CONSUMER ACCEPTANCE OF WEARABLE TECHNOLOGY DEVICES: A CROSS-CULTURAL STUDY IN TURKEY AND GERMANY

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DECLARATION OF ORIGINALITY

I, Bengi Meriç Benderlioğlu, certify that

- I am the sole author of this thesis and that I have fully acknowledged and documented in my thesis all sources of ideas and words, including digital resources, which have been produced or published by another person or institution;
- this thesis contains no material that has been submitted or accepted for a degree or diploma in any other educational institution;
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ABSTRACT

Consumer Acceptance of Wearable Technology Devices:

A Cross-Cultural Study in Turkey and Germany

With the rapid change in technology worldwide, products such as wearable technology devices tend to have an uprising trend that comes with wider variety nowadays. Consumers, however, are not necessarily adaptive in their nature and their perception is shaped by many factors. The aim of this research is to investigate the consumer acceptance of wearable technology devices. For this purpose, a research instrument was developed through which data was collected from German and Turkish university students. The study extends the widely used technology acceptance model with the introduction of new variables. The overall results provide validation to previous literature while introducing new factors for consumer acceptance of technology products, wearable technology devices and smartwatches, specifically. Importance of this research comes from the innovative and promising nature of the wearable technology devices concept, the lack of work on smartwatches in the literature as well as the cross-cultural nature of the study.

ÖZET

Tüketicilerin Giyilebilir Teknoloji Cihazlarını Kabulü: Türkiye ve Almanya'da Kültürlerarası Bir Çalışma

Dünya çapında teknoloji hızla gelişirken, giyilebilir teknoloji cihazları gibi teknolojik ürünlerin çeşitliliği ve popülerliği küresel alanda yükselen trendi yansıtır şekilde gittikçe artmaktadır. Bununla birlikte, tüketicilerin bu ürünlere adaptasyonu ve bu ürünlerin kullanımına geçişi mutlak kabul edilemez ve bu ürünlere karşı tüketici kafasında oluşan algı birçok faktör tarafından şekillenmektedir. Bu araştırmanın amacı, giyilebilir teknoloji cihazlarının tüketici tarafından kabulünü araştırmaktır. Araştırmada kullanılan veriler, Almanya'nın Berlin şehrinde yaşayan Alman üniversite öğrencileri ve Türkiye'nin İstanbul şehrinde yaşayan Türk üniversite öğrencilerinden, araştırmanın amacına hizmet etmek üzere geliştirilmiş anket aracılığı ile toplanmıştır. Çalışma, yaygın olarak kullanılan teknoloji kabul modelini yeni değişkenlerin tanıtılmasıyla birlikte genişletmektedir. Genel sonuçlar, önceki literatürün onaylanmasını sağlarken, özellikle teknoloji ürünlerinin, giyilebilir teknoloji cihazlarının ve akıllı saatlerin tüketici tarafından kabulü için yeni faktörler sunar. Bu araştırmanın önemi, giyilebilir teknoloji cihazları konseptinin yenilikçi ve gelecek vadeden doğası ve literatürdeki akıllı saatler üzerine yapılan çalışmaların kısıtlı olmasının yanı sıra çalışmanın kültürler arası doğasından kaynaklanmaktadır.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

With the internet usage rates increasing rapidly since the beginning of the 90s, the usage capacity of information increased exponentially and technology spread rapidly throughout the world. This reflected in the space allocated to technology products in our day-to-day lives. Together with that, the number of wearable technology devices produced by companies has been increasing in the previous years and these products are seen as the new era of growth for the technology (Stinson, 2013). There are various forms that wearable technology devices can be worn such as a wristwatch, a badge, a ring, jewellery, shoes, clothing or eyeglasses (Ko, El-Aufy, Lam, & Macdiarmid, 2005). Despite being a relatively new product in its early diffusion stage in the global market, smartwatches are categorized as one of the most popular wearable technology devices in today's world (Chuah, et al., 2016). Offering a wide variety of features, smartwatches are believed to be among the growth sectors in the coming future. As consumers have different reactions and adoption processes towards technology products, their attitude towards them and the intention to buy them differs.

The aim of this study is to understand the effects of selected specific factors on consumers acceptance of wearable technology devices. The study also investigates the difference between the acceptance patterns of cultures, taking Turkey and Germany as sample populations. The model of this study is an extended version of the technology acceptance model of Davis (1989). External variables are added to the original model, while also aiming to test the validity of the original

model. The instrument of the study is a questionnaire which is conducted on 221 students from Germany and Turkey.

Main literature surveyed during the conduction of this study is wearable technology with a special focus on smartwatches as they are the base of the study instrument. Furthermore, since consumer acceptance is a topic popularly discussed in consumer behavior, the study has sections dedicated to this topic and its relationship with culture. The study also introduces the technology acceptance model of Davis (1989) from which the study model takes its basis. The study is cross-cultural in its nature and is based on statistical data from two different cultures.

This study consists of five chapters. The first chapter of the study is the introduction, as we introduce the initial concepts and the study structure. In the second chapter, the theoretical background is discussed referring to the literature reviewed. In addition to culture; wearable technology devices, smartwatches, consumer behavior and technology acceptance model are the main focus on the theoretical background of this study. Under consumer behavior, consumer decision making processes, factors affecting consumer behavior and the relationship between culture and consumer behavior are presented.

Research design and methodology is introduced and further explained in the third chapter of this study. Under this chapter, we introduce our research model, explain each variable and state related hypotheses. Further on in the same chapter, the methodology, study instrument and data collection are detailed together with providing the survey items.

In the fourth chapter is analysis and findings, where descriptive analysis results, Chi-square tests and hypothesis testing findings are presented. Chi-square tests are applied and presented to measure the country dependence of certain

variables. Under hypothesis testing, first reliability analysis is conducted and then hypotheses are tested through SPSS Statistics software and mainly used analysis methods are regression, ANOVA and independent t-tests.

The fifth and last chapter is the conclusion. In this section final discussion on the findings of this study is provided with a final presentation of the accepted hypotheses and variables found significantly related to one other. Furthermore under this section, scientific contribution and managerial implications of this study are discussed while introducing the limitations this study faces and areas of further research.

CHAPTER 2

THEORETICAL BACKGROUND

This chapter presents the literature review of the study. First wearable technology devices are discussed with a special focus on smartwatches. Following, the literature on consumer behavior is presented together with the consumer decision-making process, factors affecting consumer behavior and the effects of culture on consumer behavior. Finally, following a brief introduction of technology acceptance models in the literature, technology acceptance model of Davis (1989) is further detailed.

2.1 Wearable technology devices

Since the term wearable technology and its practices are relatively new in today's world, it is not possible to find a certain description or definition in the literature. As the topic is an emerging one not only in consumer behavior industry but also in the technology industry, a variety of understanding of the topic has been presented in the articles and in the literature in recent years. Although it is not likely to describe the meaning and scope of wearable technology in a standardized way, some terms have many close meanings, including synonyms of the term wearable technologies such as 'wearable electronics', 'wearable devices' and 'wearable computers'. Excluding the term 'wearable computers', the rest are derived from the same or similar manners and very often used interchangeably. Although the topic has recently started to be a trending topic in both academic research and managerial areas, the history of the wearable technology dates back years ago starting with the head-mounted displays developed for pilots in the 1960s (European Commission, 2015).

According to Dunne (2004), “Wearable technology is a term used to describe many different forms of body-mounted technology, including wearable computers, smart clothing, and functional clothing”. Ko, El-Aufy, Lam, & Macdiarmid (2005) describe wearable technology devices as electronic devices that people continually wear as unhindered as clothes providing intelligence support that increases memory, intellect, communication, physical senses and creativity. European Commission’s (2015) report on the internet of things and wearable technology states the following:

> Wearable technology is a type of technology that is incorporated in electronics that can be worn on the body, either as an accessory or as part of materials used in clothing. One of the major features of wearable technology is its ability to connect to the Internet, enabling data to be exchanged between a network and the device.

Furthermore, another understanding and exposition of the concept of wearable technology devices is their usage as a fashion item allowing customers to reflect their style and characteristics into their daily life. Being available in a variety of customized opportunities such as different colors and sizes, a fringe benefit of wearable technology devices is their ability to be used as accessories. This trendy approach combines ‘fashion’ and ‘technology’ and often regarded as ‘fashnology’. Brem, Ro, & Rauschnabel (2006) regard wearable technology as the new form of fashion accessories for the users. Supporting the theory of Dion, Berscheid, & Walster (1972) which suggests that the consumers have a tendency to pick the objects which are perceived as aesthetically pleasing, Bajarin (2014) concludes that, “While people buy watches to tell time . . . the number one criteria in choosing a watch for most people is how it will look. It’s a fashion statement, not a technology one”.

There are various forms that wearable technology devices can be worn such as a wristwatch, a badge, a ring, jewellery, shoes, clothing or eyeglasses (Ko, El-Aufy, Lam, & Macdiarmid, 2005). The current existence of a wide range of wearable technology and smart devices is constantly in a rising trend thanks to the extended use of these products and developments in the technology industry. Being already available in many forms, it is not hard to guess that smart products will be available for their users in many different forms and preferences in the coming future.

According to a case study of the European Commission (2015), "Applications of wearable technologies include wearable cameras, smart clothing, wearable apps platforms, smart glasses, health and happiness wearables, activity trackers, 3D motion sensors, and smartphone compatible watches – also called smartwatches ".

Today, wearable technology devices are available for many different purposes for numerous customer groups all around the world. Although the literature differs between the respective industries in which the smart devices are being used, in general wearable technology devices can be categorized into five main product groups based on their usage methods, which are smartwatches, smart wristbands, smart glasses (including all types of head-mounted displays), smart clothes and smart accessories.

Smartwatches are considered among the most important developments in the information technology industry having plentiful functions in addition to showing time (Chuah, et al., 2016). Smartwatches that are in contact with a phone allow users to track their activities through the sensors transmitting information in contrast to classical watches transmitting mainly the time information only (Akbulut & Akan, 2015).

Smart wristbands are one of the most common wearable technology devices. Usually light-weighted and well-designed smarts wristbands are used for tracking and monitoring daily physical activities. These activities include but are not limited to sleeping patterns, the number of calories spent, number of steps taken, water consumption and pulse tracking. There is a variety of sensors embedded inside the smart wristbands, leading the device to have numerous diverse functions (Nanda, 2017). In addition to the activity tracking features of the smart wristbands, when connected to a mobile phone and Bluetooth, these smart devices also act as notification devices transmitting the messages from various applications.

Smart glasses are like mini-computers with high-definition images in the outside world. By processing and capturing its user's physical environment and augmenting with virtual elements, smart glasses are considered as new wearable augmented reality (AR) devices (Rauschnabel, Brem, & Ro, 2015). Having internal and external sensors that can collect data from computers, smartphones and other electronic devices, smart glasses enable their users to have a wireless connection to GPS, Wi-Fi and Bluetooth, leading users to be able to connect to the Internet and watch videos or gather information. Some versions of smart glasses and head-mounted displays include face recognition software, built-in cameras, GPS and other applications. The aim behind the usage of the smart glasses is rather different from head-mounted displays since they are mostly used in order to reach more information regarding the environment in which the user is, instead of isolating the user from the outer world.

Smart clothes, or interactive or digital clothing, is defined as a "garment-integrated device which augments the functionality of clothing. or which imparts information-processing functionality to a garment" (Dunne et al.. 2005. p.2).

According to Hwang (2014), “Science has combined with fashion where the property of clothes and various information technology (IT) functions coexist together in this new conceptual wear”. Ranging a high variety of products. smart clothes can be in many different forms such as pants. underwear. socks, suits, hats, a pair of shoes and so on.

Smart accessories, although not being as commonly used as other wearable technology devices, mostly function as to be synchronized with other mobile devices. Since smart accessories are designed relatively smaller to be worn on the body, their relative connectivity and ability to operate various applications are limited. However, at the same time, they allow the users to take advantage of the accessories’ usage as electronic identity, signature and application locker. Smart accessories such as smart rings and smart necklaces can be featured with GPS modules that allow the devices to be used as location-direction detection for individuals with special needs.

Wearable technology devices are in an increasing trend all around the world currently with capturing a favorable future potential in the market for technology products. As of the beginning of 2016, 15% of overall U.K. citizens population was characterized as smart wearable technology product users allowing a strong rise of the share of these devices on online sales stores. Amazon, for example, is one of the cream-skimmers of this super trendy cake, being the new record-breaking grow in the extended range of product portfolios in the wearables sector, unsurprisingly these positive changes are also reflected in the positive shift in the sales figures of these new generation technology products (Mills, Watson, Pitt, & Kietzmann, 2016).

