Yahoo, and Bing because they make it very easy for people to stalk me.	
Technophobia-Cellphone Avoidance (TCA)	TCA1	I try to avoid using new technologies such as cell phones whenever possible.	
	TCA1	I try to avoid changing communication devices (such as your cell phone) because it makes me nervous.	
Attitude (ATT)	ATT1	Using this sports wearable is a good idea.	*Kim and Shin, 2015*
	ATT2	I have a generally favorable attitude toward using this sports wearable.	
	ATT3	I like the idea of using this this sports wearable.	
	ATT4	Overall, using this smart watch is beneficial	
Behavioral Intention (INT)	INT1	I intend to use this sports wearable in doing sports.	*Malhotra and Galletta, 1999*
	INT2	I intend to use this sports wearable for communicating with others.	
	INT3	I intend to use this sports wearable for planning my sports activities.	
	INT4	I intend to use this sports wearable frequently in my sports life.	

The items in the questionnaire were translated into Turkish with back-to-back translation method. First, the statements were translated from English to Turkish by a researcher. Subsequently, it was investigated whether there are significant differences between the English versions or not. In addition, the correctness of the Turkish expressions was evaluated by three researchers who are experts in consumer behavior and marketing. Finally, the pilot test was conducted with 30 respondents. The pilot test results showed that any issues about the dimensions was observed. Thus, the survey took its final form.

4.2. Sampling Method

The population of the study consists of individuals who use wearable devices with the purpose of tracking their sports activities. In order to collect data about this population in an in-depth and relatively easy manner (Malhotra and Peterson, 2014), judgmental sampling method was used in this study. The reason behind this choice is the decision of reaching both the users and non-users of sports wearables at the beginning of the study. In this regard, the questionnaire was shared with people online through social media. Besides, the individuals who are actively doing sports such as personal trainers, the sports center owners, the people at the gym were especially surveyed by reaching them through social media, face-to-face (by going to the sports centers) etc.

In the study, the questionnaire was created online and the survey link was distributed in various ways. The survey was disseminated through social media. Thus, the advantage of social media, to rapidly reach the individuals was utilized. For this reason, reaching respondents with different demographic characteristics and a heterogeneous structure was obtained. The number of respondents targeted to be reached in the study was 390, which is ten times the number of items. 411 people were reached when the survey was shared on social media until it loses its' popularity on social media. This shows that the sample size in this study is higher than the adequate sample size suggestions of both Hair et al. (2006) and Westland (2010).

4.3. Data Analysis Method

In this study, structural equation modeling was used because of the advantage of examining more complex models. AMOS was used for this purpose. Another statistical software program, SPSS, was also used to calculate some values. In the Findings section, detailed information about all calculations and obtained values will be given.

5. FINDINGS

In this part of the study, the information about the demographic characteristics of the respondents and their usage-related situations will be given first. Then, scale reliability and validity will be proved. Finally, hypothesis tests and test results will be explained.

5.1. Demographic Characteristics of Sample

As shown in Table 5.1, 59.6% of the survey respondents were male. 41.6% of the respondents were in the 25 - 34 age range, 34% were in the 35 - 41 age range, and the remaining 21.4% were in the 18 - 24 age range. When the household incomes of the respondents were analyzed, it is observed that 33.6% of the respondents have more than 7501₺ as household income, 32.6% of the respondents have an income between 2001-5000₺, 25.3% of the respondents have an income between the 5001 - 7500₺, and the remaining 8.5% of the respondents have less than 2000₺ as household income. 40.1% of respondents, on the other hand, use a sports wearable to assist them in their sports activities. 69.1% of these individuals have been using this sports wearable for more than 2 years. 12.4% of them have been using this wearable for 13 - 24 months. 10.2% of them have been using this wearable for 6 - 12 months. Finally, 8.3% of the respondents use this wearable for less than 6 months.

