SALIENT CONSTRUCTS TO ENHANCE THE ACCEPTANCE OF WEARABLE MEDICAL DEVICES: AN EXPLORATORY RESEARCH

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ABSTRACT

SALIENT CONSTRUCTS TO ENHANCE THE ACCEPTANCE OF WEARABLE MEDICAL DEVICES: AN EXPLORATORY RESEARCH

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Wearables are becoming more ubiquitous and they have many functions and benefits for healthy living and aging. In this context, the acceptance of wearable medical devices depends on user acceptance and it is vital. Yet, existing understanding in this field needs firm improvement. Hence, the main objective of this research is to distill salient constructs to enhance the acceptance of wearable medical devices. Specifically, it is chiefly aimed to identify factors, associated items, & interactions of the factors. For this purpose, an original questionnaire was developed and deployed, and data were collected from 1057 people from a developing country, Turkey, to draw conclusions. A partial least squares structural equation modeling consisting of exploratory & confirmatory factor analyses was applied by data collection, model specification, identification, estimation, evaluation, & modification. On the subject of principal success factors to enhance the acceptance of wearable medical devices, 11 salient constructs (attitude and behavioral intention; dependability; design; device characteristics and features; worthiness; perceived usefulness; privacy, confidentiality, and security; perceived ease of use; compatibility; promotion; user characteristics) with 39 items and 18 statistically significantly meaningful relationships among these constructs were distilled. Consequently, composed of distilled constructs and their associations, a novel model was developed. Additionally, descriptive statistics, multi-group analyses, and quasi-statistics were conducted for further inferences. This research contributes to the body of knowledge regarding the acceptance of wearable medical devices with distilled new results. These contributions advance the understanding in this context and are going to be beneficial for both researchers and product developers.

Keywords: wearable medical devices, acceptance, critical success factors, attitude and behavioral intention, healthy living and aging

ÖZ

GİYİLEBİLİR MEDİKAL CİHAZLARIN KABULÜNÜ GELİŞTİRMEK İÇİN ÖNEMLİ ÖGELER: KEŞİFSEL BİR ARAŞTIRMA

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Giyilebilir teknolojiler gün geçtikçe daha yaygın hâle geliyor ve bunların sağlıklı yaşam ve yaşlanma için birçok işlev ve faydaları söz konusudur. Bu bağlamda, giyilebilir medikal cihazların kabulü kullanıcının kabulüne bağlıdır ve giyilebilir medikal cihazların kabulü hayati önem taşır. Öte yandan, bu alandaki mevcut anlayış ve kavrayışın sağlam bir şekilde iyileştirilmesi gerekmektedir. Bu nedenle, bu araştırmanın temel amacı, giyilebilir medikal cihazların kabulünü artırmak için önemli faktörleri damıtmaktır. Özellikle, faktörlerin, ilişkili unsurların ve faktörlerin etkileşimlerinin tanımlanması esas olarak amaçlanmaktadır. Orijinal bir anket oluşturulup uygulandı ve sonuç çıkarmak için veriler gelişmekte olan bir ülkedeki, Türkiye, 1057 kişiden toplandı. Açımlayıcı ve doğrulayıcı faktör analizlerinden oluşan kısmi en küçük kareler yapısal eşitlik modellemesi, veri toplama, model belirtimi, tanımlama, tahmin, değerlendirme ve modifikasyon adımlarıyla uygulandı. Giyilebilir medikal cihazların kabulünü artıran temel başarı faktörleri konusunda, 11 önemli öge (tutum ve davranışsal niyet; güvenilebilirlik; tasarım; cihaz özellikleri; değerlik; algılanan kullanışlılık; mahremiyet, gizlilik ve güvenlik; algılanan kullanım kolaylığı; uyumluluk; tutundurma; kullanıcı özellikleri) 39 madde ve bu ögeler arasında 18 anlamlı ilişki damıtıldı. Sonuç olarak, ögeler ve bunların etkileşimlerinden oluşan yeni bir model geliştirildi. Ayrıca, ilave çıkarımlar için tanımlayıcı istatistikler, çoklu grup analizleri ve yarı-istatistikler uygulandı. Bu araştırma, damıtılmış yeni sonuçlarla, giyilebilir medikal cihazların kabul edilmesine ilişkin bilgi birikimine katkıda bulunmaktadır. Bu katkılar, bu bağlamdaki anlayışı ilerletecek ve hem araştırmacılar hem de ürün geliştiriciler için faydalı olacaktır.

Anahtar Sözcükler: giyilebilir medikal cihazlar, kabul, kritik başarı faktörleri, tutum ve davranışsal niyet, sağlıklı yaşam ve yaşlanma

To My Dear Father

HACI DEĞERLİ

(1958–2015)

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Steve Jobs, one of my picks as a difference-maker, said, "One of the ways that I believe people express their appreciation to the rest of humanity is to make something wonderful and put it out there." That's why, I also must express thanks to all people making Apple, Google, and TED happen. Their products and services helped me much in this expedition.

Last but not least, I want to thank all and sundry with whom I experienced great things in this life. They really helped me enjoy life, experience new things, and make a difference.

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LIST OF ABBREVIATIONS

ABI	Attitude & Behavioral Intention
ASS	After-sales Support
ATT	Attitude
AVE	Average Variance Extracted
BAN	Balanced Notifications
BIN	Behavioral Intention
BMI	Body Mass Index
CMP	Compatibility
CR	Composite Reliability
Cum.	Cumulative
CUS	Customization
DCF	Device Characteristics and Features
DES	Design
df	Degree of Freedom
DLC	Development Level of the Country
DPD	Dependability
DSF	Data Sharing Feature
ENF	Environmental Friendliness
ESE	Explanations for Side Effects
GOS	Government Support
ID	Identifier
IDO	Involving Doctors
kg	Kilogram
KMO	Kaiser-Meier-Olkin
m	Meter
Max.	Maximum
METU	Middle East Technical University
Min.	Minimum
N	Number
PAN	Proactive Alerts and Notifications
PCS	Privacy, Confidentiality, and Security
PEU	Perceived Ease of Use

PLS	Partial Least Squares
PRO	Promotion
PUS	Perceived Usefulness
REC	Robust to Environmental Conditions
SEM	Structural Equation Modeling
Sig.	Significance
SPF	Special Functions
TRY	Turkish Lira
UCA	User Characteristics
UNA	Use of Nanotechnology
Var.	Variance
VIF	Variance Inflation Factor
WHO	World Health Organization
WOR	Worthiness
#	Number
%	Percent

CHAPTER 1

INTRODUCTION

In this chapter, the background and motivation for the research are given. Furthermore, comprehensive information about relevant prominent studies, research questions, and the progression of the research are provided.