Providing numerous advantages for consumers, wearable technology devices can be stated as one of the most personal accessories available in many

shapes and forms. The new concept of wearable technology devices shows that the consumer can benefit from a range of wearables on their bodies no matter which part of the body is the area of interest for taking the maximum advantage on the usage of the device (Robson, Kietzmann, & Pitt, 2016). Please refer to Table 1 to have a further understanding on which parts of the human body the smart devices can currently being worn on.

Table 1. Usage of Wearable Technology Devices on Human Body

Human Body	Wearable Technology Devices	Example of Application
Head	Ears, cap, glasses, eyes	Portable personal computer, monitor, camera and voice recording, smartphone control
Neck	Necklace, tie, chain	Camera and voice recording, smartphone control, monitor health
Upper body	Jacket, shirt, band, bra	Monitoring health, monitoring posture, activity monitoring, enhance lifting strength
Lower body	Belt, bands, pants, fob	"Smart jeans" enable smartphone interaction, enhance physical strength Pressure sensors monitor foot injury, posture
Arms and wrist	Bands, watch, bracelet	Monitor fitness activity, interact with smartphone, portable computer. Activity monitoring, enhance lifting strength
Hands	Gloves, ring	Unlock doors, connect people, interact with touch screens in winter, SIRI/Cortana/Google Now enabled
Legs	Bands, socks, pants, shorts	"Smart jeans" enable smartphone interaction, enhance physical strength Pressure sensors monitor foot injury, posture
Foot	Socks, shoes	Navigation, fitness, activity tracking
Table adapted from Robson, Kietzmann, & Pitt (2016).		

2.2 Smartwatches

Despite being a relatively new product in its early diffusion stage in the global market, smartwatches are categorized as one of the most popular wearable technology devices in today's world (Chuah, et al., 2016). As the technology evolved to become an inevitable and crucial part of our lives, the advantages we have taken from the practical and life-easing features of them have been increasing respectively. Gaining popularity and rapidly saturating the wearable technology devices market, smartwatches are one of the devices people use in their daily life in order to gain a wide range of advantages offered by the products.

The benefits of the smartwatches are numerous depending on the aimed area of usage and initial expectation from the product. Users of the smart wearable devices, smartwatch owners in particular, might have different motivations leading them to use or consider to use these devices including; being in more control of their actual vital indicators through health activity tracking such as through pulse, water consumption and blood pressure tracking, ability to understand the extent to which the user is participating in sports activities through a number of steps taken and calories spent, increasing efficiency in work and personal life through having continuous availability and experiencing constant mobility.

The main difference between the smartwatches and other wearable smart devices which can be used on the wrist such as smart wristband and smart bracelets is that smartwatches offer their users a much wider range of features than the others can only supply with pulse and time tracking. Furthermore, according to Chuah (2016), "Most of the smart wristbands offer the very limited sensation of information and mostly do not offer the possibility to install apps". Being physically larger than the traditional personal watches and smart wristbands, smartwatches very often have

a touchscreen through which users can experience extra mobility and availability offered by the product as a result of the interaction between the operating system and numerous applications available upon the preference of the user. Latest studies on the usefulness of smartwatches suggest that, “while the primary purpose of smart wristband is to collect data, presenting relevant information (e.g., Facebook notifications, Emails) is a primary function of smartwatches” (Chuah, et al., 2016).

Connectedness, with minimum possibility of discontinuance, is another valuable asset that smartwatches offer to the owner. Belk (2013) has stated that the meaning of everyday objects changes according to who and what connects them and to where they are connected to. According to Verhoef, et al. (2016), “The ability of smart objects to connect not only with consumers and each other but also with other virtual and physical devices on the Internet will speed up the pace of change in their meaning”.

2.3 Consumer behavior

Consumer behavior, is defined as the process of selection, purchase, usage and disposal of products, services, ideas with the purpose of satisfying the needs and desires of the consumers (Solomon, 2009). There are two important points that need to be noted at this point regarding the formerly presented definition, firstly consumer behavior cannot be degraded to products and services only as ideas and experiences can also be purchased and used, secondly the form of the consumer mentioned is not limited to ultimate/individual consumers but also organizational consumers such as profit-oriented and non-profit oriented institutions. However, the consumer mentioned in this study is the ultimate/individual consumer and the focus is on individual consumer behavior while approaching wearable technology devices not

only as a product allowing its consumers reach a service but also enabling them with the experience offered by the product.

A more basic definition of consumer behavior is stated by Odabaşı & Barış (2002) as, applied science that examines consumer behavior in the marketplace and investigates the causes of this behavior. While studying consumer behavior, there are numerous fundamental questions for which academics and managers are aiming to find answers to questions such as 'Who are the consumers constituting the market?', 'What and how do the consumers purchase?', 'When and from where do the consumers purchase?' and 'Why do consumers purchase?' (Mazlum, 2010). According to Hoyer & MacInnis (2007), in addition to questions that have been mentioned above; frequency of consumption, usage duration and reason for the disposal of the good or service should also be important factors attention-worthy in order to understand the consumer behavior in a more extended concept. Only the science of consumer behavior itself is not sufficient enough to deeply understand the consumer and answer the questions consumer behavior scientists are looking into. In order to better understand the consumer, observations being one of the primary sources of data, one should investigate the factors affecting the behavior of the consumer. Bearing in mind the fact that consumption is increasing day by day around the world with enormous product ranges and new industries being introduced to consumers, also considering different desires, needs, norms, values and personalities of consumers, it can be concluded that consumer behavior became a more unique and a comprehensive area of study.

In addition to individual influences, the culture and environment in which consumers are born and grew are the elements that need to be investigated to understand the consumer (Hanna & Wozniak, 2017). Value differences are generated

through cultural exposure, societal norms and personal experiences. In the literature, the term consumption value is described as the perceived attributes of services and products for consumers (Tse, Wong, & Tan, 1988). As people are a part of their environment and their society, the values, norms, beliefs, desires and needs are shaped around these concepts leading consumption value to differ among cultures such as Chinese people being more functional value oriented when it comes to purchasing decision compared to the citizens of the United States. Consumption value is used for explaining and analyzing consumer behavior and attitude. It is suggested in the literature that, affecting the purchase motivation of the consumers, emotional, social, functional and epistemic values are provided by goods and services (Xiao & Kim, 2009). Consumers attach different values to different products groups resulting in altered consumer purchase motivation (Sheth, Newman, & Gross, 1991). In the literature, scales of functional value included statements such as 'They are trustworthy', 'They are everywhere and easy to get' and 'I like the (taste, feel, look) of these brands'. Social value scales include statements like 'They are prestigious', 'They give me social status', and 'Rich and successful people use these brands'. Three items represented emotional value: 'They make me feel happy', 'They make me feel sophisticated', and 'They make me feel good'. Three more items - 'I am bored with domestic brands', 'I am curious about these foreign brands' and 'I like to experience things that are new and different' - represented epistemic value.

Choices involving highly visible goods such as clothing and jewellery and services to be shared with others often driven by social value. According to Sheth, Newman, & Gross (1991), social value is defined as:

> The perceived utility acquired from an alternative's association with one or more specific social groups. An alternative acquires social value through association with positively or negatively stereotyped demographic,

socioeconomic and cultural ethnic groups. Social value is measured on a profile of choice imagery.

2.3.1 Consumer decision making process

Consumers need to make many decisions during the day so that they can continue their daily lives. The most common definition of decision-making is to decide on one of several alternatives. However, due to increasing competition and product variety, it is becoming increasingly difficult for consumers to make the decision to buy. As the number of alternatives increases, the consumers' decision on a certain product becomes more and more difficult and progressive. Individuals in their daily lives, get involved in decision-making processes constantly. When analyzed from the perspective of the consumers, these decisions can be categorized under three main form. Some of the decisions consumers encounter to make can be listed as; purchasing decisions such as to purchase a good or product or not, time and place of purchase, payment method and the item; consumption decisions such as to consume or not, time and way of consumption; disposal decisions such as give away, recycling and resale (Engel, Blackwell, & Kollat, 1978).

Many models have been put forward to explain the decision-making processes of consumers. However, although the stages of these models are different, they are all similar. According to the most generally accepted model among these models, there are five stages of the consumer purchasing decision process (Odabaşı & Barış, 2002). These are shown in Figure 1.

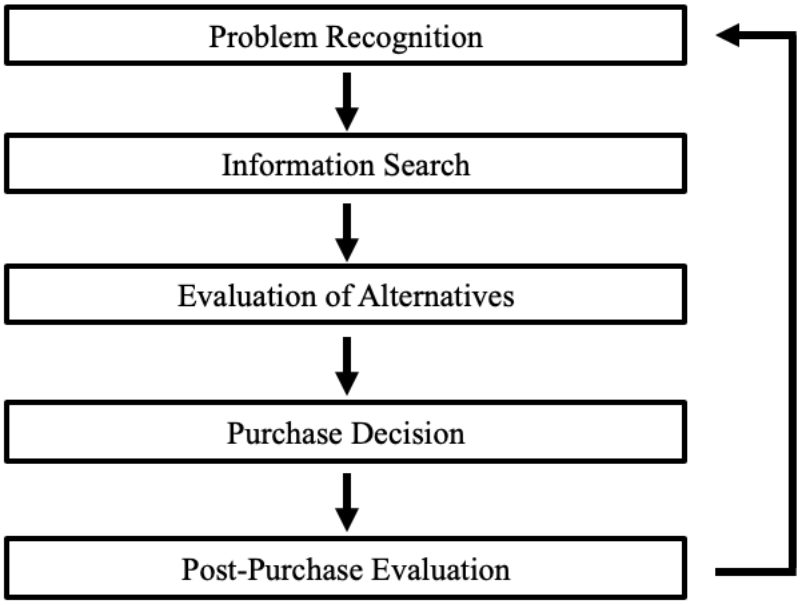

Figure 1. Consumer decision making process (Engel, Blackwell & Kollat, 1978)

Although consumers are expected to behave rationally most of the time, the consumers are surrounded by personal, cultural, social and psychological factors. These factors alter their process of decision making to a certain extent (Armstrong & Kotler, 2005). These alterations result in different decision-making processes per consumer, turning decision making patterns into customized processes. There are many factors that affect the decision-making processes of consumers. These factors will be discussed next.

2.3.2 Factors affecting consumer behavior

Whether originating from the consumer or not, there are numerous factors affecting consumer behavior. While some of the personal factors affecting consumer behavior can be listed as perception, memory, motivation, interest, attitude, personality and lifestyle; among environmental factors affecting consumer behavior there are many others along with culture, social class, family and group dynamics.

Among the factors affecting consumer behavior, ‘attitude’ will be further discussed in the section related to the model of this research, as ‘attitude’ is considered as one of the most important factors to be examined in this research. ‘Perception’, on the other hand, is a topic of interest when it comes to establish or discover a relationship between the culture and consumer behavior, as culture is one of the cornerstones of understanding the way consumers behave and act in their choices. A good or service is obtained by consumers mostly in order to satisfy their recognized needs. The choice to purchase particular goods or service as per satisfying those recognized needs are tied to the perception the consumer has on the item, regarding whether or not the offered quality would be capable of the satisfying the aimed needs (Agyekum, Haifeng, & Agyeiwaa, 2015). According to Kotler (1999), “Perception is the process by which people select, organize and interpret information to form a meaningful picture of the world . . . each of us receives, organizes and interprets this sensory information in an individual way”.

To understand consumer behavior and their reactions, one should make sense of the way this behavior and reactions occur. Every consumer reasons out the reality through his or her perception filter and exhibits his or her behavior and reacts accordingly. In other words, the concept of reality is a personal concept that changes from consumer to consumer and can be interpreted in different ways. Therefore, consumer purchasing behavior, which is one of the most important points for marketers, can be brought closer to the daylight by examining the perceptions of consumers and the effects that cause these perceptions (Schiffman & Kanuk, 1978). As stated by Kastanakis & Voyer (2014), culturally conditioned perception is to be considered as one of the factors affecting consumer decision making. In their study, it is also argued that marketing research and industry can be improved through

having a deeper understanding of cross-cultural consumer behavior, with analyzing the conditioning effect of culture on perception.