Table 5.1: Demographic characteristics of sample (n = 411)

Characteristics	N	%
Gender		
Female	166	40.4
Male	245	59.6
Age		
18-24	88	21.4
25-34	171	41.6
35-41	152	34
Income		
Less than 2000₺	35	8.5
2001-5000₺	134	32.6
5001-7500₺	104	25.3
More than 7501	138	33.6
The usage of sports wearables		
Yes	165	40.1
No	246	59.9
Usage time		
Less than 6 months	34	8.3
6-12 months	42	10.2
13-24 months	51	12.4
More than 24 months	36	69.1

5.2. Measure Assessments

Before the hypothesis testing, the validity and reliability of the scales used should be proved. Therefore, confirmatory factor analysis was used in this study. Confirmatory factor analysis was performed through AMOS statistical software program. In this process, the two-step approach of Anderson and Gerbing (1988) was used. A hierarchical confirmatory factor analysis was conducted including the dimensions of performance expectancy, effort expectancy, facilitating conditions, subjective norm, technophobia,

attitude, and behavioral intention as first-order constructs, and the sub-dimensions of technophobia (techno paranoia, techno fear, techno anxiety, cybernetic revolt, and cellphone avoidance) as second order factor.

In this study, the method of examining the internal consistency was investigated to prove reliability of the scales. For this purpose, the Cronbach's alpha estimates, and composite reliability scores were calculated. The Cronbach's alpha estimates are in between 0.79 – 0.96, composite reliability scores are in between 0.79 – 0.96. These values indicate that the measures used in this study have a reasonable reliability (Nunally 1978; Fornell and Larcker 1981; Hair et al., 2006). On the other hand, to prove the validity of the scales in this study, construct validity was investigated. In this context, it was observed that convergent validity was in the offered range by means of factor loadings. Factor loadings are large and significant enough to prove convergent validity, ranging from 0.60 to 0.98 (Fornell and Larcker 1981; Hair et al., 2006). Two methods were followed for evaluating discriminant validity. First, the average variance-extracted (AVE) values were examined and it was seen that these values were in the desired range, in between 0.52 – 0.86. In addition, the square roots of AVE estimates were compared with the correlations between constructs. At the end of this evaluation, it was seen that any correlation is greater than the related square root of AVE. Thus, discriminant validity was proved in two ways (Fornell and Larcker 1981; Hair et al., 2006). All relevant values are presented in Table 5.2.

Table 5.2 also presents the fit indices of the measurement model. The reason for this is the need to prove how well the measurement model fits with the observed data. In this context, the indices were presented as suggested by Hair et al. (2006). These values were within the desired range, $X^2/df = 2.69$; root mean squares error approximation (RMSEA) = .06; comparative fit index (CFI) = .92; Tucker-Lewis index (TLI) = .91; normed fit index (NFI) = .88; and incremental fit index (IFI) = .92.

Table 5.2: Factor loadings and reliability scores

Construct	Standardized loadings	Cronbach's alpha	AVE	CR
Performance Expectancy		.87	.63	.87
PE1	.79***			
PE2	.75***			
PE3	.85***			
PE4	.79***			
Effort Expectancy		.92	.75	.92
EE1	.82***			
EE2	.83***			
EE3	.93***			
EE4	.88***			
Facilitating conditions		.85	.61	.86
FC1	.78***			
FC2	.85***			
FC3	.87***			
FC4	.60***			
Subjective Norm		.86	.70	.87
SN1	.70***			
SN2	.89***			
SN3	.90***			
Technophobia		.92	.82	.96
Techno Paranoia	.74***	.81	.52	.81
TTP1	.61***			
TTP2	.69***			
TTP3	.81***			
TTP4	.75***			
Techno Fear	.98***	.88	.62	.89
TTF1	.67***			

TTF2	.69***				
TTF3	.82***				
TTF4	.86***				
TTF5	.88***				
Techno Anxiety		.90***	.87	.77	.87
TTA1	.91***				
TTA2	.84***				
Cybernetic Revolt		.98***	.79	.65	.79
TCR1	.78***				
TCR2	.83***				
Cellphone Avoidance		.92***	.86	.76	.86
TCA1	.89***				
TCA1	.85***				
Attitude			.96	.86	.96
ATT1		.94***			
ATT2		.93***			
ATT3		.93***			
ATT4		.90***			
Behavioral Intention			.93	.80	.94
INT1		.94***			
INT2		.71***			
INT3		.95***			
INT4		.95***			

CCR composite construct reliability. X^2 = 1716.07 (df = 639), p < .001; X^2/df = 2.69; root mean squares error approximation (RMSEA) = .06; comparative fit index (CFI) = .92; Tucker-Lewis index (TLI) = .91; normed fit index (NFI) = .88; and incremental fit index (IFI) = .92, *** p < .001.