1.1. Background and Motivation

1.1.1. Wearable Medical Devices

To improve the quality of life for everyone in the community from newborns to older people, technology is there as a salient instrument. For an active and healthy living, technology is appreciatively there to be employed. In this context, the application of information technologies like wearables intensely renovates our current and future healthcare views and experiences (Bates, Cresswell, Wright, & Sheikh, 2017; Page, 2015). Wearable medical devices are the instruments, which especially provide medical monitoring and support, those people wear especially to manage and improve their health. The main examples of these devices are smartwatches, smart clothes, smart glasses, sports/activity trackers, or various sensors placed on a body (Reeder & David, 2016; Wright & Keith, 2014).

By definition, wearable medical devices are autonomous and noninvasive, and they perform certain medical functions of monitoring or support for an extended duration. Moreover, these devices are supported by either the human body or clothing (Hemapriya, Viswanath, Mithra, Nagalakshmi, & Umarani, 2017). For a wearable medical device to attach to a body, the wrist is the most fortunate place (Fang & Chang, 2016) and accordingly, smartwatches are the foremost disseminated one among all wearable devices (Chuah et al., 2016; Dehghani, 2018; Jung, Kim, & Choi, 2016). For inclusive integrated care, investments in information and communication technologies are a must for both today and the future (Araujo de Carvalho et al., 2017). Besides, there are also assistive technologies to support health (Do, Pham, Sheng, Yang, & Liu, 2018). The primary persistence of assistive health technology is to sustain and advance people's functioning and well-being (World Health Organization, 2015).

Wearables are becoming more ubiquitous and they have many benefits for our life (Erdmier, Hatcher, & Lee, 2016; Seshadri, Rowbottom, Drummond, Voos, & Craker, 2016; Steven Kohn, 2018). Effective and sustainable wearable devices are going to bring about positive changes for not only individuals but also societies at large (J. Lee, Kim, Ryoo, & Shin, 2016). In this context, wearable medical devices come up with unlimited potentials and promising future for healthcare settings (J. Wu, Li, Cheng, & Lin, 2016). Moreover, they provide remarkable means for reducing the burden on systems and costs associated with healthcare owing to aging society (Hentschel, Haaksma, & van de Belt, 2016). Furthermore, wearable medical devices are one of the most practical approaches to take precautionary health monitoring and to treat patients with a fairly custom-made method at an early stage to improve early detection, early diagnosis, and early treatment (Zheng et al., 2013).

Wearable medical devices with a variety of sensors are and will be used for a wide range of healthcare purposes (Haghi, Thurow, & Stoll, 2017). Thanks to wearable medical devices, pervasive monitoring, transmission, and storage of data become more practical (Aileni, Valderrama, & Strungaru, 2017). Nowadays, it is clear that wearable medical devices are pragmatic and clinically useful concerning diagnosis, treatment, and care (Cella et al., 2018; Godfrey et al., 2018; H. Li, Wu, Gao, & Shi, 2016). Moreover, it is definitely projected that there will be many other user-acceptable, high-performance, and low-cost wearable devices to be offered for recognition of a variety of physical activities (Dehghani & Dangelico, 2017; Kumari, Mathew, & Syal, 2017). Additionally, there is a notable increase in medical devices to control bodily functions and to measure certain physiological parameters (Y. K. Kim, Wang, & Mahmud, 2016). However, the technology maturity level for home health monitoring technologies is still moderately low (Liu, Stroulia, Nikolaidis, Miguel-Cruz, & Rios Rincon, 2016), yet wearable technology usage is projected to rise constantly (Srizongkhram, Shirahada, & Chiadamrong, 2018). Naturally, a transdisciplinary approach will move us fast forward on this journey (Khosravi & Ghapanchi, 2016; S. Park, Chung, & Jayaraman, 2014; Qi et al., 2017) to understand critical success factors.

Definitely, the term of wearable medical devices is quite broad, and it might mean devices and/or applications used for 1) supporting patients in monitoring a disease (e.g. diabetes support applications), 2) general monitoring of well-being (e.g. heart rate, sleep, exercise), and 3) supporting elderly/disabled people in independent living. However, in this research, we set and limited the definition of wearable medical devices with smartwatches, smart clothes, smart glasses, sports/activity trackers, or various sensors placed on bodies for health-related purposes.

1.1.2. Potentials of Wearable Medical Devices for Health

Healthy aging can be defined as the course of developing and sustaining the functional ability that empowers well-being in older ages, where functional ability encompasses the health-related attributes that qualify people to be and to do what they have reason to value. Besides, physical activity and nutrition are the foremost aspects prompting

healthy aging (World Health Organization, 2015). In this context, the essence of healthy aging is the functional ability comprising the intrinsic capacities of people, relevant environmental characteristics, and interactions between people and these (Beard, Officer, de Carvalho, et al., 2016). Healthy aging is the concentration of the World Health Organization's work on the subject of aging between 2015 – 2030 (World Health Organization, 2019). Unambiguously, healthy aging is a course that occurs across the life course rather than as a state at a particular point in time (Beard, Officer, & Cassels, 2016).