2.3.3 Culture and consumer behavior

As previously mentioned as one of the environmental factors found to be affecting consumer behavior, culture has always been a very crucial element of understanding and interpreting the behavior of people all around the world. It is not only a very powerful factor forming human approach but it also has a very strong effect on human behavior. Culture is the set of behavior patterns that are transmitted and maintained by the members of a particular society through various means (Arnould & Thompson, 2005). Culture of the society, along with family values and subcultures all influence the formation of an individual's cultural values. Thus, from the beginning of an individual's life, each individual grows up with benefits and restrictions of a particular culture, resulting in becoming a major influence upon consumers' purchasing decisions (Mooij M. d., 2010).

Marketing decision makers, try to spot cultural shifts while new product designs. Even in one of the earliest editions of 'Principles of Marketing' by Kotler, Armstrong, Saunders and Wong in 1999, it is implied that the cultural shift towards greater concern about health and fitness created a huge industry for exercise equipment. The increasing demand for wearable technology products coinciding with current health concerns all around the world can be an example of how a similar situation is going on in our age. As time passes by, with respect to the fast improvements in technology and the World Wide Web, everyday effects of globalization around the world are becoming a fact which cannot be overlooked. Hence the world is shrinking every day, comes the realization of increased

opportunities to seek after. Consumers around the world can benefit from a huge variety of products. As a consequence people face the cognitive process called 'Overchoice' in which they have problems with making a decision faced with many options. People often conclude that they feel confused because there are so many brands to choose from (Hafstrom, Chae, & Chung, 1992). When it comes to making a choice to buy products such as wearable technology devices, smartphones and computers which require high involvement from the side of the consumer, things can get even more complex. Among the factors considered in often complicated decisions, there are many which can be thought to have an impact on shaping a human being's decision including cultural values.

Cross-cultural researchers have been considering culture as one of the most effective determinants of consumer behavior (Mooij M. d., 2010). Culture is not only effective in forming what people do but it also changes how they perceive and do things. Other researchers used some cultural dimensions such as individualism-collectivism to measure the impact of cultural values in consumer behavior research (Luna & Gupta, 2001). There have been also other researches related with culture and consumer innovativeness (Steenkamp, Hofstede, & Wedel, 1999), impulse buying (Kacen & Lee, 2002) and complaint behavior of consumer (Liu & Mcclure, 2001).

Internationally known Dutch social psychologist researcher with his studies in the field of culture, Geert Hofstede has found that culture has different dimensions. As a former IBM employee with the help of his extensive investigations in culture, which have been conducted first with other IBM employees all around the world and then expanded to other industries and countries, he came up with six cultural dimensions. Hofstede's initial cultural dimensions are; power distance,

uncertainty avoidance, individualism/collectivism, masculinity/femininity, long term/short term orientation with indulgence being the final dimension added to his study the latest. He categorized countries according to these value scales. These dimensions allow marketers to understand and explain the different tendencies of consumer behavior.

2.4 Technology acceptance models

As a result of the advanced and emerging technologies continuous development in a fast-paced constantly changing the digital world, numerous models have been proposed to better understand consumer adoption of new technologies and their implications (Chuah, et al., 2016). Diffusion and acceptance of innovation and technology are particularly important for social scientists in order to understand the perception of the consumer and serve their needs better. Understanding and analyzing the cultural and social changes while trying to better explain the tools of change is an area of interest for researchers interested in social science.

There is a vast amount of research in literature which tries to meaningfully understand and make sense of user's adoption of technology such as innovation diffusion model of Rogers (1962), theory of reasoned action (TRA) (Ajzen & Fishbein, 1980), technology acceptance model of Davis (1989), extended version of the technology acceptance model (Venkatesh & Davis, 2000; Venkatesh & Bala, 2008), theory of planned behavior (Ajzen, 1991), unified theory of acceptance and use of technology (Venkatesh, Morris, Davis, & Davis, 2003) and extended version of the unified theory of acceptance and use of technology (Venkatesh, Thong, & Xu, 2012).

According to literature dating back to 1989, the technology acceptance model of Davis is believed to be one of the most validated models investigating and explaining the intention to adopt the technology. Being an evolved version of Fishbein and Ajzen's (1980) theory of reasoned action, the TAM model introduces new belief variables; perceived usefulness and perceived ease of use. The original model consists of five elements: external variables, perceived usefulness, perceived ease of use, attitude and intention. The model is widely used in order to understand the technology acceptance and adoption patterns of the consumers, and people, in general. According to Fishbein and Ajzen's (1980) theory of reasoned action, beliefs are one of the influencing sources of attitude, which then shape the intention. And following, behaviors are generated through intention (Ma & Liu, 2004). As the technology acceptance model takes its roots from the theory of reasoned actions and is further developed, today the model is applicable in not only consumer behavior area but also in social psychology. Davis, in 1989, introduced two new dimensions to the model being perceived usefulness and perceived ease of use. Please refer to Figure 2 for the original TAM model of Davis.

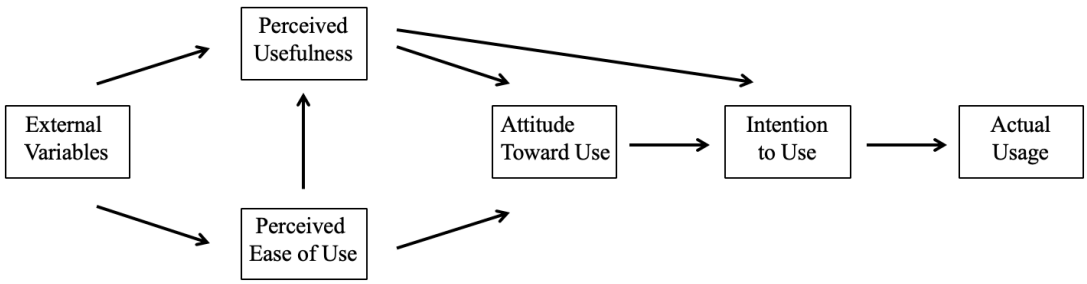

Figure 2. The original technology acceptance model (Davis, 1989)

With the new constructs of the model, perceived usefulness and perceived ease of use, consumers' beliefs on technology are measured, resulting in explaining and

predicting attitude towards technology and therefore predicting acceptance of technology *(Ma & Liu, 2004)*. As a result of the analysis conducted on the model, Davis concluded that both perceived usefulness and perceived ease of use have a relationship with actual use, with perceived usefulness being significantly more correlated. To conclude, by combining an already existing model of TRA with two new constructs, the original TAM model was developed and tested many times by researchers trying to understand the patterns of consumer acceptance of the technology. It was found that when perceived usefulness and perceived ease of use - variables that are successfully adapted to the model- are enhanced, they positively influence attitude and intention (Kim & Shin, 2014).

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

As the aim of the study is to investigate and explore factors affecting the consumer acceptance of wearable technology devices through sample data, quantitative research methods are applied. Based on the literature review and the research model, numerous hypotheses are generated to be analyzed through statistical analysis techniques. Statistical analysis methods applied in this research range from descriptive statistics to regression analysis, chi-square tests, and independent samples t-tests. This chapter includes the research model, variables used and investigated in this research, the hypotheses formed and tested, and methodology of the study.

3.1 Model

The structure of this study is based on the technology acceptance model of Davis, with the aim of proving the findings of the previous researches while contributing to the literature with its cross-cultural nature and specific focus on wearable technology devices and smartwatches in particular.

The following model represents the basis of this study and is constructed by the addition of new variables that are believed to have a relationship with consumer acceptance to wearable technology devices to the basic Technology Acceptance Model (TAM) Model. When these selected external variables are adapted to the original TAM of Davis (1989), the research model is shaped and the hypotheses are positioned in each correlation as shown in Figure 3.

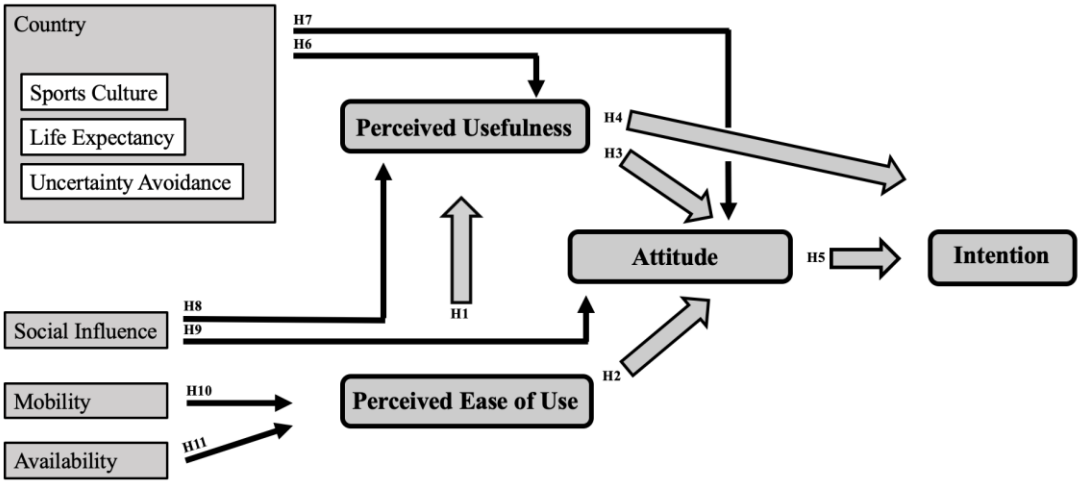

Figure 3. Research model

3.2 Variables and hypotheses

3.2.1 Perceived ease of use

Perceived ease of use of a product represents the degree to which a consumer perceives a product easy to operate or service easy to receive. Davis (1989) defines perceived ease of use as “the degree to which a person believes that using a particular system would be free of efforts”. If a specific service which includes technological aspects is perceived as easy to use and take advantage of, users have an enhanced belief of that technology or service is more useful and they are more likely to have a positive attitude towards that technology product or service (Kim & Shin, 2014). As perceived ease of use is proved to be effective in technology acceptance, our study aims to explore if such a relationship is established in acceptance to wearable technology devices in a cross-cultural comparison perspective. Following the discussion above, proposed hypotheses are:

Hypothesis 1: Perceived ease of use will have a positive relationship with perceived usefulness of wearable technology devices.

Hypothesis 2: Perceived ease of use will have a positive relationship with attitude towards wearable technology devices.

3.2.2 Perceived usefulness

According to Davis (1989,1993), perceived usefulness is one of the main psychological determinants of attitude towards technology and the intention to use technology. Perceived usefulness is defined by Davis (1989) as "the extent to which a person believes that using particular technology will enhance his/her job performance". As stated by Kim and Shin (2014), "When users tend to believe that the technology is useful, they form favorable attitudes towards it". In the basis of the study of Davis, together with the importance of opportunity cost of using any service, perceived usefulness is believed and proved to have effects on the attitude towards a technology product and the intention to use that product. In our study, we aim to prove the existence of the same relationship in wearable technology acceptance among two different cultures, Germany and Turkey. The hypotheses proposed are:

Hypothesis 3: Perceived usefulness will have a positive relationship with attitude towards wearable technology devices.

Hypothesis 4: Perceived usefulness will have a positive relationship with the intention to use wearable technology devices.

3.2.3 Attitude

Attitude is defined as the positive or negative tendency the consumers gain against an object over time by learning. The object mentioned here could be a human, product, service, location, event, advertising and similar elements (Schiffman &

Kanuk, 1978). Attitude, as stated in the definition, is not inherent in consumers upon birth, rather they tend to learn it later. For example, the idea that a brand or a product has better quality than the others is not an innate thought of the consumer (Solomon, 2009). According to Fishbein and Ajzen (1975), attitude towards use is defined as "an individual's positive or negative feelings (evaluative affect) about performing the target behavior".

It is necessary to draw attention to the various characteristics of attitudes. Firstly, attitudes are formed by consumers through the process of learning, so attitude is learned tendencies. If a consumer is not satisfied with the product, the consumer may gain a negative attitude towards that product. Attitudes refer to trends over time and they often stay unchanged and continuous because they develop slowly over time (Hoyer & MacInnis, 2007). Therefore, when consumers have a negative attitude towards an object, it is hard for marketers to change this negative attitude. Consumers make purchasing decisions based on their attitudes. For example, a consumer who is satisfied with the quality of a brand may choose the brand again in his or her next purchase or recommend it to others (Hanna & Wozniak, 2017).