5.3. Hypotheses Testing

As a preliminary step of hypothesis testing, correlations between the constructs and descriptive statistics (means and standard deviations of the constructs) were investigated. These values presented in Table 5.3 are very close to the threshold levels.

Table 5.3: Descriptive statistics and correlations estimates

	Mean	**SD**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
PE	3.4653	1.04627	(.80)							
EE	3.9124	.96395	.488**	(.87)						
FC	3.6302	1.14061	.508**	.604**	(.78)					
SN	3.0941	1.12850	.597**	.289**	.332**	(.83)				
TP	2.3219	.98978	.100*	-.081	.025	.332**	(.91)			
ATT	3.8491	1.10254	.736**	.577**	.623**	.539**	.025	(.92)		
INT	3.3200	1.25504	.706**	.450**	.594**	.555**	.142**	.786**	(.89)	
A	2.16	.749	-.002	-.191**	-.081	.054	-.006	-.008	.0.42	NA

Notes: Numbers on diagonals indicate square root of AVE. No correlation is greater than the corresponding square root of AVE.

**Correlation is significant at $p < 0.01$ (2-tailed).

*Correlation is significant at $p < 0.05$ (2-tailed).

The tests of the hypotheses were performed by structural equation modeling through AMOS. In this regard, fit indices for the structural equation model was tested by following the suggestions of Hair et al. (2006). The related indices which are very close to the threshold values (Nunally, 1978; Fornell and Larcker, 1981; Anderson and Gerbing, 1988) include X^2 = 2144.09 (df = 723), $p < .001$; X^2/df = 2.97; root mean squares error approximation (RMSEA) = .06; comparative fit index (CFI) = .90; Tucker-Lewis index (TLI) = .88; normed fit index (NFI) = .85; and incremental fit index (IFI) = .90, *** $p < .001$. Besides, the model explains the variability in the "behavioral intention to use sports wearables" significantly (with the power of 70%). Figure 2 presents structural equation model with the estimated parameter coefficients for the predicted relationships.