Moreover, active aging is the progression of enhancing prospects for health, participation, and security with the intention of improving quality of life as people age (Amado, São José, & Santos, 2016). For active aging, investigating digital strategies embodies a thrilling zone of global research (Robbins, Lim Choi Keung, & Arvanitis, 2018). Precisely, active aging is the process of improving prospects for health, participation, and security with the aim of boosting the quality of life as we age (World Health Organization, 2015). In this context, physical activity is a leading aspect of both health and well-being (Sullivan & Lachman, 2017). In addition, regular physical activity is very imperative for healthy aging, and luckily technology devices such as wearables are practically there to encourage people for regular physical activity (Cooper et al., 2018; Jonkman, van Schooten, Maier, & Pijnappels, 2018; Muellmann et al., 2018; Thompson, Kuhle, Koepp, McCrady-Spitzer, & Levine, 2014; Tocci et al., 2016).

Aging in place is the term where people safely and comfortably pursue their independent and high-caliber life at their own home and community. This obviously diminishes the possible associated costs of external supports for health and wellbeing (K. Kim, Gollamudi, & Steinhubl, 2017). In this context, new technological and innovative devices will be beneficial for tracking significant parameters to perfectly deliver preventive and proactive actions for health. Therefore, caring for people in their own homes thanks to technology devices like wearables possibly will be effective and economically adventurous (K. Kim et al., 2017). To manage mobility loss of people, physical activity including physical exercise requiring energy expenditure is a must (World Health Organization, 2017b). By means of active aging and physical activity, we will possibly be able to avoid, slow, or converse deteriorations regarding people's physical and mental capabilities (World Health Organization, 2017b).

Moreover, there is a major initiative, called Be He@lthy, Be Mobile, led by the World Health Organization, supporting the expansion of mobile health technology within health systems to help fight noncommunicable diseases and support healthy aging. In this initiative, Mobile Health for Ageing is a program to assist people in maintaining the functional ability and living independently and healthily through evidence-based self-management and self-care (World Health Organization, 2011). The World Health Organization recommends that health systems ought to be oriented around intrinsic capacity and functional ability, and in this context, we need to employ technologies (like wearable medical devices) in clinical, home, and community settings (World Health Organization, 2017a).

1.1.3. Objective and Importance of This Study

In today's world, wearable technologies are becoming more ubiquitous. Moreover, wearable medical devices are promising instruments for healthy living and aging. For these reasons, it is very important to align these health-related technologies with people's needs and expectations. Specific strategies of aligning health systems to the needs of populations and improving measurement, monitoring, and research in the World Health Organization's global strategy and action plan on aging and health are truly noteworthy (World Health Organization, 2017a). Actually, we need to fine-tune our way of thinking, sense, and actions regarding both age and aging (Beard, Araujo de Carvalho, Sumi, Officer, & Thiyagarajan, 2017).

Additionally, people's acceptance, adoption, and intention of the use of wearable medical devices are anticipated to grow in the near future (Nasir & Yurder, 2015) and the market for wearable medical devices is one of the wildest rising ones of this era (Casselman, Onopa, & Khansa, 2017). Parenthetically, unlike typical technologies like smartphones, the adoption of wearable medical devices has been moderately slow. Thus, there is an increasing concentration to understand the full picture (Kalantari, 2017; Pal, Funilkul, Charoenkitkarn, & Kanthamanon, 2018).

Furthermore, smart wearable systems designed for health, wearable medical devices, are intensely in the interest zone of not only researchers but also industry professionals (Chan, Estève, Fourniols, Escriba, & Campo, 2012). The acceptance of innovative technologies like wearables by people is a vital issue not only for governments and healthcare providers but also for technology providers and other key actors regarding people's life (Mostaghel, 2016). There are a number of efforts to utilize formerly established models of technology acceptance for the success, yet pertinent models, unfortunately, have major themes to be improved regarding the attitude and behavior in the health domain, and further work is needed in this context (Renaud & van Biljon, 2008; Ward, 2013).

Original constructs of the technology acceptance model ought to be refined with some alterations and additions to better understand and predict the acceptance and success of information technologies related to health such as wearables (Holden & Karsh, 2010). The end-user acceptability of wearable medical devices is very important and the success of any systems in the healthcare banks mainly on user-awareness and user-acceptance (Baig, GholamHosseini, Moqeem, Mirza, & Lindén, 2017). However, the existing understanding of this context is lacking and needs firm improvements (Gücin & Berk, 2015; Iqbal, Aydin, Brunckhorst, Dasgupta, & Ahmed, 2016; Lunney, Cunningham, & Eastin, 2016; Or & Karsh, 2009). The technology acceptance model is fairly valuable to understand the acceptance leading to success, yet it needs to be unified into a more inclusive one with contextual features specific for relevant circumstances (Legris, Ingham, & Collerette, 2003).

Therefore, the main objective of this research is to distill the salient constructs to enhance the success of wearable medical devices, which are today's and future's

promising technology solutions. In this context, we purposefully aimed to identify the factors, the interactions of the factors, and the accompanying items (the elements, features, and/or situations related to the factors) influencing the success of wearable medical devices for healthy living and aging.

1.2. **Relevant Prominent Studies**

1.2.1. Relevant Studies Focusing on Wearable Health Devices

An empirical study of wearable technology acceptance in healthcare (Gao, Li, & Luo, 2015) with 462 contributors using a survey concluded that people's choice for having a healthcare wearable technology is determined by factors such as hedonic motivation, functional congruence, social influence, perceived privacy risk, perceived vulnerability, perceived expectancy, self-efficacy, effort expectancy, and perceived severity. Besides, based on the data collected from 616 respondents, in related research (S. Y. Lee & Lee, 2018) on wearable healthcare devices, it was noted that consumer attitudes, personal innovativeness, and health interests are vital factors influencing the intention to adopt a wearable healthcare device.

Moreover, with a sample size of 877, to understand usage intention, a fairly prominent study (E. Park, Kim, & Kwon, 2016), on wearable devices as next-generation tools for health communication, identified perceived control, interactivity of wearable healthcare devices, and innovative tendencies of users as main elements in consort with the main constructs of the original technology acceptance model. In another study (M. Zhang, Luo, Nie, & Zhang, 2017) of an empirical investigation with 436 participants, scholars showed that the adoption intention of healthcare wearable technology is determined through technical attributes, health attributes, and consumer attributes concurrently.