Consumers establish certain attitudes as a result of many different events, situations and experiences. However, Solomon (2009) categorizes the sources of attitude and mentions three basic sources that cause attitudes. These are personal experiences, social interaction and mass communication. Below hypothesis is proposed based on the above discussion:

Hypothesis 5: Attitude will have a positive relationship with intention to use wearable technology devices.

3.2.4 Intention

The intention is defined as “the strength of one’s intention to perform a specified behavior” by Fishbein and Ajzen (1975). Multi-attribute models are often used to anticipate behavioral intention. In these models, the focus is on the technology related beliefs of users (Fishbein & Ajzen, 1975). According to the TAM model of Davis (1989), the intention is shaped by attitude and factors affecting attitudes such as perceived usefulness and perceived ease of use and these as a result influence actual use of a technology product. Additionally, TAM proposes that technologies are perceived as more useful when they are easier to use, and that usefulness also directly influences usage intention.

In addition, as per the theory of the reasoned actions suggests, the subjective standard determines the intended meaning of the behavior (Ajzen & Fishbein, 1980) and actions are taken with more motivation by the individuals when it is believed that the others expect them to perform these actions (Venkatesh & Davis, 2000). In this study, the intention to use wearable technology models is measured under the technology acceptance model.

3.2.5 Country

In this section, the focus is the differences between cultures and/or countries and the effects of these differences on acceptance to wearable technology devices. Two groups are analyzed separately and comparatively to understand the different patterns of acceptance to smartwatches with special focus on the effects of country difference on perceived usefulness of wearable technology devices and attitude towards them. Following the review of the literature, three main aspects of the national culture are determined to further investigate; sports culture representing the involvement in

sports activities, life expectancy rates showing the long term expectations and uncertainty avoidance indicating extent to which individuals embrace ambiguity.

3.2.5.1 Sports culture

Term ‘sports culture’ in this study refers to the extent to which different cultures’ attitude towards participation to sports or physical activities in general. Germany and Turkey are compared in this case. As studies have shown there is a strong gap between the levels of sports participation in Germany and Turkey. 2014 Eurostat data of the European Commission states that only 8% of Turkish population participates in sports, fitness or recreational (leisure) physical activities at least once a week whereas among German people this figure is found to be 66%. Figure 4 illustrates this finding.

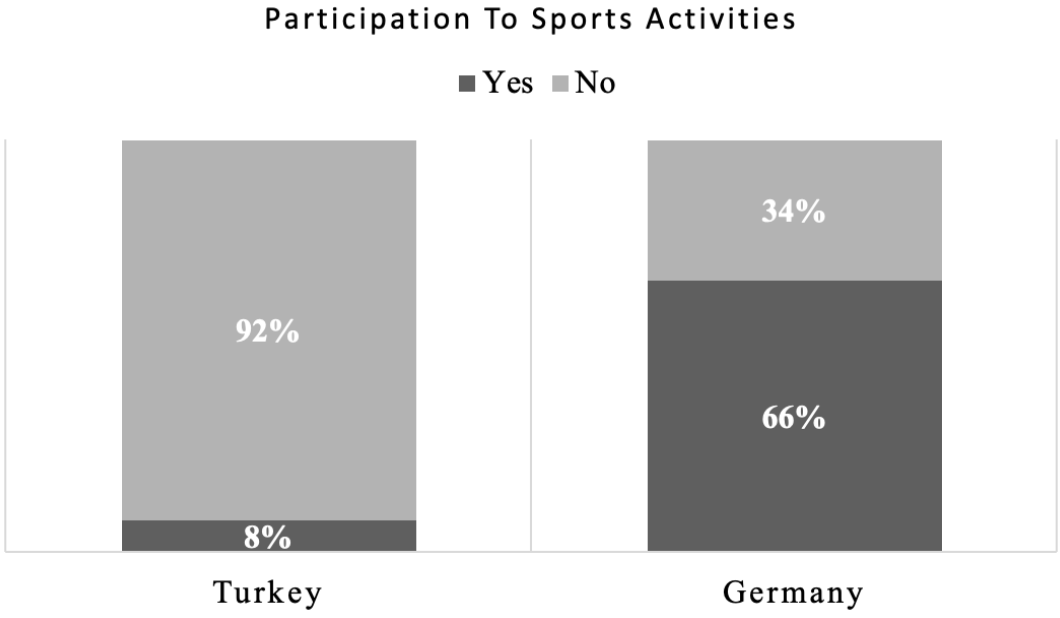

Figure 4. Participation to sports activities

As discussed previously, one of the key features of smart wearable technology devices such as smartwatches is their ability to track sports activities such as the duration and pace of the sports activity and its expected results on the body.

Wearable technology devices provide healthy living by detecting and monitoring heart and respiratory rates, calculating calorie counts, guessing stress levels and help to make the benefits of sports better by analyzing instruments (Wright & Keith, 2014). In addition to further analyzing the sports data, smart technology devices can also be seen as a motivating factor if seen as a fun and engaging way to get involved in sports. According to Ananthanarayan and Siek (2012), through wearable technology products, people already active in sports can increase their motivation to a greater extent while less motivated users can gain an encouraging direction gradually.

Although the current literature has some insights on the relationship between attitude towards sports and technology devices, there is no study found investigating the difference acceptance patterns towards wearable technology devices with comparison to different sports culture levels.

3.2.5.2 Life expectancy

The life expectancy levels in a country can be helpful to understand the current development status of a country when technological developments are also taken into consideration on a larger scale. According to the World Health Organization (2018), life expectancy at birth is 81 years in Germany, with a five years difference in between it is 76 years in Turkey. As a result of developments in technology and medical innovations, not only the quality of life but also the life expectancy is increasing (Wamble, Ciarametaro, & Dubois, 2019). If improvements in technology affect life expectancy, it is worth to further investigate this effect the other way around; a potential alteration on the levels of consumer belief in terms of increased usefulness of wearable technology products, when it is believed that there will be a

longer life span ahead. Hence, another aim of this study is to investigate any existence of a meaningful relationship between life expectancy in different countries and the perceived usefulness of wearable technology devices.

3.2.5.3 Uncertainty avoidance

One of Hofstede's defined dimensions of national culture, uncertainty avoidance, shows the extent to which individuals can deal with uncertain and ambiguous situations. The level of uncertainty avoidance is a function of the degree to which a social group feels threatened by ambiguous, uncertain, unknown situations (Mooij & Hofstede, 2002). Societies with higher uncertainty avoidance scores tend to minimize the unknown, as they feel more comfortable with clarity and certainty.

In the literature, there are different opinions on the relationship between uncertainty avoidance and technology acceptance. While some academics argue that the relationship is negatively moderated meaning the societies with higher uncertainty levels would not be early adopters of these technologies; the others suggest practically the opposite, implying the relationship is positive, as people with higher uncertainty avoidance scores would accept the technology as they would be willing to decrease the level of unknown through information technology products.

Individuals from a greater uncertainty avoidant culture tend to have a better attitude towards technology products as they decrease the level of uncertainty in a being's life (Hofstede, 2001). Previous research suggests that cultures with higher uncertainty avoidance scores would accept the new technologies faster when the technology is believed to minimize the uncertainty in the environment (Alshare, Mesak, Grandon, & Badri, 2011). Decreased levels of unknown and a greater clarity wearable technology devices bring can be reflected to their acceptance in the society

based on the cultural difference and their ability to deal with unknown situations representing their uncertainty avoidance levels.

Contrary to the statements of the former discussion on the other hand, literature also implies that uncertainty and change are embedded in information technology products (De Jong & Erumban, 2006). As wearable technology devices represent a meaningful portion of information communication technology (ICT), a potential tie between those products and the possibility to experience an increased level of uncertainty after the adoption of the product can result in lower acceptance of these products in more uncertainty avoidant cultures. For example, according to Ford, et al. (2003), cultures with higher levels of uncertainty avoidance are not likely to see technology products as useful for their life and would not be early adopters. Above arguments and previous research conducted taken all together into consideration, this study investigates the relationship between uncertainty avoidance levels in the culture and attitude towards wearable technology devices. Please see below hypotheses formed:

Hypothesis 6: Country difference has an effect on the perceived usefulness of wearable technology devices.

Hypothesis 7: Country difference has an effect on attitude towards wearable technology devices.

3.2.6 Social influence

According to O'Cass (2001), and many others, people try to dress up in a way that they would be able to present themselves in a chosen particular way, supporting the findings of fashion marketing studies in general. As the world we are living in is shrinking every day as a result of technical improvements, today it is way easier to

obtain the desired product through online websites allowing consumers all around the world with a greater variety of products. It has been known for a long time now that products or brands that are used in public are linked to social aspects (Bearden & Etzel, 1982). Smartwatches, smart glasses, smart wristbands, as well as other wearable technology devices, can be identified as a new form of fashion accessories for the customers. As stated by Rauschnabel et al. (2015), " . . . psychological similarities between what is known from fashion adoption and smart glasses [devices] are very likely, although research in this domain remains scare". Furthermore, in their investigations, Rauschnabel et al. (2015) proved that consumers tend to accept smart wearable technology devices when they believe that these devices will be commonly adopted in their peer group.

Social influence, as defined by Turner (1991), "is the processes whereby people directly or indirectly influence the thoughts, feelings and actions of others". Unsurprisingly coinciding with the rise of the internet age, a number of people any person has in their influence cycle is larger than ever before. Also standing as one of the fundamentals of human survival in the history of the universe, human races are able to survive as much as they socialize and feel socially accepted. In order to feel socially accepted, people tend to focus on and implement other people's opinion in their daily lives. Whether being a compliment, or a suggestion or just sharing of a positive or undesired experience, people affect each others' purchase, consumption and disposal decisions.

Being said that purchase decisions are shaped around the environment and trusted people in the eyes of the consumers, peer groups are not the only way to be exposed to social influence on decision making. Online consumer reviews are also considered to be kind of consumer-created reviews that provide the indirect

experience of products and services to potential buyers influencing their purchase decisions (Park, Lee, & Han, 2014). Further research conducted on the effects of social influence on the consumer decision-making process has proven that female consumers are more likely to be affected by social influence than men, allowing their ideas and mindsets to be pierced by customer reviews (Lim & Yazdanifard, 2014). Below hypotheses are formed:

Hypothesis 8: Social influence will have a positive relationship with the perceived usefulness of wearable technology devices.

Hypothesis 9: Social influence will have a positive relationship with attitude towards wearable technology devices.

3.2.7 Mobility and availability

Mobility and availability of product or service are more important than ever in today's fast-paced world with numerous information reaching a single consumer on a day to day basis and the ability of the consumer to be responsive constantly. As the mobility and availability of a service or a product is now a crucial concept, the applications and implementations of increasing the mobility and availability of offered services and products are very broad mainly in the areas of entertainment, knowledge and health (Kirstein, Cottet, Grzyb, & Tröster, 2005). The implications of mobility and availability features of the wearable technology devices in the health sector include monitoring health indicators such as tracking pulse, water consumption and blood pressure rates in addition to general monitoring and checking of physical sports activities. Examples in the entertainment sector can be the device's connectivity with the world wide web, allowing the users to reach video and audio context depending on the model and the category of the device. In terms of

knowledge, consumers get to have constant access to all databases and sources available online including an opportunity to broaden the reach of information through special applications for navigation and planning or instructions for work.

Due to the shifting focus on technical concerns to consumer-oriented marketing strategies, it has been a fundamental issue for researchers to reach higher mobility (Ariyatum & Holland, 2003). It is further argued by Kim and Sundar (2015) that "effects of mobile communications factors mainly result from the mobility levels of the device giving a feel of availability . . . mobility sense tends to be reinforced in wearable communication having firm effects on perceived hedonic quality of smart wearable technology devices including smartwatches". Tested hypotheses are:

Hypothesis 10: Mobility will have a positive relationship with perceived ease of use of wearable technology devices.

Hypothesis 11: Availability will have a positive relationship with perceived ease of use of wearable technology devices.

3.3 Methodology, data collection and surveys

As the aim of the study is to investigate and explore factors affecting the consumer acceptance of wearable technology devices, a questionnaire is prepared in order to deeper understand these variables and their effects on a cross-cultural level between German people and Turkish people. As the nature of the study required us to do so, quantitative research methods are applied. Based on the literature review and the research model, numerous hypotheses are generated to be analyzed through statistical analysis techniques. Statistical analysis methods applied in this research range from descriptive statistics to regression analysis, chi-square tests, and independent samples t-tests. The main source of data used in this study is derived

from the study questionnaire which consists of 24 questions, among two being short open-ended questions, six being multiple choice questions and 16 statements used for the Likert scale type questions. 5 point Likert scale is applied to allow the participants to decide on their extent to which they agree given statements, from 'Totally Disagree' to 'Totally Agree'.