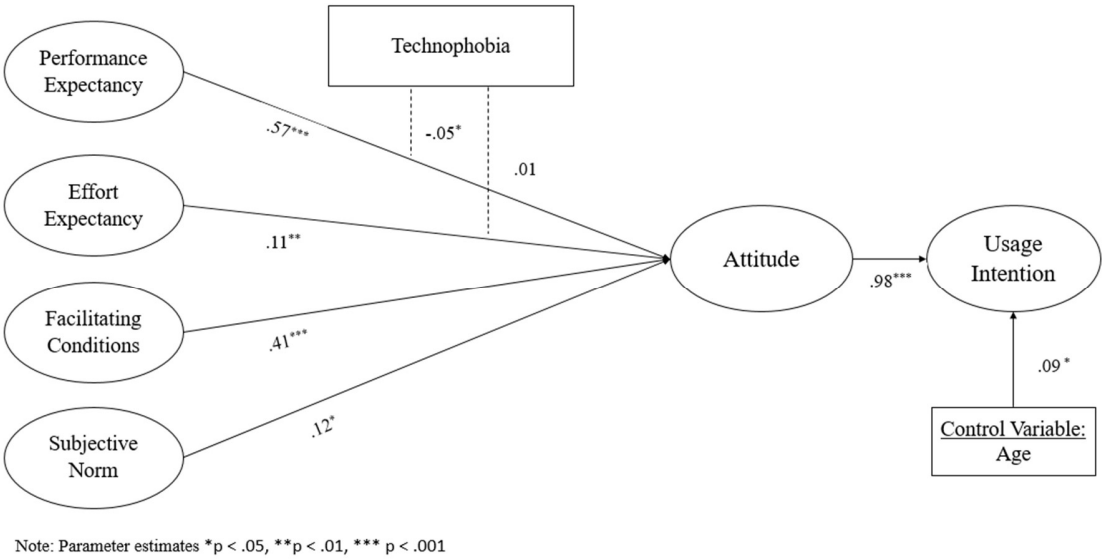

Figure 5.1: Structural equation model with parameter estimates

The next step is to evaluate the hypnotized effects based on the results of statistical tests. According to the research findings, H1 which predicts the positive effect of performance expectation on attitude towards sports wearables was supported (β, standardized path coefficient = 0.59; t = 9.62; p < 0.001). H2 predicts that effort expectancy has a positive effect on individuals' attitudes towards sports wearables. In parallel with this, statistical tests provide significant results and H2 was supported (β = 0.12; t = 2.22; p < 0.01). The estimated path coefficient concerning the positive effect of facilitating conditions on attitude towards sports wearables indicates a significant effect in expected direction. Therefore, H3 was supported (β = 0.41; t = 5.7; p < 0.001). As expected, subjective norm has positive effect on attitude towards sports wearables (β = 0.09; t = 2.11; p < 0.01). Thus, H4 was supported. H5 hypothesizes that individuals' attitudes towards sports wearables affect their intentions to use such devices positively. The statistical test results supported this hypothesis (β = 0.98; t = 23.4; p < 0.001). Moreover, the results of examining the age as a control variable are also significant.

Table 5.4: Structural parameter estimates

Hypotheses	Path	Standardized estimates	*t* value	Result
H1	PE→ATT	.59	9.62^{***}	Supported
H2	EE→ATT	.12	2.22^{**}	Supported
H3	FC→ATT	.41	5.7^{***}	Supported
H4	SN→ATT	.09	2.11^{*}	Supported
H5	ATT→INT	.98	23.4^{***}	Supported
Control variable	Age→INT	.09	1.85^{*}	Supported

Notes: Path coefficients are standardized.

Concerning the moderating effect of technophobia on the relationships between performance expectancy and attitude, effort expectancy and attitude, two interaction effects were added to the structural equation mode. The first interaction effect (Performance expectancy x Attitude) was found significant. Therefore, H6a was supported. Contrarily, the other interaction effect (Effort expectancy x Attitude) indicates not a statistically significant value. Thus, H6b was not supported.

Table 5.5: Moderating effect of technophobia

		Model 1		Model 2	
		Path coefficient	*t* value	Path coefficient	*t* value
Main effect					
	PE→ATT	.58	9.56***	.57	9.48***
	EE→ATT	.10	1.95**	.11	2.04**
	FC→ATT	.41	5.73***	.41	5.68***
	SN→ATT	.12	2.79**	.12	2.85**
Interaction effect					
	PE→ATT			-.05	-1.685*
	EE→ATT			.01	.770

Notes: Regression coefficients are standardized. *p < .05, **p < .01, *** p < .001.

6. DISCUSSION and IMPLICATIONS

Within the scope of this study, the intention to use sports wearables, which represents a growing market, for the purpose of tracking the sports activities is investigated. The market points to a relatively new market for individuals. In this regard, understanding people's attitudes towards these new generation consumption products has a critical importance from the consumer behavior point of view, because attitude creates intention and intention is an important previous step of actual behavior (Davis, 1989; Venkatesh et al., 2003). From starting this point of view, a comprehensive and up-to-date theory has been used to properly conduct the research, *the Unified Theory of Acceptance and Use of Technology* (Venkatesh et al., 2003).

Performance expectancy is accepted as the strongest predictor of intention in UTAUT model. Its significant effect on intention toward information systems usage was supported in organizational context (Venkatesh, 2003). It is associated with perceived usefulness from Technology Acceptance Model. UTAUT model has been used as the base model for many studies and the strong effect of performance expectancy was supported by many research (Zhou et al., 2010; Wu et al., 2016; Gu et al., 2016). One of them is the study of Wu et al. (2016) in which consumers' intention to use a smartwatch was examined. They included the construct "relative advantage", of which definition is almost the same with perceived usefulness. Therefore, those two are interchangeable. The study supported the significant effect of perceived relative advantage, in other words, perceived usefulness, on attitude in smartwatch context. The present study handles performance expectancy with a holistic approach, covering all types of wearable devices in addition to smartwatches. Effect of performance expectancy on attitude was supported in this context, through a survey conducted in Turkey.