Furthermore, in a study effort (Nasir & Yurder, 2015), focusing on wearable health products, to analyze what determines users' and physicians' acceptance, researchers integrated perceived risk and compatibility constructs into the original technology acceptance with a sample size of 730. In additional notable research (H. Li et al., 2016), concentrating on healthcare wearable devices, including 333 responders, it was shown that people's choices to adopt healthcare wearable devices are determined by their risk-benefit analyses, and perceived privacy risk is important.

Additionally, people's health, health information, and privacy concerns were shown to be significant regarding the adoption and diffusion of wearable devices for healthcare, in research (Marakhimov & Joo, 2017) with the data collected from 260 partakers. Yet another effort (Deranek, Hewitt, Gudi, & McLeod, 2020), focusing on the impact of exercise motives on adolescents' sustained use of wearable technology, investigated the influence of extrinsic and intrinsic exercise motives for the relevant context.

1.2.2. Relevant Studies Focusing on Smartwatches and Activity Trackers

In a relevant research effort (K. J. Kim & Shin, 2015), with a total number of 363 participants, researchers identified the six psychological determinants (affective quality, relative advantage, mobility, availability, and subcultural appeal) of smartwatch adoption and developed an extended technology acceptance model. Besides, in a relevant study (Adapa, Nah, Hall, Siau, & Smith, 2018), employing interviews, scholars identified that the look-and-feel is the most leading item for smart glasses and the availability of fitness apps is the most influential element for smartwatch adoption.

Moreover, based on the data collected from 375 people, in another pertinent study (Yang, Yu, Zo, & Choi, 2016), scholars confirmed that perceived value is a net factor for adoption intention. Moreover, another relevant study (Nelson, Verhagen, & Noordzij, 2016), on activity trackers, conducted with 210 members, determined that attractiveness, monitoring, feedback, privacy protection, readability, and gamification are salient constructs for success. Additionally, through investigating the data collected from 143 people, researchers in another applicable study (Srizongkhram et al., 2018) identified that tech novelty, interface, and fitness application are critical factors for the adoption of wearable technology.

What's more, concerning the prominent factors that support adoption and sustained use of health and fitness wearables, in a notable research effort (Canhoto & Arp, 2017), about health and fitness wearables, with a total of 20 people in 5 focus groups, scholars concluded that the characteristics of the device, the context, and the user are significant. In addition, in a study (J. Li, Ma, Chan, & Man, 2019) conducted with 146 samples about the smart wearables acceptance model for health monitoring through wearable technologies, related results showed that perceived usefulness, compatibility, facilitating conditions, and self-reported health status significantly add to intention to use.

Furthermore, in another notable study (Koo & Fallon, 2018), on wearable technology for tracking, interviews were conducted with 20 people and it was concluded that such devices must be useful, non-invasive, aesthetically pleasing, easy to use, comfortable, durable, reasonably priced, easy to care for, and capable of protecting the privacy of users to attain the success. Moreover, one more research (Pfeiffer, Von Entress-Fuersteneck, Urbach, & Buchwald, 2016) noted that perceived usefulness, perceived enjoyment, social influence, trust, personal innovativeness, and perceived support of well-being are the main facets for the intention to use wearable self-tracking technologies, based on the collected data from 374 responders.

1.2.3. Other Relevant Studies

In a pertinent research effort (Cimperman, Makovec Brenčič, & Trkman, 2016), researchers developed and empirically tested a model for predicting the factors for home telehealth services acceptance behavior with a sample size of 400, and they

identified six relevant predictors such as performance expectancy, effort expectancy, facilitating conditions, perceived security, computer anxiety, and doctor's opinion. They noted that perceived ease of use is the leading acceptance predictor, and perceived usefulness and perceived security also major elements for success. Besides, in research (Karahoca, Karahoca, & Aksöz, 2018) with a sample size of 426, it was shown that perceived advantage, image, and perceived ease of use factors have a weighty role on the intention to adopt the internet of things in healthcare technology products.

Moreover, as indirectly quite relevant and notable, there was a successful mobile phone intervention (Aino Ahtinen Elina Mattila, Kirsikka Kaipainen, Miikka Ermes, 2012) for improving mental and physical wellbeing ensuring both usability and acceptability. Another noteworthy work in this context (Mattila et al., 2008) was about a concept for personal and mobile wellness management. Researchers in the pertinent work of wellness management safeguarded the acceptance, ease of use, and usefulness for success. Besides, still another prominent and pertinent effort (Salvi et al., 2018) of a home-based program with high levels of user acceptance and perceived usefulness firmly included educational and motivational components for success. Additionally, as extracted in some previous notable researches, usability (A. Holzinger, Searle, Kleinberger, Seffah, & Javahery, 2008) and previous exposure to technology (Andreas Holzinger, Searle, & Wernbacher, 2011) are essentially imperative aspects for acceptance and success.

1.2.4. Overview of the Most Relevant Studies

While it is still open for firm improvements, there are some distinguished efforts which are quite relevant for the critical success factors for wearable medical devices. Consequently, an overview of the most relevant studies is given in Table 1 with details about factors identified and their focuses.

Table 1: Overview of the Most Relevant Studies

Factors Identified	Focus	Reference
Perceived Control, Interactivity, Users' Innovative Tendencies, Usefulness, Ease of Use	Wearable Healthcare Devices	(E. Park et al., 2016)
Consumers' Health Concerns, Consumers' Health Information Concerns, Consumers' Privacy Concerns	Wearable Devices for Healthcare	(Marakhimov & Joo, 2017)
Hedonic Motivation, Functional Congruence, Social Influence, Perceived Privacy Risk, Perceived Vulnerability, Perceived Expectancy, Self-efficacy, Effort Expectancy, Perceived Severity	Healthcare Wearable Technology	(Gao et al., 2015)
Perceived Privacy Risk, Health Information Sensitivity, Personal Innovativeness, Legislative Protection, Perceived Prestige, Perceived Benefit, Perceived Informativeness, Functional Congruence	Healthcare Wearable Devices	(H. Li et al., 2016)

Table 1 (continued).