In terms of scale development, most of the Likert scale questions are collected from the literature and used after slight adaptations to the context of this study and sample groups. Please refer to Table 2 for items used in the study questionnaire.

As this study is a cross-cultural research, the overall sample group consists of not only Turkish participants but also Germans. Both Turkish respondents and German respondents are chosen among university students. The study is conducted at Marmara University in Turkey and Free University of Berlin in Germany. The Turkish participants are predominantly social science students whereas the German sample is more homogenous with participating students from different study areas. The overall sample size is 221 among which 101 are Turkish students and 120 German students from both higher education cycles. All data is provided through face to face survey collection in above-mentioned universities in Istanbul and Berlin. An introduction statement is introduced at the beginning of the survey summarizing the aim of the study, confidentiality matters and the study concept. Following the collection of the data, responses are transcribed into data analysis software and made ready for the statistical analysis process.

Table 2. Items Used in the Study Questionnaire

Dimension/Construct	Source
Perceived Usefulness	(Davis, 1989, 1993).
1. *'Using a smartwatch would help me productively complete my tasks'*	
2. *'A smartwatch would be useful in tracking my health data'*	
3. *'Using a smartwatch would make it easier to track my sports activities'*	
Perceived Ease of Use	(Davis, 1989, 1993).
1. *'I find smartwatches easy to use in general'*	
2. *'Using a smartwatch does not require a lot of my mental effort'*	
Attitude	(Venkatesh, Morris, Davis, & Davis, 2003).
1. *'Using a smartwatch is a good idea'*	
2. *'I like the idea of using a smartwatch'*	
3. *'Overall, using a smartwatch is beneficial'*	
Intention to Use	(Venkatesh, Morris, Davis, & Davis, 2003).
1. *'I predict I will use a smartwatch in the future'*	
2. *'I plan to use a smartwatch in the future'*	
Social Influence	Self-Constructed
1. *'Using a smartwatch would enhance my image in others' eyes'*	
2. *'Ability to share my user statistics on social media platforms is an important feature of a smartwatch'*	
Mobility	(Huang, Lin, & Chuang, 2007)
1. *'A smartwatch has good mobility'*	
2. *'I feel I can use a smartwatch anywhere'*	
Availability	(Shin, 2012)
1. *'I want to get desired information and service'*	
2. *'A smartwatch offers the sense of real-time connectedness'*	

CHAPTER 4

ANALYSIS AND FINDINGS

This section introduces the findings of this research. After the presentation of descriptive statistics, Chi-square tests follow. To test the hypotheses linear regression and t-test analysis are applied and findings are presented under this section.

4.1 Descriptive findings

The overall sample size is 221 among which 101 are Turkish students and 120 German students from both higher education cycles. 12 of all 101 Turkish participants and 17 of all 120 German participants are smartwatch owners or used be. The average age among Germans is found to be 26 with Turkish average being 22. Among all 221 participants of the research instrument, 46% is Turkish and 54% is German, as provided on the Figure 5.

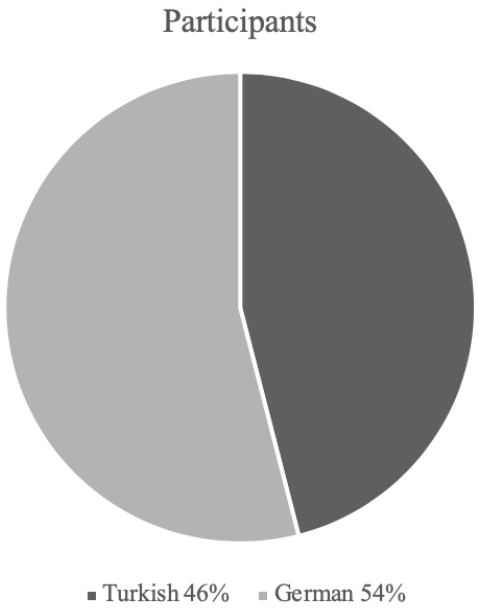

Figure 5. Percentage of Turkish and German participants

While 58% of Turkish participants are female, female participation rates are found to be 53% in Germany. In terms of area of study, almost all participants are from social science studies such as business administration, economics and law in Turkey, whereas in German participants are more from following areas, social science, communications, media and arts, natural science and engineering, information technologies and medicine.

4.2 Chi-square tests

Below findings are found as a result of the evaluation of Pearson Chi-Square analysis. Findings have shown that the use of wearable technology devices are not country dependent and found to be independent. On the other hand, social media usage is found to be more frequent and popular in Turkey compared to Germany. Sports culture, the degree to participate in sports activities, in particular, is found to be independent between countries following the same patters. However, when further investigated it is found that on a weekly basis, German people are more involved in sports activities.

According to Table 3 cross tabulation and Table 4 Chi-Square tests applied for use of wearable technology, it can be concluded that country and use of wearable technology devices are not different and but independent meaning that use of wearable technology devices is not related to country, not being different in Turkey and Germany (Chi-Square = 0.369, $p = 0.543$).

Table 3. Country * Use of Wearable Technology Devices Cross Tabulation

			Use of Wearable Technology Device		
			Yes	No	Total
Country	TURKEY	Count	10	91	101
		Expected Count	11.4	89.6	101.0
		% within Country	9.9%	90.1%	100.0%
		% within Use of WTD	40.0%	46.4%	45.7%
		% of Total	4.5%	41.2%	45.7%
	GERMANY	Count	15	105	120
		Expected Count	13.6	106.4	120.0
		% within Country	12.5%	87.5%	100.0%
		% within Use of WTD	60.0%	53.6%	54.3%
		% of Total	6.8%	47.5%	54.3%
Total		Count	25	196	221
		Expected Count	25.0	196.0	221.0
		% within Country	11.3%	88.7%	100.0%
		% within Use of WTD	100.0%	100.0%	100.0%
		% of Total	11.3%	88.7%	100.0%

Table 4. Chi-Square Tests Country * Use of Wearable Technology Devices

	Value	Df	Asymptotic Significance (2-Sided)
Pearson Chi-Square	.369[a]	1	.543
Continuity Correction[b]	.156	1	.693
Likelihood Ratio	.372	1	.542
Linear-by-Linear Association	.368	1	.544
N of Valid Cases	221		
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 11.43.			

By looking at Table 5, it can be seen that the percentage of people using social media more than three hours a day is 15.8% in Turkey whereas it is 7.5% in Germany. Representing similar patterns, the percentage of people using social media one to three hours a day is 56.4% in Turkey whereas 35% in Germany. Results show that daily social media usage is higher in Turkey compared to Germany. As it can be concluded from Table 6 Chi-Square tests applied for social media usage, country and social media usage are different but not independent meaning that social media usage is correlated to country, being different in Turkey and Germany (Chi-Square =

20.843, $p = 0.000$). This indicates that there is a difference between social media usage in Turkey and Germany.

Table 5. Country * Social Media Usage Cross Tabulation

		Use of Social Media					
		< 30 Minutes	30-60 Minutes	1-3 Hour	> 3 Hours	None	Total
TURKEY	Count	7	17	57	16	4	101
	Expected Count	13.3	26.5	45.2	11.4	4.6	101.0
	% within Country	6.9%	16.8%	56.4%	15.8%	4.0%	100.0%
	% within Use of WTD	24.1%	29.3%	57.6%	64.0%	40.0%	45.7%
	% of Total	3.2%	7.7%	25.8%	7.2%	1.8%	45.7%
GERMANY	Count	22	41	42	9	6	120
	Expected Count	15.7	31.5	53.8	13.6	5.4	120.0
	% within Country	18.3%	34.2%	35.0%	7.5%	5.0%	100.0%
	% within Use of WTD	75.9%	70.7%	42.4%	36.0%	60.0%	54.3%
	% of Total	10.0%	18.6%	19.0%	4.1%	2.7%	54.3%
Total	Count	29	58	99	25	10	221
	Expected Count	29.0	58.0	99.0	25.0	10.0	221.0
	% within Country	13.1%	26.2%	44.8%	11.3%	4.5%	100.0%
	% within Use of WTD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	13.1%	26.2%	44.8%	11.3%	4.5%	100.0%

Table 6. Chi-Square Tests Country * Social Media Usage

	Value	Df	Asymptotic Significance (2-Sided)
Pearson Chi-Square	20.843[a]	4	.000
Likelihood Ratio	21.419	4	.000
Linear-by-Linear Association	3.882	1	.049
N of Valid Cases	221		
a. 1 cells (10.0%) have expected count less than 5. The minimum expected count is 4.57.			

According to cross tabulation and Chi-Square tests presented in Table 7 and Table 8, it can be concluded that country and sports frequency are independent. That is the amount of sports activities participated is not related to the country, not being different in Turkey and Germany (Chi-Square = 9.309, $p = 0.054$).

Table 7. Country * Sports Frequency Cross Tabulation

		Sports Activity Frequency					
		Never	Few times a year	Few times a month	Few times a week	Daily	Total
TURKEY	Count	6	8	34	51	2	101
	Expected Count	5.5	8.2	28.3	51.6	7.3	101.0
	% within Country	5.9%	7.9%	33.7%	50.5%	2.0%	100.0%
	% within Use of WTD	50.0%	44.4%	54.8%	45.1%	12.5%	45.7%
	% of Total	2.7%	3.6%	15.4%	23.1%	0.9%	45.7%
GERMANY	Count	6	10	28	62	14	120
	Expected Count	6.5	9.8	33.7	61.4	8.7	120.0
	% within Country	5.0%	8.3%	23.3%	51.7%	11.7%	100.0%
	% within Use of WTD	50.0%	55.6%	45.2%	54.9%	87.5%	54.3%
	% of Total	2.7%	4.5%	12.7%	28.1%	6.3%	54.3%
Total	Count	12	18	62	113	16	221
	Expected Count	12.0	18.0	62.0	113.0	16.0	221.0
	% within Country	5.4%	8.1%	28.1%	51.1%	7.2%	100.0%
	% within Use of WTD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	5.4%	8.1%	28.1%	51.1%	7.2%	100.0%

Table 8. Chi-Square Tests Country * Sports Frequency

	Value	df	Asymptotic Significance (2-Sided)
Pearson Chi-Square	9.309[a]	4	.054
Likelihood Ratio	10.365	4	.035
Linear-by-Linear Association	2.998	1	.083
N of Valid Cases	221		
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.48.			

As it can be concluded from Chi-Square tests applied for the country and weekly sports activity on Table 9, country and participation in weekly sports activities are not independent meaning that level of involvement in weekly sports activities is related to country (Chi-Square = 11.638, $p = 0.009$). This indicates that there is a difference between weekly sports activity involvement in Turkey and Germany. By looking at the cross tabulation results Table 10, it can be seen that almost one-third of Turkish participants are not involved in sports activities on a weekly basis, whereas in Germany this figure is almost only ten per cent which shows that German

people are more involved in sports activities on a weekly manner basis. More than 85% of the German sample is involved in sports activities on a weekly basis.

Table 9. Chi-Square Country * Weekly Sports Involvement

	Value	df	Asymptotic Significance (2-Sided)
Pearson Chi-Square	11.638[a]	3	.009
Likelihood Ratio	11.742	3	.008
Linear-by-Linear Association	8.675	1	.003
N of Valid Cases	221		
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 20.11.			

Table 10. Country * Weekly Sports Involvement Cross Tabulation

		Sports Activity Frequency				
		Up to 2 hours	2 to 4 hours	More than four hours	Not applicable (Less than weekly)	Total
TURKEY	Count	22	22	29	28	101
	Expected Count	26.0	29.7	25.1	20.1	101.0
	% within Country	21.8%	21.8%	28.7%	27.7%	100.0%
	% within Use of WTD	38.6%	33.8%	52.7%	63.6%	45.7%
	% of Total	10.0%	10.0%	13.1%	12.7%	45.7%
GERMANY	Count	35	43	26	16	120
	Expected Count	31.0	35.3	29.9	23.9	120.0
	% within Country	29.2%	35.8%	21.7%	13.3%	100.0%
	% within Use of WTD	61.4%	66.2%	47.3%	36.4%	54.3%
	% of Total	15.8%	19.5%	11.8%	7.2%	54.3%
Total	Count	57	65	55	44	221
	Expected Count	57.0	65.0	55.0	44.0	221.0
	% within Country	25.8%	29.4%	24.9%	19.9%	100.0%
	% within Use of WTD	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	25.8%	29.4%	24.9%	19.9%	100.0%

4.3 Hypothesis testing

As the first step of the statistical analysis, Cronbach's alpha reliability test has been applied to the data collected from the surveys in order to test the reliability and trustworthiness of the instruments used in this study. Please refer to Table 11.