Effort expectancy is related to perceived ease of use from TAM. In UTAUT, it was supported that effort expectancy has an influence on intention to use information systems in workplace (Venkatesh, 2003). Gao et al. (2015) argued in their study that it has an influence on intention. The study supported that effort expectancy is positively related to intention in the context of healthcare wearable devices. Kim and Shin (2015) examined this construct through TAM framework in smartwatch context. Results of the study, which

took place through a survey in South Korea, showed that perceived ease of use has a positive influence on attitude. From this point of view, we assumed that it would have an influence on attitude towards wearable sports devices. Empirical results of the present study supported the significant effect of effort expectancy on attitude. Contribution of the study is taking the construct to a more holistic level.

Social influence is the individual's perception of what important others think about his/her usage of the new system. In TAM, it was expressed as subjective norm. In both TAM and UTAUT, it was supported that individuals' behaviors will be influenced by how others think of them related to technology usage (Davis, 1989; Venkatesh, 2003). Weng (2016) studied this construct through acceptance of wearable devices in healthcare context in China. The study focused on smart bands which are able to collect data to monitor physical activity and sleeping patterns. In light of empirical results, the significant impact of social influence on behavioral intention to use wearable devices was supported. The present study tested its effects on attitude in the context of sports wearables. Besides smart bands, there are much more wearable devices such as fitness trackers and smartwatches which can serve the same purpose. The contribution of the study is supporting the impact of social influence in a wider context.

Facilitating conditions is another construct in UTAUT model, differentiating from others in the way that it directly influences technology usage. UTAUT supported its direct impact on usage (Venkatesh, 2003). Song et al. (2017) handled this subject in framework based on TPB. The study was held in sports wearables context but investigating continuance intention. It was found that facilitating conditions have an influence on behavioral control. Another finding of the study was that behavioral control has a positive influence on users' attitudes toward sports wearables. Hereby, it was assumed in the present study that facilitating conditions would have a positive impact on attitude towards technology usage. Empirical findings supported this impact.

According to Ajzen (1991), attitudes towards a behavior can be strong predictors of that behavior and a positive or negative attitude will effect behavioral intention in the same way. The impact of attitude on behavioral intention was supported in the literature. Lunney et al. (2016) handled attitude in TAM framework in the context of wearable fitness technology usage. Wearable fitness trackers were in the focus of the study. It was found

that attitude is positively related to wearable fitness technology adoption. This study handles attitude in a wider context including all kinds of wearable sports technology. The influence of attitude on behavioral intention was supported with empirical results. The study contributes to the literature by supporting this effect with holistic view.

In short, the findings of the study support the positive effects of performance expectancy, effort expectancy, facilitating conditions, social influence on attitude towards sports wearables. In this regard, the study provides evidence both for studies in which wearable technologies are specifically examined (Gao et al., 2015; Kim and Shin; Gu et al., 2016; Wu et al., 2016), and studies which are conducted in other digital contexts (Yang, 2010; Rahman et al., 2011; Celik, 2016; Gupta et al., 2018). Based on these findings, the contribution of the study to extant literature is holding the topic with a holistic approach. In some other studies, mostly only one sports wearable is considered like smart watches, fitness trackers etc. In this respect, considering the issue by presenting a holistic approach is worthwhile.

On the other hand, this kind of technologies have an important dark side (De Cremer et al., 2017), *privacy and security*. For such consumption products, individuals are in doubt about the confidentiality of the data they share with the devices and do not feel safe. In this context, it has been proved that technophobia has the power to moderate some various relationships by believing in the necessity of examining psychological constructs while working on the behavior of consumers. Technophobia defines a negative psychological reaction toward technology. It was proved by previous research that psychological factors have strong influence on high-tech purchase decisions. Such a strong, negative psychological reaction as technophobia was believed to be worth examining, since it can be a barrier. The scale developed by Sinkovics et al. (2002) provided empirical results which proved the impact of technophobia on technology usage in ATM machines context. In this way, one of the relationships between the expectations and the attitudes of individuals in the context of the sports wearables was added to the moderating role of technophobia in different scopes in extant literature (Agha and Saeed, 2015). The moderating effect of technophobia was proved by Agha and Saeed (2015) in online banking context in Pakistan. An extended version of TAM was used in the study. It was found that technophobia moderates the relationship between credibility and