Factors Identified	Focus	Reference
Technical Attributes, Perceived Convenience, Perceived Irreplaceability, Perceived Credibility, Perceived Usefulness, Health Attribute, Consumer Attributes, Consumer Innovativeness, Conspicuous Consumption, Informational Reference Group Influence, Gender Difference	Healthcare Wearable Technology	(M. Zhang et al., 2017)
Perceived Ease of Use, Perceived Usefulness, Behavioral Intention, Perceived Risk, Compatibility	High Tech Wearable Health Technologies	(Nasir & Yurder, 2015)
Reliability, Ease of Use, Interpretation, Consumer Demand	Wearable Devices in Health Monitoring	(Wen, Zhang, & Lei, 2017)
Health Value Factor, Compatibility, Perceived Usefulness, Perceived Ease of Use, Self-efficacy, Technical Support, Training	Mobile Healthcare Systems	(J.-H. Wu, Wang, & Lin, 2007)
Perceived Usefulness, Compatibility, Facilitating Conditions, Self-reported Health Status, Aesthetics, External Support, Performance Risk, Reliability, Accuracy	Health Monitoring Wearable Technologies	(J. Li et al., 2019)
Characteristics of the Device, Context, User Characteristics	Health and Fitness Wearables	(Canhoto & Arp, 2017)
Perceived Advantage, Image, Perceived Ease of Use, Compatibility, Trialability, Perceived Privacy Risk, Perceived Vulnerability	Internet of Things (IoT) Products in Healthcare	(Karahoca et al., 2018)
Habit, Perceived Usability, Perceived Enjoyment, Confirmation, Perceived Usefulness, Satisfaction	Smartwatches	(Nascimento, Oliveira, & Tam, 2018)
Perceived Usefulness, Hedonic Motivation, Perceived Comfort, Perceived Privacy, Self-socio Motivation, Hedonic Motivation, Battery-life Concern, Perceived Accuracy, Functional Limitations	Smartwatches	(Pal, Funilkul, & Vanijja, 2018)
Attributes, Brand, Price, Standalone Communication, Display Shape and Size	Smartwatches	(Jung et al., 2016)
Perceived usefulness, Visibility, Fashnology	Smartwatches	(Chuah et al., 2016)
Complementary Goods, Healthology	Smartwatches	(Dehghani, Kim, & Dangelico, 2018)
Attitude, Design Aesthetics, Perceived Values, Social Value, Performance Value	Smartwatches	(Hsiao & Chen, 2018)
Compatibility, Result Demonstrability, Perceived Enjoyment	Smartwatches	(L.-H. Wu, Wu, & Chang, 2016)
Perceived Enjoyment, Perceived Self-expressiveness, Perceived Usefulness, Attitude, Intention to Use, Ease of Use	Smartwatches	(Choi & Kim, 2016)
Design, Compatibility, Healthtology, Additional Features, Complementary Goods, Enabling Technologies	Smartwatches	(Dehghani, 2018)

Table 1 (continued).

Factors Identified	Focus	Reference
Affective Quality, Relative Advantage, Mobility, Availability, Subcultural Appeal, Cost, Perceived Usefulness, Perceived Ease of Use, User Attitude, Intention to Use	Smartwatches	(K. J. Kim & Shin, 2015)
Notifications, GPS, GPS Accuracy, Fitness Apps, Waterproof Ability, Internet Access, Weight, Hands-free Feature, Image, Esthetics, Information Privacy	Smart Glasses and Smartwatches	(Adapa et al., 2018)
Usefulness, Ease of Use, Perceived Health Outcomes	Wearable Fitness Technologies	(Lunney et al., 2016)
Interpersonal Influence, Personal Innovativeness, Self-efficacy, Attitude, Health Interest, Perceived Expensiveness	Wearable Fitness Tracker	(S. Y. Lee & Lee, 2018)
Privacy, Value Proposition, Self-awareness, Motivation, Subjective Norm, Social Support, Sense of Independence, Equipment Characteristics, Display, Battery, Comfort, Aesthetics	Wrist-Worn Activity Trackers	(Puri et al., 2017)
Usability, Accuracy, Usefulness, Encouragement, Communicating Personal Benefits, Creating tutorials, Hints, Trial-use	Activity Trackers	(Preusse, Mitzner, Fausset, & Rogers, 2017)
Perceived Usefulness, Perceived Enjoyment, Social Influence, Trust, Personal Innovativeness, Perceived Support	Wearable Self-tracking Devices	(Pfeiffer et al., 2016)
Small, Lightweight, Neutral Colored, Useful, Non-invasive, Aesthetically Pleasing, Easy to Use, Comfortable, Durable, Reasonably Priced, Easy to Care for, Privacy, User Experience	Wearables for Tracking Self and Others	(Koo & Fallon, 2018)
Performance Expectancy, Effort Expectancy, Facilitating Conditions, Perceived Security, Computer Anxiety, Doctor's Opinion	Home Telehealth Services	(Cimperman et al., 2016)
Support, Simplicity, Age, Marital Status, Education, Health Status, Perceived Behavioral Control, Perceived Usefulness	Health-related ICT	(Heart & Kalderon, 2013)
Perceived Efficaciousness, Perceived Usability, Perceived Collateral Damages	Wearables or Clothing Attachments	(Golant, 2017)
Confidence with Technology, Motivation, Routine, Emotions	Sensors in Wearable Devices	(Massa, Mazzali, Zampini, & Zancanaro, 2017)
Consumers' Domain-specific Innovativeness, Product-possessing Innovativeness, Information-possessing Innovativeness, Relative Advantage, Social Image, Aesthetics, Novelty	Wearable Technology Components	(Jeong, Kim, Park, & Choi, 2017)
Perceived Value, Perceived Benefit, Perceived Usefulness, Enjoyment, Social Image, Perceived Risk	Wearable Devices	(Yang et al., 2016)
Robustness, Cost, Privacy, Aesthetics, Comfort	Wearable Technology	(Page, 2015)

To ground our research, we mostly benefited from the studies listed in Table 1. On the other hand, the full results of our comprehensive literature review and distillations to ground our research are given in Table 3.