Table 11. Reliability Analysis of the Scales

Name of the Variable	Number of Items	Cronbach's Alpha
Perceived Usefulness	3	.761
Social Influence	2	.630
Perceived Ease of Use	2	.538
Mobility	2	.505
Availability	2	.615
Attitude	3	.895
Intention	2	.946

As it can be seen from Table 11, intention (α = .946), attitude (α = .895), and perceived usefulness (α = .761) are found to have the highest internal reliability. Social influence (α = .630) and availability (α = .615) are the constructs with lower internal reliability. Perceived ease of use (α = .538) and mobility (α = .505) are the items with lowest internal reliability rates, having less reliability than expected. This relatively poorer internal reliability results of perceived ease of use and mobility might be resulting from the number of items used to measure the variable or sample size.

In order to test the significance of the 'Hypothesis 1: Perceived ease of use will have a positive relationship with perceived usefulness of wearable technology devices', regression analysis is applied. Model summary presented in Table 12 shows that 10.5% of variations in the perceived usefulness of wearable technology devices results from perceived ease of use of these products.

Table 12. Regression Model Summary – Perceived Ease of Use and Perceived Usefulness

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
.325	.105	.101	.82302
Predictors: (Constant), Perceived Ease of Use			

As it can be seen from the significance results reported in Table 13, perceived ease of use has significantly predicted perceived usefulness of wearable technology devices ($F = 25.781$, $p = 0.000 < 0.05$). The results of regression analysis has shown that perceived ease of use of wearable technology devices has an effect on perceived usefulness of them.

Table 13. Regression ANOVA – Perceived Ease of Use and Perceived Usefulness

ANOVA					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	17.463	1	17.463	25.781	.000
Residual	148.341	219	.677		
Total	165.804	220			
Dependent Variable: Perceived Usefulness			Predictors: Perceived Ease of Use		

According to Table 14 showing the coefficients together with the regression analysis we can confidently state that Hypothesis 1 is supported and perceived ease of use has a positive relationship with perceived usefulness of wearable technology devices as supported by the previous literature. When the result of the unstandardized beta coefficient is analysed, it can be concluded that one unit increase in the perceived ease of use of wearable technology devices leads to almost 0.410 units increase in the perceived usefulness of them.

Table 9. Regression Coefficients – Perceived Ease of Use and Perceived Usefulness

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.838	.296		6.209	.000
Perceived Usefulness	.410	.081	.325	5.077	.000
Dependent Variable: Perceived Usefulness					

When Germany and Turkey are compared in terms of the effect of perceived ease of use on perceived usefulness of wearable technology devices, it can be concluded that

perceived usefulness is less effective on shaping the perceived usefulness of wearable technology devices in Germany (R Square = 0.090, $p = 0.001$) than in Turkey (R Square = 0.122, $p = 0.000$) as presented in Table 15.

Table 15. Regression Model Summary – Perceived Ease of Use and Perceived Usefulness in Turkey and Germany

Model Summary					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	Significance
Country = 1 Turkey (n = 101)	.350	.122	.113	.79215	.000
Country = 2 Germany(n = 120)	.300	.090	.082	.85387	.001
	Predictors: (Constant), Perceived Ease of Use				

Simple linear regression analysis is used to test 'Hypothesis 2: Perceived ease of use will have a positive relationship with attitude towards wearable technology devices'. Model summary on Table 16 shows that 15.1% of variation in the attitude towards wearable technology devices results from perceived ease of use of these products.

Table 10. Regression Model Summary – Perceived Ease of Use and Attitude

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
.388	.151	.147	.90048
Predictors: (Constant), Perceived Ease of Use			

Shown by results reported in Table 17, perceived ease of use has significantly predicted attitude towards wearable technology devices ($F = 38.859$, $p = 0.000 < 0.05$). The results show that perceived ease of use of wearable technology devices has an effect on attitude towards them.

Table 17. Regression ANOVA – Perceived Ease of Use and Attitude

ANOVA					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	31.510	1	31.510	38.859	.000
Residual	177.580	219	.811		
Total	209.090	220			
Dependent Variable: Attitude			Predictors: Perceived Ease of Use		

Table 18 shows the coefficients together with the regression analysis and we can confidently state that Hypothesis 2 is not rejected and perceived ease of use positively effects attitude towards wearable technology devices as supported by the previous literature. It can be concluded that one unit increase in the perceived ease of use of wearable technology devices leads to 0.551 units increase in the attitude towards them.

Table 18. Regression Coefficients – Perceived Ease of Use and Attitude

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	66	.324		3.909	.000
Perceived Usefulness	.551	.088	.388	6.234	.000
Dependent Variable: Attitude					

In the country comparison of Germany and Turkey in terms of the effect of perceived ease of use on attitude towards wearable technology devices, it can be concluded that perceived ease of use is less effective on shaping the attitude towards wearable technology devices in Germany (R Square = 0.104, p = 0.000) than in Turkey (R Square = 0.153, p = 0.000) as seen in Table 19.

Table 19. Regression Model Summary – Perceived Ease of Use and Attitude in Turkey and Germany

Model Summary					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	Significance
Country = 1 Turkey (n = 101)	.391	.153	.144	.74167	.000
Country = 2 Germany (n = 120)	.322	.104	.096	.97627	.000
	Predictors: (Constant), Perceived Ease of Use				

In order to test the significance of 'Hypothesis 3: Perceived usefulness will have a positive relationship with attitude towards wearable technology devices', simple linear regression analysis is applied. Table 20 presents the model summary which shows that 38.1% of the variation in attitude towards wearable technology devices results from perceived usefulness of these products.

Table 20. Regression Model Summary – Perceived Usefulness and Attitude

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
.617	.381	.378	.76905
Predictors: (Constant), Perceived Usefulness			

As it can be seen from the regression results reported in Table 21, perceived usefulness has significantly predicted attitude towards wearable technology devices ($F = 134.5$, $p = 0.000 < 0.05$).

Table 21. Regression ANOVA – Perceived Usefulness and Attitude

ANOVA					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	79.564	1	79.564	134.524	.000
Residual	129.526	219	.591		
Total	209.090	220			
Dependent Variable: Attitude			Predictors: Perceived Usefulness		

Table 22 shows the coefficients of the regression analysis, we can confidently state that Hypothesis 3 is supported and perceived usefulness has a positive relationship with attitude towards wearable technology devices as supported by the previous literature. Results show that one unit increase in the perceived usefulness of wearable technology devices leads to about 0.693 units increase in the attitude towards them.

Table 22. Regression Coefficients – Perceived Usefulness and Attitude

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.953	.205		4.661	.000
Perceived Usefulness	.693	.060	.617	11.598	.000
Dependent Variable: Attitude					

When countries are compared, it can be concluded that perceived usefulness is more effective on shaping the attitude towards wearable technology devices in Germany (R Square = 0.460, $p = 0.000$) than in Turkey (R Square = 0.315, $p = 0.000$). Model summary in Table 23 presents the statistical analysis results.

Table 23. Regression Model Summary – Perceived Usefulness and Attitude in Turkey and Germany

Model Summary					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	Significance
Country = 1 Turkey (n = 101)	.561	.315	.308	.66689	0.000
Country = 2 Germany (n = 120)	.678	.460	.455	.75813	0.000
	Predictors: (Constant), Perceived Usefulness				

To test the significance of the ‘Hypothesis 4: Perceived usefulness will have a positive relationship with intention to use wearable technology devices’, again, linear regression analysis is applied. Model summary in Table 24 shows that 25% of the

variation on the intention to use wearable technology devices results from perceived usefulness of these products.

Table 24. Regression Model Summary – Perceived Usefulness and Intention

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
.500	.250	.246	1.10331
Predictors: (Constant), Perceived Usefulness			

As seen from the results reported in Table 25, perceived usefulness has significantly predicted intention to use wearable technology devices ($F = 72.929$, $p = 0.000 < 0.05$). The results of regression analysis has shown that perceived usefulness of wearable technology devices has an relationship with intention to use them.

Table 25. Regression ANOVA – Perceived Usefulness and Intention

ANOVA					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	88.776	1	88.776	72.929	.000
Residual	266.588	219	1.217		
Total	355.364	220			
Dependent Variable: Intention			Predictors: Perceived Usefulness		

According to Table 26 we can confidently state that Hypothesis 4 is supported and perceived usefulness has a positive relationship with intention to use wearable technology devices as indicated by previous literature. When the unstandardized beta coefficients are analysed, it can be concluded that one unit increase in the perceived usefulness of wearable technology devices leads to 0.732 units increase on intention to use them.

Table 26. Regression Coefficients – Perceived Usefulness and Intention

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.496	.293		1.690	.092
Perceived Usefulness	.732	.086	.500	8.540	.000
Dependent Variable: Intention					

In terms of this effect of perceived usefulness on attitude, according to country comparison, it can be concluded that perceived usefulness is more effective on shaping the intention to use wearable technology devices in Germany (R Square = 0.277, $p = 0.000$) than in Turkey (R Square = 0.220, $p = 0.000$) as it can be concluded from Table 27.

Table 27. Regression Model Summary – Perceived Usefulness and Intention in Turkey and Germany

Model Summary					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	Significance
Country = 1 Turkey (n = 101)	.469	.220	.213	.96517	0.000
Country = 2 Germany (n = 120)	.526	.277	.270	1.14911	0.000
	Predictors: (Constant), Perceived Usefulness				

Next, ‘Hypothesis 5: Attitude will have a positive relationship with intention to use wearable technology devices.’ is tested and according to the model summary presented in Table 28, more than half of the variation on intention to use results from attitude towards these products.

Table 28. Regression Model Summary – Attitude and Intention

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
.740	.547	.545	.85692
Predictors: (Constant), Attitude			

Shown in Table 29, attitude has significantly predicted intention to use wearable technology devices ($F = 264.939$, $p = 0.000 < 0.05$). The results of simple linear regression analysis shows that attitude towards wearable technology devices has an effect on intention to use them.

Table 29. Regression ANOVA – Attitude and Intention

ANOVA					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	194.549	1	194.549	264.939	.000
Residual	160.815	219	.734		
Total	355.364	220			
Dependent Variable: Intention			Predictors: Attitude		

By looking at Table 30 showing the coefficients together with the regression analysis we can confidently state that Hypothesis 5 is not rejected and attitude is found to have a positive relationship with intention to use wearable technology devices as supported by the previous literature. A very strong correlation is found between attitude and intention as previously confirmed and proven in the literature on technology acceptance models and patterns among consumers. When the result are analysed, it can be concluded that one unit increase in the perceived usefulness of wearable technology devices leads to almost 1 unit increase on intention to use them.

Table 30. Regression Coefficients – Attitude and Intention

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	-.213	.201		-1.060	.290
Attitude	.965	.059	.740	16.277	.000
Dependent Variable: Intention					

In terms of country comparison, when Germany and Turkey are compared in terms of the effect of attitude on intention to use wearable technology devices, it can be concluded that attitude is almost equally effective on shaping the intention to use wearable technology devices in Turkey (R Square = 0.520, p = 0.000) as in Germany (R Square = 0.518, p = 0.000). Please see Table 31 showing the statistical results.

Table 31. Regression Model Summary – Attitude and Intention in Turkey and Germany

Model Summary					
	R	R Square	Adjusted R Square	Std. Error of the Estimate	Significance
Country = 1 Turkey (n = 101)	.721	.520	.515	.75761	0.000
Country = 2 Germany (n = 120)	.720	.518	.514	.93766	0.000
	Predictors: (Constant), Attitude				

Hypothesis 6: Country difference has an effect on perceived usefulness of wearable technology devices was tested next through independent samples t-test, in order to determine whether there is a statistically significant difference between the means of Germany and Turkey in terms of perceived usefulness of wearable technology devices.

Mean results of Turkey and Germany samples in the case of perceived usefulness is quite similar as presented in Table 32, Turkey with mean of 3.3663 and Germany with 3.2694. When further investigated through Levene's test for equality

of variances shown in Table 33, equal variances can be assumed. Independent samples test results show that perceived usefulness is not found to be affected by country ($t(219) = 0.826$, $p = 0.410$).