customer acceptance. Technophobia was included in the present study considering it might have a moderating effect in such an innovative and developing context as sports wearables. According to empirical results, it was supported that technophobia has a negative moderating effect on the relationship between performance expectancy and attitude. On the other hand, no significance influence of technophobia was found on the relationship between effort expectancy and attitude. Here, the moderator effect of technophobia on the relationship between performance expectation and attitude is in the expected direction. However, the moderator effect on the relationship between expectation and attitude was not supported by statistical tests. The reason behind this could be a contradiction in the perception of items related to effort expectancy. The study was handled with a holistic view, involving all kinds of wearable devices which some people are not familiar with. Involvement of a wide range of technological devices might have caused confusion. Performance expectancy may be perceived a bit more internal then effort expectancy. Respondents might have associated performance expectancy with their own performances but such an association might have not been made with effort expectancy. Another reason behind this may be that the interpretation of the ease of use of sports wearables may be perceived more complex than the interpretation of the usefulness of these devices. In this regard, it can be seen that a construct such as effort expectancy cannot be interpreted in a situation where the device is not directly used.

Another important finding of the study is the significance of age as a control variable in the context of sports wearables. In this respect, this study supports the findings in extant literature (Morris and Venkatesh, 2000; Morris and Venkatesh, 2005; Chung et al., 2010).

6.1. Managerial Implications

The present study has suggestions for managerial applications. First of all, customer value can be attained through a successful marketing communications strategy. Marketing communication can emphasize the benefits of sports wearables and how easy it is to use them and also integrate to daily life. These devices' power of increasing the effectiveness of sports activities and power of motivating people for a healthier life can be highlighted.

Advertisements can give such messages that these devices are not complicated to use and they can improve life quality.

Beside highlighting strengths and benefits of sports wearables, negative perceptions and fears can be challenged and overcome in order to motivate people to use them. Technophobia was found to be effective and its negative effects can be reduced. People may be concerned about security issues; these concerns can be targeted in marketing communications. Technophobia's effect can be reduced by giving people more chance to interact with sports wearables. Experience rooms in stores can be created where people can actually try these products. These rooms can give people chance to examine products closely, try them out and interact with them. Such rooms can be created in stores or even in events for shorter times. Moreover, such rooms can also increase the positive effect of social influence through arising an environment in which people can interact with other people and they can also experience the products together with their friends, families etc. That situation will create a new topic to communicate each other in the social environment.

On the other hand, segmentation strategies can be created to handle "age" effect. Younger people who were born into technology may have no issues in getting familiar with new technologies but older people can experience issues in this regard. Targeting them with segmentation strategies can be beneficial to attract them. It can be showed that older people can also make use of sports wearables easily. The ability of sports wearables to lead to a healthy life can be highlighted.

6.2. Limitations and Future Research

There have been some limitations to the study, which can be addressed for future research. The process of data collection process was longer than usual. It was hard to reach people who are actually using sports wearable products. Besides, it couldn't be reached users of all types of sports wearables. To handle this difficulty, projects can be run, and collaborations can be made with companies in the business world.

The other limitation to address is that other generations can be reached. For example, thoughts and approaches of elderly people can be examined. Thus, making comparisons between the intentions and attitudes of the different generations will also be possible.

Technophobia, a negative construct, was handled as moderator in the study. The opposite can be done, technophilia can be studied to explore the effects of a powerful positive construct toward technology. Technophiles can adopt to new technologies very easily. They are not concerned about technological developments and their effects on society. Outcomes of this situation can be explored. It can be investigated whether effects such a positive construct will be meaningful or not. On the other hand, a single but detailed construct, technophobia, was examined in the study. Various constructs can be included in the model in order to explore dark side of such markets.

As another suggestion for future research, the effect of different demographic variables on attitude toward sports wearables can be examined. The dimensions of gender, income, education may be effective factors in this context. Besides, the comparisons will be made between the wearable devices with a more holistic approach. In this regard, comparing sports wearables and other devices used for different purposes like entertainment, communication etc. is possible. More specifically, the difference between the categories of sports wearables can also be examined. For example, the differences between smart watches and fitness wristbands can be investigated in the context of behavioral outcomes like attitude, intention, actual use etc. These kind of comparisons will make a significant contribution to the literature.