1.3. Research Questions

The principal research questions handled in the scope of this research are:

- What are the factors influencing the acceptance of wearable medical devices?
- What are the interactions of the factors influencing the acceptance of wearable medical devices?
- What are the accompanying items (elements, features, and/or situations) ensuring the factors influencing the acceptance of wearable medical devices?

1.4. Progression of the Research

The high-level progression of the research is shown in Figure 1.

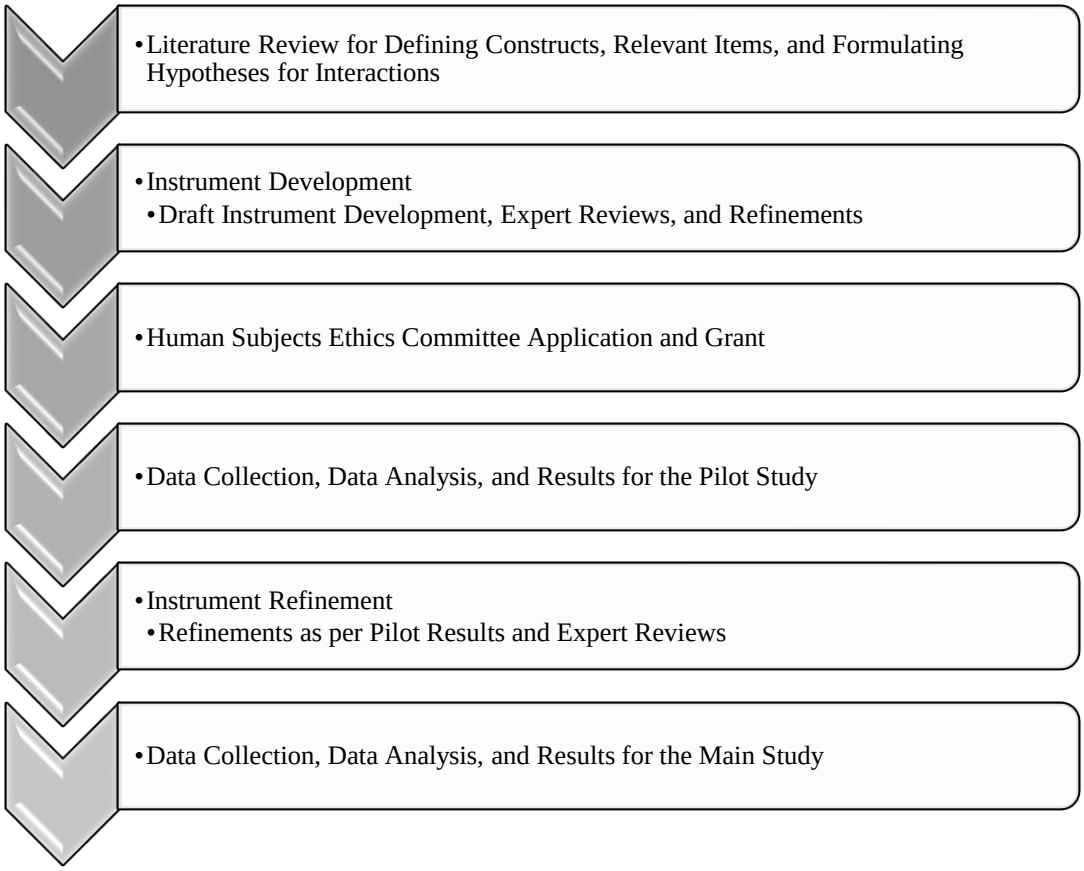

Figure 1: High-level evolution/progression of the research

CHAPTER 2

MATERIALS AND METHODS

In this chapter, complete particulars for the instrument, the dataset, and the applied data analysis are provided.

2.1. Instrument

With the intention of identifying the factors, the interactions of the factors, and the accompanying items (elements, features, and/or situations) influencing the acceptance of wearable medical devices by people, a soberly original questionnaire was developed and deployed in this research.

During the design and development of the questionnaire, three main versions were created and refined. The first version of the questionnaire, given in Appendix A, was created with three sections including 89 questions (19 in section 1, 69 in section 2, and 1 in section 3) in total. In order to create a valid, improved, and refined version of the questionnaire, the first version was reviewed by seven subject matter experts and professionals, and the questionnaire was improved and refined accordingly. After this, the second version of the questionnaire, given in Appendix B, was created with three sections including 66 questions (20 in section 1, 45 in section 2, and 1 in section 3) in total. With invaluable comments from the reviews, the questionnaire was slightly shortened and some of the items were made clearer to get more dependable data. Owing to such reviews and refinements, the content validity of the questionnaire was achieved and ensured. In order to qualify and finalize the questionnaire, the second version of the questionnaire was applied for data collection, and data were collected from 85 people for the pilot study. After analyzing data from the pilot study, the questionnaire was again improved and refined accordingly. After this, the third version of the questionnaire, given in Appendix C, was created with three sections including 53 questions (13 in section 1, 39 in section 2, and 1 in section 3) in total. In this context, no significant wording changes were applied but 13 of the questions (7 from section 1 and 6 from section 2) were removed from the questionnaire.