Table 32. Group Statistics – Perceived Usefulness

Group Statistics				
	N	Mean	Standard Deviation	Standard Error Mean
TURKEY	101	3.3663	.84130	.08371
GERMANY	120	3.2694	.89118	.08135
	Perceived Usefulness			

Table 33. Independent Samples Test – Perceived Usefulness in Turkey and Germany

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.144	.704	0.826	219	.410	.09689	.11731	-.13431	.32810
Equal variances not assumed			0.830	216.103	.407	.70078	.09689	.11673	-.13319
Perceived Usefulness									

In order to determine whether there is a statistically significant difference between the means of Germany and Turkey in terms of attitude towards wearable technology devices, independent samples t-test is used in for testing Hypothesis 7: Country difference has an effect on attitude towards wearable technology devices.

When the means are compared, a difference is noticed. Mean of Turkey and Germany in the case of attitude towards wearables is found to have a meaningful difference in the means. Table 34 presents mean statistics; Turkish sample has a mean of 3.5710 and German sample has a mean of 2.9778. Levene's test for equality of variances indicates that equal variances cannot be assumed. Table 35 Independent t-test results show that difference between the two country samples exist ($t(219) = 4.719$, $p = 0.000$). Therefore, the hypothesis is not rejected and it can be concluded that country has an effect on attitude towards wearable technology devices.

Table 34. Group Statistics – Attitude

Group Statistics				
	N	Mean	Standard Deviation	Standard Error Mean
TURKEY	101	3.5710	.80185	.07979
GERMANY	120	2.9778	1.02693	.09375
	Attitude			

Table 35. Independent Samples Test – Attitude in Turkey and Germany

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	7.609	.006	4.719	219	.000	.59318	.12571	.34543	.84093
Equal variances not assumed			4.819	217.828	.000	.59318	.12310	.35055	.83580
Attitude									

With an aim to test Hypothesis 8: Social influence will have positive effects on perceived usefulness of wearable technology devices, simple linear regression analysis is applied. Model summary shows that only 12.3% of the variation on the

perceived usefulness of wearable technology devices can be attributed to social influence. Please refer to Table 36.

Table 36. Regression Model Summary – Social Influence and Perceived Usefulness

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
.351	.123	.119	.81464
Predictors: (Constant), Social Influence			

As it can be seen from the significance results reported in Table 37, social influence has significantly predicted perceived usefulness of wearable technology devices ($F = 30.841$, $p = 0.000 < 0.05$). The analysis results show that social influence has an effect on perceived usefulness of wearable technology devices.

Table 37. Regression ANOVA – Social Influence and Perceived Usefulness

ANOVA					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	20.467	1	20.467	30.841	.000
Residual	145.337	219	.664		
Total	165.804	220			
Dependent Variable: Perceived Usefulness			Predictors: Social Influence		

According to Table 38 showing the coefficients together with the regression analysis results, we can confidently state that Hypothesis 8 is supported and social influence has a positive relationship with perceived usefulness of wearable technology devices. It can be concluded that one unit increase in the social influence leads to 0.320 unit increase on perceived usefulness of wearable technology devices.

Table 38. Regression Coefficients – Social Influence and Perceived Usefulness

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.633	.134		19.609	.000
Attitude	.320	.058	.351	5.553	.000
Dependent Variable: Perceived Usefulness					

Next, regression analysis is applied with the aim of testing Hypothesis 9: Social influence will have positive effects on attitude towards wearable technology devices. Model summary on Table 39 shows that almost one quarter of variations on the attitude towards wearable technology devices results from social influence.

Table 39. Regression Model Summary – Social Influence and Attitude

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
.490	.240	.236	.85189
Predictors: (Constant), Social Influence			

As it can be seen from the significance results reported in Table 40, social influence has significantly predicted attitude towards wearable technology devices ($F = 69.115$, $p = 0.000 < 0.05$) and it can be stated that social influence has an effect on attitude towards wearable technology devices.

Table 40. Regression ANOVA – Social Influence and Attitude

ANOVA					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	50.158	1	50.158	69.115	.000
Residual	158.932	219	.726		
Total	209.090	220			
Dependent Variable: Attitude			Predictors: Social Influence		

According to Table 41, we can confidently state that Hypothesis 9 is not rejected and social influence has a positive relationship with attitude towards wearable technology devices. Coefficient results indicate that one unit increase in the social influence leads to 0.502 unit increase on attitude towards wearable technology devices.

Table 41. Regression Coefficients – Social Influence and Attitude

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	2.183	.140		15.548	.000
Attitude	.502	.060	.490	8.314	.000
Dependent Variable: Attitude					

In addition to above findings on the effects of social influence on attitude, our cross-cultural study allows us to further analyse social influence. As a result of the group statistics on Table 42 and two population independent samples t-test shown on Table 43, it can be concluded that there is a significant difference between the effects of social influence in Germany and Turkey when it comes to usage and valued features of wearable technology devices. When the means are compared, it can be seen that the effects of social influence is higher in Turkey (mean = 2.5050) than it is in Germany (mean = 1.8042) and this difference is significant ($t = 5.800$, $p = 0.000 < 0.05$).

Table 42. Group Statistics – Social Influence

Group Statistics				
	N	Mean	Standard Deviation	Standard Error Mean
Country = 1 Turkey	101	2.5050	.93406	.09294
Country = 2 Germany	120	1.8042	.84589	.07722
	Social Influence			

Table 43. Independent Samples Test – Social Influence in Turkey and Germany

Independent Samples Test									
	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.180	.672	5.849	219	.000	.70078	.11981	.46466	.93691
Equal variances not assumed			5.800	204.014	.000	.70078	.12084	.46254	.93903
Social Influence									

Finally, we examine the effect of mobility and availability together on perceived ease of use. Mobility and availability are found to be explaining almost one fourth of the variations on the perceived ease of use of wearable technology devices as can be seen from Table 44.

Table 44. Regression Model Summary – Mobility, Availability and Perceived Ease of Use

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
.490	.240	.233	.60425
Predictors: (Constant), Mobility and Availability			

According to the results reported in Table 45, mobility and availability have significantly predicted perceived ease of use of wearable technology devices ($F = 34.130$, $p = 0.000 < 0.05$). The results of the regression analysis has shown that mobility and availability together have an effect on perceived ease of use of wearable technology devices.

Table 45. Regression ANOVA – Mobility, Availability and Perceived Ease of Use

ANOVA					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	24.923	2	12.462	34.130	.000
Residual	78.867	216	.365		
Total	103.790	218			
Dependent Variable: Perceived Ease of Use			Predictors: Mobility, Availability		

However, according to Table 46 we can confidently state that Hypothesis 11 is rejected while Hypothesis 10 is not. Availability is not found to have a positive relationship with perceived ease of use of wearable technology devices.

Table 46. Regression Coefficients – Mobility and Perceived Ease of Use

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.886	.213		8.849	.000
Availability	.108	.056	.131	1.934	.054
Mobility	.362	.059	.413	6.098	.000
Dependent Variable: Perceived Ease of Use					

On the other hand, when only measured in Turkey, availability is found to be significantly affecting perceived ease of use ($p = 0.015 < 0.05$) as seen in Table 47.

Table 47. Regression Coefficients – Mobility and Perceived Ease of Use in Turkey

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.693	.323		5.247	.000
Availability	.205	.082	.239	2.485	.015
Mobility	.354	.086	.394	4.101	.000
Dependent Variable: Perceived Ease of Use Selecting only cases for which Country = TURKEY					

CHAPTER 5

CONCLUSION

In this chapter, the research findings presented formerly in this study will be overall reviewed and the relationship between variables affecting consumer acceptance of wearable technology devices are discussed. Furthermore, under this section, scientific contribution and managerial implications of this study are discussed while introducing the limitations the study faces and providing suggestions for further research.

As the aim of this study was trying to understanding the factors behind consumer acceptance of wearable technology devices in two different cultures, extended TAM model is constructed and the hypotheses are individually tested. First of all, findings have shown that the technology acceptance model formed by Davis (1989) is proved to be valid and applicable for wearable technology products. Our study has shown that perceived ease of use has an effect on perceived usefulness, the more a consumer perceives a smartwatch easy to use the more likely that they will also perceive this product as useful. Moreover, when a product is found to be easy to use, consumers also build a positive attitude towards it. Validating the results of Davis (1989), our study has affirmed that perceived usefulness of smartwatches effects both attitude towards them and the intention to own and use a smartwatch. Having a very strong correlation, one unit increase in the perceived usefulness of a smartwatch leads to almost 0.70 unit increase in attitude towards them and 0.73 unit increase in intention to use a smartwatch. The strongest and the most significant relationship is found to be between attitude and intention, again validating the results on the original technology acceptance model of Davis (1989). To put with an

example, a hundred percent increase in positive attitude toward smartwatches leads to hundred percent higher intention to use a smartwatch. Our respondents have a tendency to fully associate intention with attitude, when positive attitudes are formed towards smartwatches the intention to buy one increases respectively. In contrary, when a consumer has a negative attitude toward a smartwatch, the intention to own one is unlikely, excluding the effects of other external factors.

In this cross-cultural study, we have also investigated the country effect on perceived usefulness and attitude. Country differentials were sports culture, representing the popularity of regular physical activities; and life expectancy and uncertainty avoidance which differ between the two countries that comprise our sample, Germany and Turkey. According to the findings, while perceived usefulness did not differ in Germany in Turkey, attitude on the other hand is found to be shaped by the country and thus culture. When means are compared and the results of the independent samples t-tests are taken into consideration, it is found that Turkish people hold a more positive attitude towards smartwatches than the Germans.

Social influence received from the environment is found to have a positive relationship with perceived usefulness of smartwatches and attitude towards them. This relationship is stronger between social influence and attitude compared to social influence and perceived usefulness. The study shows that when people receive positive influence about a smartwatch from their environment, there is higher likelihood of them to shape a more positive attitude towards smartwatches, which than leads to positive intention to use and purchase one. More interestingly, our study has revealed that Turkish people are more likely to be affected by social influence. As a result of the mean comparison, it is found that the effects of social influence are higher in Turkey. According to the findings of this study, it is found

that Turkish people are more influenced by their social cycle and they form a more positive attitude towards smartwatches. Furthermore the social media usage in both cultures were also measured, suspecting a potential positive correlation with smartwatch usage and social media usage. Results have proven our suspects to be correct as there is a more positive attitude towards smartwatches in Turkey with much higher social media usage. The more consumers are exposed to positive social influence on smartwatch usage and the more they are active on social media, the stronger positive attitudes are formed.

Last but not the least, as mobility is a very popular and essential consideration in our age, our study also investigated the relationship between mobility provided by smartwatches and their perceived ease of use. Our study results show that while mobility has a significant relation with the perceived usefulness of smartwatches, whereas availability has no relationship. However, when the results were analyzed at the country level, it was observed that Turkish respondents positively associated smartwatches' perceived usefulness and their availability. Overall, according to the statistical findings of this study, mobility is one of the features shaping the perception towards usefulness of smartwatches. Consumers who think a smartwatch has good mobility, also think that it is useful.

5.1 Contribution to the literature

To begin with, this study contributes to a limited body and extent of research, as academical studies on smartwatches are still rare. So by investigating this important and promising topic which is yet still not fully explored and rather under-researched, it is believed that this study adds to the literature.

In addition to once more validating well-known and widely used technology acceptance model of Davis (1989), this study particularly introduces sports culture, life expectancy and uncertainty avoidance all under country effect, measuring their potential relationship with acceptance of smartwatches. Availability and mobility variables are also used as a part of the extended model, through which new independent factors are added, revealing more findings on consumer acceptance patterns for technology products and smartwatches in particular.

As the nature of this study allowed us to do so, the study was conducted in two countries. This cross-cultural research allows interested parties to gain exploratory information on the differences between consumer acceptance in two different cultures.

5.2 Managerial implications

The study also has a contribution towards the industry not only for the technology products area but also to all areas in general as the insights and findings lead us to make further comments on the overall effect of consumer behavior on adaption and purchasing decision making. To some extent, managers of technology companies who chase after growth in their businesses in terms of acquiring bigger market share and creating further demand can use this study as an exploratory tool that allows them with insights and findings on consumer adaptation to technology devices and intention to own one.