7. CONCLUSION

The study contributes to the extant literature by integrating the intention to use sports wearables with a holistic approach. In this regard, the fact that the study covers all sports wearables shows a general consumer tendency consisting of various sports wearables. In addition, the presented model arises also from a psychological construct to these technological products. This study, which didn't ignore humane approaches, is expected to provide benefits for future studies and practical applications.

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BIOGRAPHY

Alican Aksoy was born in Istanbul in 1990. He graduated from Marmara University, Department of Business Administration in German in 2015. In 2017, he started his master's study in Business Administration at Gebze Technical University. In 2019, he completed his master’s and gained her master’s degree. He worked at various organizations. Currently, he is working at Crossover as a Global Sourcing Specialist.

APPENDIX

Appendix A: Measures

GEBZE TEKNİK ÜNİVERSİTESİ

Sayın Katılımcı,

Bu anket formu; Gebze Teknik Üniversitesi İşletme Fakültesi'nde tamamen bilimsel amaçlarla yürütülen, **bireylerin giyilebilir spor cihazlarına karşı tutumlarını değerlendirmek** amacıyla yapılan bir çalışma için hazırlanmıştır. Çalışmada **giyilebilir cihazlar**; bireylerin spor aktiviteleri için kullandığı **saat, bileklik** vb. ürünleri ifade etmekte olup **cep telefonu adımsayarları ve diğer telefon uygulamalarını içermemektedir.** Sorulara vereceğiniz cevaplar kesinlikle gizli tutulacaktır. Size göre en doğru olan cevabı vermeniz araştırmanın sağlıklı ilerlemesi açısından önem arz etmektedir.

Okudum, anladım. Evet ( )

Spor yaparken aktivitelerinizde size yardımcı olması için giyilebilir cihazlar (fitness bilekliği, akıllı saat vb. ürünler) kullanıyor musunuz? Evet ( ) Hayır ( )
Bu ürünü ne kadar süredir kullanıyorsunuz? 6 aydan az ( ) 6-12 ay ( ) 13-24 ay ( ) 2 yıldan fazla ( )
Cinsiyetiniz: Kadın ( ) Erkek ( )
Yaşınız: 18-24 ( ) 25-34 ( ) 35-41 ( )
Aylık toplam hane halkı geliri: 2000 TL'den az ( ) 2000-5000 TL ( ) 5001-7500 TL ( ) 7501 TL ve üzeri ( )

Aşağıdaki ifadeleri <u>giyilebilir spor cihazlarıyla ilgili beklentilerinizi düşünerek</u> derecelendiriniz. (1= Hiçbir zaman; 2= Nadiren; 3= Bazen; 4= Sıklıkla; 5= Her zaman)					
Giyilebilir spor cihazlarını spor aktiviteleri için faydalı bulurum.	1	2	3	4	5
Giyilebilir spor cihazları sayesinde tamamlanması gereken spor aktiviteleri daha hızlı yapılır.	1	2	3	4	5
Giyilebilir spor cihazlarını kullanarak, spor aktivitelerinin etkinliği artırılır.	1	2	3	4	5
Giyilebilir spor cihazlarını kullanırsam daha iyi bir spor yaşantısına sahip olurum.	1	2	3	4	5
Giyilebilir spor cihazlarının kullanımı açık ve anlaşılırdır.	1	2	3	4	5
Giyilebilir spor cihazlarının kullanımı hususunda ustalaşmak benim için kolaydır.	1	2	3	4	5
Giyilebilir spor cihazlarının kullanımı kolaydır.	1	2	3	4	5
Giyilebilir spor cihazlarının kullanılmasını öğrenmek basittir.	1	2	3	4	5
Spor alanında uzman kişilerin giyilebilir spor cihazlarının kullanımını desteklemesi benim için önemlidir.	1	2	3	4	5
Etkilendiğim insanlar, alternatif ürünler yerine giyilebilir spor cihazları kullanmamı destekler.	1	2	3	4	5
Fikirlerine değer verdiğim insanlar, giyilebilir spor cihazları kullanmam için beni teşvik ederler.	1	2	3	4	5
Aşağıdaki ifadeleri <u>giyilebilir cihazlar ile ilgili düşüncelerinizi göz önünde bulundurarak</u> derecelendiriniz. (1= Hiçbir zaman; 2= Nadiren; 3= Bazen; 4= Sıklıkla; 5= Her zaman)					
Giyilebilir spor cihazlarla entegre çalışan gerekli diğer ürünlere (telefon uygulamaları, bulut sistemler vb.) sahibim.	1	2	3	4	5