As a result of the pilot study and analyses, the 6 items were removed from section 2 of the questionnaire, since their average ratings by the participants were less than 3.5 out of 5. Details for the removed items are given in Table 2

Table 2: Details for the Removed Items

ID	Item	Average
UCA1	Innovative people are more willing to use wearable medical devices.	3.39
POL1	There should be a special system of principles (principles) of wearable medical devices to guide decisions and achieve relevant goals.	3.29
POL2	Governments and related organizations should define and maintain a wearable medical device policy.	3.37
POL3	The wearable medical devices policy should take into account both barriers and facilitators.	3.49
DES2	Human factors (ergonomics) standards should be applied in the design of wearable medical devices.	3.48
DCF3	Wearable medical devices must have gamification (goal setting and rewards) feature.	3.25

In this context, specifically, the items related to the "policy" construct were removed owing to that many people rated these items, related to the policy construct, either strongly disagree or disagree. In reality, we still think that policy may be a prominent factor for enhancing the acceptance of wearable medical devices, yet these items must be tested with the right people (policymakers and members of the regulatory bodies).

Finally, the third version of the questionnaire was again reviewed by three subject matter experts, and their final approval was confirmed. All these efforts resulted in the final version of the questionnaire used in this research, given in Appendix C (Turkish) and Appendix D (English).

In this context, we purposefully designed and finalized our questionnaire such that people have clear understandings and directions while answering the relevant questions. Specifically, in order to make it clear about what kind of devices the respondents should have in mind while answering the questions, our questionnaire starts with the definition of wearable medical devices and an image supporting it on the cover page of the questionnaire. Precisely, the exact statement we included is: "Wearable Medical Device: Devices, which especially provide medical monitoring and support, those people wear to manage and improve their health. Examples of these devices are: Smartwatches, smart clothes, smart glasses, sports/activity trackers, or various sensors placed on bodies."

Moreover, again on the cover page of the questionnaire, we included the purpose of the research to let the respondents know the content and context of our research while answering the questions. Besides, for each section of the questionnaire, at the beginnings of each section, we included clear directions to let people easily and appropriately complete the questionnaire. The items used in the questionnaire were mostly derived from the all-embracing literature review and distillations, and the references for the items used in the final version of the questionnaire are given in Table 3.

Table 3: Constructs and Relevant Items

ID	Constructs / Items	References
PEU	**Perceived Ease of Use**	(Choi & Kim, 2016; Cimperman et al., 2016; Davis, 1989; Gao et al., 2015; Golant, 2017; Hoque & Sorwar, 2017; Hung & Jen, 2012; K. J. Kim & Shin, 2015; Koo & Fallon, 2018; J. Li et al., 2019; Macedo, 2017; Nascimento et al., 2018; E. Park et al., 2016; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Venkatesh, Morris, Davis, & Davis, 2003; J.-H. Wu et al., 2007; L.-H. Wu et al., 2016; Yang et al., 2016)
PEU1	My interaction with wearable medical devices must be clear and understandable, and must not require a lot of mental and physical effort.	
PEU2	Wearable medical devices must be easy to use.	
PEU3	It must be easy to find information and functions I need from wearable medical devices.	
PUS	**Perceived Usefulness**	(Choi & Kim, 2016; Chuah et al., 2016; Cimperman et al., 2016; Davis, 1989; Gao et al., 2015; Golant, 2017; Heart & Kalderon, 2013; Hoque & Sorwar, 2017; Hung & Jen, 2012; K. J. Kim & Shin, 2015; Koo & Fallon, 2018; J. Li et al., 2019; Lunney et al., 2016; Macedo, 2017; Nascimento et al., 2018; Pal, Funilkul, & Vanijja, 2018; E. Park et al., 2016; Pfeiffer et al., 2016; Preusse et al., 2017; Sezgin, Özkan-Yildirim, & Yildirim, 2017; Venkatesh & Bala, 2008; Venkatesh et al., 2003; J.-H. Wu et al., 2007; L.-H. Wu et al., 2016; Yang et al., 2016; M. Zhang et al., 2017)
PUS1	Using wearable medical devices must be useful in managing and improving my health.	
PUS2	Using wearable medical devices must enhance my effectiveness in managing my health.	
PUS3	Using wearable medical devices must improve my performance in managing my health.	
ABI	**Attitude & Behavioral Intention**	(Ajzen, 1991; Choi & Kim, 2016; Hsiao & Chen, 2018; Hussein, Oon, & Fikry, 2017; K. J. Kim & Shin, 2015; S. Y. Lee & Lee, 2018; Macedo, 2017; Peek et al., 2016; Sezgin et al., 2017; Venkatesh & Bala, 2008; Venkatesh et al., 2003; Wen et al., 2017; L.-H. Wu et al., 2016)
ATT1	Using wearable medical devices is a good and wise idea.	
ATT2	Using wearable medical devices will be valuable and beneficial.	
ATT3	I have positive feelings toward wearable medical devices.	
BIN1	I intend to use wearable medical devices in the future.	
BIN2	I plan to use wearable medical devices in the future.	
BIN3	Assuming I had access to wearable medical devices, I intend to use them.	

Table 3 (continued).