Furthermore, by getting closer to exploring the factors behind wearable technology acceptance and the effect of culture, companies may be able to understand the consumers better and serve them accordingly, with customized features and characteristics per culture and target group. Despite the fact that the

focus of this research is on smartwatches, managerial implications are believed to be transferrable to other wearable technology devices in general.

5.3 Limitations and future research

When interpreting this study, it should be kept in might that the study has limitations and room for future research. As a limitation, we can present the differences between the sample groups, the German and Turkish students. The facts that average age of the German sample is higher and Turkish students are selected from a social science background whereas the study area is more homogenous in the German sample can be named as limitations. Further, the ability to show this study as a pure comparison between Turkish and German culture is limited due to all samples being students from selected universities which result in the decreased representation of the overall culture. In potential research, the scale of this study can be enlarged and made more representative by having more homogenous samples.

As the main focus of the research instrument used in this study was smartwatches, rather than wearable technology devices in general on a broader scale, ability to validate or generalize the findings on a larger scale is limited. This limitation of the study embeds the potential to explore more about consumer acceptance of products and services if applied to different countries and fields. Furthermore, since the participants of the questionnaires are not necessarily smartwatch users, the level of knowledge on the area might potentially be a factor among the limitations.

Taking into consideration the fact that the reliability levels of the items are not very significant, a more tailored and extended instrument can be designed in order to have more reliable and valid findings. If more detailed questions are to be

included, such as measuring the country effect variables on a deeper scale with questions evaluating uncertainty avoidance, the extent and contribution of further studies can be improved.

APPENDIX A

SURVEY INSTRUMENT

Please note that this questionnaire has been created under the scope of a Master's degree thesis study. All data will be anonymous and will not be shared with 3rd parties by any means. A smartwatch is a wearable computer in the form of a wristwatch. A smartwatch is a wearable technology device enabling users to track daily sports activities such as burned calories and distances achieved; and health-related data including measuring blood pressure, pulse and sleeping patterns. Today's smartwatches have general functionality closer to smartphones, including mobile apps, a mobile operating system and Wi-Fi/Bluetooth/GPS connectivity. Depending on the software and model, smartwatches might include a broad range of features such as a digital map, personal organizer, digital camera, constant availability through sending and receiving calls, texts and emails. All data received through the device is available to be shared online upon the users' preference.

Survey Questions

1. What is your gender?

a. Male

b. Female

c. Prefer not to answer

2. Your age? _____

3. What is your area of study? _____

4. Do you use a smartwatch?

a. Yes

b. No

c. Previously used

(Please specify reason for termination of usage: _____)

5. How often do you participate in sport or physical activity?

a. Daily

b. A few times per week

c. A few times per month

d. A few times per year

e. Never

6. How many hours a week, on average, do you participate in sport or physical activity?

a. Up to 2 hours

b. 2 - 4 hours

c. More than 4 hours

d. Not applicable

7. How much time, on average, do you spend on social media each day?

a. Less than 30 minutes

b. 30 - 60 minutes

c. 1 - 3 hours

d. More than 3 hours

e. I do not use social media

8. What is your average monthly net income?

a. Less than €1000

b. €1001 - €2000

c. €2001 - €3000

d. €3001 - €4000

e. More than €4001

Please indicate to what extent you agree with the following statements.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Using a smartwatch would help me productively complete my tasks.					
A smartwatch would be useful in tracking my health data.					
Using a smartwatch would make it easier to track my sports activities.					
Using a smartwatch would enhance my image in others' eyes.					
Ability to share my user statistics on social media platforms is an important feature of a smartwatch.					
I find smartwatches easy to use in general.					
Using a smartwatch does not require a lot of my mental effort.					
A smartwatch has good mobility.					
I feel I can use a smartwatch anywhere.					
I can use a smartwatch any time I want to get the desired information and service.					
A smartwatch offers the sense of real-time connectedness.					
Using a smartwatch is a good idea.					
I like the idea of using a smartwatch.					
Overall, using a smartwatch is beneficial.					
I predict I will use a smartwatch in the future.					
I plan to use a smartwatch in the future.					

Thank you for your participation!

APPENDIX B

SURVEY INSTRUMENT (TURKISH)

Elinizde bulunan anket bir yüksek lisans programının tez çalışması için hazırlanmıştır. Anket kapsamında toplanan tüm veriler anonim olacak ve hiç bir koşul altında 3.kişi ve kurumlarla paylaşılmayacaktır. Akıllı saatler kol saati şeklinde kullanılan kişisel bilgisayarlardır. Akıllı saatler kullanıcıların yakılan kaloriler ve katedilen mesafeler gibi günlük spor aktivitelerini ve kan basıncı, nabız ve uyku düzeni gibi tıbbi verileri takip etmelerini sağlar. Günümüzün akıllı saatleri, mobil uygulamalar, mobil işletim sistemi ve WiFi / Bluetooth / GPS bağlantısı dahil olmak üzere akıllı telefonlara daha yakın genel bir işlevselliğe sahiptir. Yazılım ve modele bağlı olarak akıllı saatler dijital harita, kişisel planlayıcı, dijital kamera ve buna ek olarak anlık arama, mesajlaşma ve e-posta gönderimi/alımı gibi bir çok özellik içerebilmektedir. Cihaz üzerinden alınan tüm veriler, kullanıcıların tercihleri doğrultusunda çevrimiçi olarak paylaşılabilir.

Anket Soruları

1. Cinsiyetiniz?

a. Kadın

b. Erkek

c. Cevaplamamayı tercih ederim

2. Yaşınız? _____

3. Öğrenim alanınız nedir? _____

4. Bir akıllı saat kullanıyor musunuz?

a. Evet

b. Hayır

c. Geçmişte kullanmıştım

(Lütfen kullanımı sonlandırmadaki ana etkeni belirtiniz: _____)

5. Spor veya benzeri fiziksel aktivitelerde bulunma sıklığınız nedir?

a. Her gün

b. Haftada bir kaç defa

c. Ayda bir kaç defa

d. Yılda bir kaç defa

e. Hiç bir zaman

6. Haftada ortalama olarak kaç saatinizi spor ve benzeri fiziksel aktivitelere ayırırsınız?

a. 2 saate kadar

b. 2 - 4 saat

c. 4 saatten fazla

d. Haftalık düzeyde spor ve benzeri fiziksel aktivite yapmıyorum

7. Günde ortalama ne kadar vaktinizi sosyal medya platformlarına ayırırsınız?

a. 30 dakikadan daha az

b. 30 - 60 dakika

c. 1 - 3 saat

d. 3 saatten fazla

e. Sosyal medya hesabı kullanmıyorum

8. Aylık ortalama geliriniz?

a. 1000 TL'den az

b. 1001 TL - 2000 TL

c. 2001 TL - 3000 TL

d. 3001 TL - 4000 TL

e. 4001 TL ve üzeri

Lütfen aşağıdaki ifadelere ne ölçüde katıldığınızı belirtiniz.

	Kesinlikle Katılmıyorum	Katılmıyorum	Ne katılıyorum Ne katılmıyorum	Katılıyorum	Kesinlikle katılıyorum
Akıllı saat kullanmak, günlük işlerimi verimli bir şekilde tamamlamama yardımcı olacaktır.					
Sağlık verilerimin izlenmesinde akıllı saat faydalı olacaktır.					
Akıllı saat kullanımı spor aktivitelerimin takibini kolaylaştıracaktır.					
Akıllı saat kullanımı, başkalarının gözündeki imajımı geliştirecektir.					
Kullanıcı istatistiklerimi sosyal medya platformlarında paylaşabilme imkanı, bir akıllı saatin önemli özelliklerindendir.					
Akıllı saat genel olarak kullanılması kolay bir üründür.					
Akıllı saat kullanımı fazla miktarda zihinsel çabamı gerektirmez.					
Akıllı saat iyi bir mobiliteye (taşınabilirliğe) sahiptir.					
Akıllı saati her yerde kullanabileceğimi hissediyorum.					
Akıllı saati istediğim bilgi ve hizmeti almak için her an kullanabilirim.					
Akıllı saat gerçek zamanlı bağlantı hissi sunar.					
Akıllı saat kullanmak iyi bir fikirdir.					
Akıllı saat kullanma fikri hoşuma gider.					
Genel olarak, akıllı saat faydalı bir üründür.					
Gelecekte bir akıllı saat kullanıcısı olacağımı tahmin ediyorum.					
Gelecekte akıllı saat kullanmayı planlıyorum.					

Katılımınız için teşekkürler!

APPENDIX C

SURVEY INSTRUMENT (GERMAN)

Diese Umfrage wurde im Rahmen einer Masterarbeit erstellt. Alle Daten werden vertraulich behandelt und bleiben anonym. Eine Smartwatch ist ein tragbarer Computer in Form einer Armbanduhr. Eine Smartwatch ist ein tragbares Technologiegerät, mit dem Benutzer ihre täglichen sportlichen Aktivitäten wie verbrannte Kalorien und erzielte Distanzen verfolgen können. Die Smartwatch gibt Auskunft über gesundheitsbezogene Daten, einschließlich der Messung von Blutdruck, Puls und Schlafverhalten. Die Smartwatch bietet allgemeine Funktionen, die näher an Smartphones liegen, darunter mobile Apps, ein mobiles Betriebssystem und Wi-Fi / Bluetooth / GPS-Verbindungen nach Software und Modell können Smartwatches eine breite Palette von Funktionen wie digitale Landkarte, persönlicher Organizer, Digitalkamera und ständige Verfügbarkeit durch Senden und Empfangen von Anrufen, Nachrichten und E-Mails enthalten. Alle über das Gerät empfangenen Daten können nach Belieben des Benutzers online geteilt werden.

Umfrage Fragen

1. Geschlecht?

a. Männlich

b. Weiblich

c. Keine Angabe

2. Alter? _____

3. Studienbereich/-fach? _____

4. Benutzen Sie eine Smartwatch?

a. Ja

b. Nein

c. Nicht mehr

(Bitte geben Sie den Grund an für die Beendigung der Verwendung: _____)

5. Wie oft machen Sie Sport oder nehmen an einer sportlichen Aktivität teil?

a. Täglich

b. Einige Male pro Woche

c. Einige Male im Monat

d. Einige Male im Jahr

e. Nie

6. Wie viele Stunden in der Woche betätigen Sie sich sportlich?

a. Bis zu 2 Stunden

b. 2 - 4 Stunden

c. Mehr als 4 Stunden

d. Nicht zutreffend

7. Wie viel Zeit verbringen Sie im Durchschnitt täglich mit Social Media?

a. Weniger als 30 Minuten

b. 30 - 60 Minuten

c. 1 - 3 Stunden

d. Mehr als 3 Stunden

e. Ich benutze kein Social Media

8. Wie hoch ist Ihr durchschnittliches monatliches Nettoeinkommen?

a. Weniger als €1000

b. €1001 - €2000

c. €2001 - €3000

d. €3001 - €4000

e. Über €4001

Bitte geben Sie an inwieweit die folgenden Aussagen auf Sie zutreffen.

	Trifft überhaupt nicht zu				Trifft voll und ganz zu
Eine Smartwatch würde mir dabei helfen meine Aufgaben produktiv zu erledigen.					
Eine Smartwatch wäre nützlich, um meine Gesundheitsdaten zu verfolgen.					
Die Verwendung einer Smartwatch erleichtert das Nachverfolgen meiner sportlichen Aktivitäten.					
Die Verwendung einer Smartwatch würde mein Image in den Augen anderer verbessern.					
Die Möglichkeit meine Benutzerstatistiken auf Social Media-Plattformen zu teilen, ist eine wichtige Eigenschaft einer Smartwatch.					
Ich finde Smartwatches im Allgemeinen einfach zu bedienen.					
Die Verwendung einer Smartwatch erfordert keine großen mentalen Anstrengungen.					
Eine Smartwatch bietet Raum für Mobilität.					
Ich habe das Gefühl ich kann eine Smartwatch überall verwenden.					
Ich kann eine Smartwatch jederzeit verwenden, wenn ich die gewünschten Informationen und den gewünschten Dienst erhalten möchte.					
Eine Smartwatch bietet das Gefühl von Echtzeit-Verbundenheit.					
Die Verwendung einer Smartwatch ist eine gute Idee.					
Ich mag die Idee eine Smartwatch zu verwenden.					
Insgesamt ist die Verwendung einer Smartwatch von Vorteil.					
Ich gehe davon aus, dass ich in Zukunft eine Smartwatch verwenden werde.					
Ich habe vor, in Zukunft eine Smartwatch zu verwenden.					

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