Giyilebilir spor cihazları kullanmak için gerekli bilgiye sahibim.	1	2	3	4	5
Giyilebilir spor cihazları, kullandığım diğer teknolojik cihazlarla uyumludur (akıllı saat - akıllı telefon uyumu gibi).	1	2	3	4	5
Giyilebilir spor cihazları kullanılırken, karşılaşılabilecek zorluklara yardımcı olabilecek asistan hizmetleri (müşteri hizmetleri) mevcuttur.	1	2	3	4	5
Giyilebilir spor cihazlarını kullanmak iyi bir fikirdir.	1	2	3	4	5
Giyilebilir spor cihazlarını kullanmaya karşı olumlu bir tutuma sahibim.	1	2	3	4	5
Giyilebilir spor cihazlarını kullanma fikri hoşuma gider.	1	2	3	4	5
Genel olarak, giyilebilir spor cihazlarını kullanmak faydalıdır.	1	2	3	4	5
Spor yaparken giyilebilir spor cihazları kullanmak niyetindeyim.	1	2	3	4	5
Spor yapan bireylerle iletişimde kalmak için giyilebilir spor cihazları kullanmak niyetindeyim.	1	2	3	4	5
Spor aktivitelerimi planlarken giyilebilir spor cihazları kullanmak niyetindeyim.	1	2	3	4	5
Spor yaşamımda giyilebilir spor cihazları kullanmak niyetindeyim.	1	2	3	4	5
Aşağıdaki ifadeleri TEKNOLOJİ ile ilgili düşüncelerinizi göz önünde bulundurarak derecelendiriniz. (1= Hiçbir zaman; 2= Nadiren; 3= Bazen; 4= Sıklıkla; 5= Her zaman)					
Birilerinin günümüz gelişen teknolojilerini kullanarak beni izlediği ve dinlediği konusunda endişe taşıyorum.	1	2	3	4	5
Teknolojinin insanların yaşam biçimlerini (iletişim kurma, sevme ve hatta başkaları ile ilgili düşüncelerini vb.) değiştirmesinden korkarım.	1	2	3	4	5

Yeni teknolojilerin insanları bir gün işe yaramaz hale getireceğinden korkarım.	1	2	3	4	5
Yeni teknolojilerin bir gün işimi elimden alacağından korkarım.	1	2	3	4	5
Hayatıma fiziksel ve psikolojik olarak müdahale edebilme ihtimalinden dolayı yeni teknolojilerden korkarım.	1	2	3	4	5
Cep telefonumdaki bazı özellikleri (Siri vb.) kullanmaktan korkarım.	1	2	3	4	5
Arama motorları aracılığıyla bilgi aramaktan tedirgin olurum.	1	2	3	4	5
Herhangi biri beni takip edebileceği için, internete bağlanmaktan tedirgin olurum.	1	2	3	4	5
Eğer bir gün teknolojik ürünler bir nedenden dolayı çalışmayı bırakırsa, eski zamanlara dönmekten korkarım.	1	2	3	4	5
Daha önce hiç kullanmadığım bir iletişim cihazı kullanma durumunda kalırsam kendimi huzursuz hissederim.	1	2	3	4	5
Yeni bir işletim sistemi öğrenmem gerektiğinde (örneğin Windows 7'den Windows 8'e geçmek, IOS güncellemesi vb.) kendimi tedirgin hissederim.	1	2	3	4	5
Bir gün robotların dünyamızın her yerinde olma ihtimalinden korkarım.	1	2	3	4	5
Bazı web sitelerini kullandığım için (Google, Yahoo, Bing vb.) takip ediliyor olmaktan endişelenirim.	1	2	3	4	5
Elimden geldiğince cep telefonu gibi yeni teknolojileri kullanmaktan kaçınırım.	1	2	3	4	5
Cep telefonu gibi iletişim cihazlarımı değiştirmek beni tedirgin ettiği için, bu tür cihazlarımı değiştirmekten kaçınırım.	1	2	3	4	5

Anketimize katıldığınız için teşekkür ederiz.