ID	Constructs / Items	Reference
PCS	**Privacy, Confidentiality, and Security**	(Adapa et al., 2018; Al-Janabi, Al-Shourbaji, Shojafar, & Shamshirband, 2017; Cimperman et al., 2016; Gao et al., 2015; Karahoca et al., 2018; H. Li et al., 2016; J. Li et al., 2019; Marakhimov & Joo, 2017; Motti & Caine, 2015; Nelson et al., 2016; Page, 2015; Pal, Funilkul, & Vanijja, 2018; Puri et al., 2017; Seneviratne et al., 2017; van Hoof, Kort, Rutten, & Duijnstee, 2011; Yang et al., 2016)
PCS1	Users must have the authority to determine what information to share, with whom, and how.	
PCS2	The information must be used for the intended purpose only, and user consent must be taken first for any disclosure.	
PCS3	The protection to safeguard from unauthorized access to or modification, denial of service to unauthorized users, and provision of service to authorized users only must be ensured.	
DPD	**Dependability**	(Golant, 2017; K. J. Kim & Shin, 2015; J. Li et al., 2019; Nasir & Yurder, 2015; Sezgin et al., 2017; van Hoof et al., 2011; M. Zhang et al., 2017)
DPD1	Wearable medical devices must ensure readiness for correct service to let users use them whenever they want to.	
DPD2	Wearable medical devices must ensure continuity of correct service to let users have reliable information.	
DPD3	Wearable medical devices must ensure the absence of catastrophic consequences on the user(s) and the environment to let users feel safe.	
DPD4	Wearable medical devices must ensure the ability for maintenance and repair to let users conveniently continue using them.	
CMP	**Compatibility**	(Adapa et al., 2018; Cimperman et al., 2016; Hoque & Sorwar, 2017; Jung et al., 2016; Karahoca et al., 2018; J. Li et al., 2019; Nasir & Yurder, 2015; Peek et al., 2016; Puri et al., 2017; J.-H. Wu et al., 2007; Y. Zhang & Rau, 2015)
CMP1	Using a wearable medical device must be consistent with my current preferences and habits.	
CMP2	Wearable medical devices must be compatible with my existing electronic devices (smartphone, tablets, computer, etc.).	
CMP3	Using wearable medical devices must be compatible with all aspects of my life.	
PRO	**Promotion**	(Ajzen, 1991; Chen & Chan, 2014; Cimperman et al., 2016; Dehghani et al., 2018; Gao et al., 2015; Hoque & Sorwar, 2017; K. J. Kim & Shin, 2015; Luijkx, Peek, & Wouters, 2015; Macedo, 2017; Pal, Funilkul, Charoenkitkarn, et al., 2018; Peek et al., 2016; Pfeiffer et al., 2016; Preusse et al., 2017; Puri et al., 2017; Stragier, Vanden Abeele, Mechant, & De Marez, 2016; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Venkatesh et al., 2003; J.-H. Wu et al., 2007; L.-H. Wu et al., 2016)
PRO1	I take into account medical doctor's recommendation and views from my family, friends, and those whom I value to decide on the use of wearable medical devices.	
PRO2	The use of wearable medical devices must be supported by complementary goods and services.	
PRO3	The benefits and values of using wearable medical devices must be clearly communicated to improve acceptance and adoption.	

Table 3 (continued).

ID	Constructs / Items	Reference
UCA	**User Characteristics**	(Beaudry & Pinsonneaul, 2010; Canhoto & Arp, 2017; Chen & Chan, 2014; Cimperman et al., 2016; Gao et al., 2015; Heart & Kalderon, 2013; Hoque & Sorwar, 2017; Jeong et al., 2017; Jung et al., 2016; K. J. Kim & Shin, 2015; S. Y. Lee & Lee, 2018; H. Li et al., 2016; Macedo, 2017; Marakhimov & Joo, 2017; Massa et al., 2017; E. Park et al., 2016; Peek et al., 2016; Pfeiffer et al., 2016; Sezgin et al., 2017; Stragier et al., 2016; Venkatesh & Bala, 2008; Venkatesh et al., 2003; J.-H. Wu et al., 2007; M. Zhang et al., 2017)
UCA2	The use of wearable medical devices must be a habit.	
UCA3	If I have health problems, I will more probably use wearable medical devices.	
UCA4	My authentic characteristics and expectations of wearable medical devices determine my attitude and behavior in this context.	
DES	**Design**	(Adapa et al., 2018; Chuah et al., 2016; Dehghani, 2018; Hagedorn, Krishnamurty, & Grosse, 2016; Holden, Kulanthaivel, Purkayastha, Goggins, & Kripalani, 2017; Hsiao & Chen, 2018; Jeong et al., 2017; Jung et al., 2016; K. J. Kim, 2017; Koo & Fallon, 2018; J. Li et al., 2019; Nelson et al., 2016; Page, 2015; E. Park et al., 2016; Patel et al., 2016; Privitera, Evans, & Southee, 2017; Puri et al., 2017; Shieh, Hsiao, Lin, & Lin, 2017; Srizongkhram et al., 2018; Vincent, Li, & Blandford, 2014; L.-H. Wu et al., 2016)
DES1	The color and materials of wearable medical devices must be satisfying regarding aesthetics, convenience, and robustness.	
DES3	Relevant and target users must be involved throughout the design phases of wearable medical devices.	
DES4	Wearable medical devices must be lightweight and durable.	
DES5	Comfort, interface convenience and simplicity must be considered during the design of wearable medical devices.	
DCF	**Device Characteristics and Features**	(Adapa et al., 2018; Canhoto & Arp, 2017; Choi & Kim, 2016; Jeong et al., 2017; Jung et al., 2016; Nelson et al., 2016; Ogbanufe & Gerhart, 2018; Pfeiffer et al., 2016; Puri et al., 2017; Seneviratne et al., 2017; Srizongkhram et al., 2018; Wright & Keith, 2014; Yang et al., 2016; M. Zhang et al., 2017)
DCF1	Battery and energy efficiency of wearable medical devices must be satisfactory for convenient use.	
DCF2	Wearable medical devices must use sounds, visuals, and haptics for continuous feedback.	
DCF4	Wearable medical devices must provide a variety of functionality and added value to manage and improve health.	
DCF5	Wearable medical devices must offer detailed analytics and recommendations to users.	
WOR	**Worthiness**	(Choi & Kim, 2016; Hsiao & Chen, 2018; K. J. Kim & Shin, 2015; S. Y. Lee & Lee, 2018; H. Li et al., 2016; Lunney et al., 2016; Nascimento et al., 2018; Page, 2015; Pal, Funilkul, Charoenkitkarn, et al., 2018; Pal, Funilkul, & Vanijja, 2018; Pfeiffer et al., 2016; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Yang et al., 2016)
WOR1	Using wearable medical devices must offer value for money and effort spent.	
WOR2	The performance and quality value of wearable medical devices must be satisfactory.	
WOR3	Purchasing and maintenance costs for wearable medical devices must be affordable for users.	

Both the reliability (Cronbach's alpha reliability test) and content validity (expert views) were ensured for the instrument used in this research.

Explicitly, Cronbach's alpha value, given in Table 4, was calculated with IBM SPSS 23 and 0.913 value was gotten, which is far above the minimum requirements of 0.6 or 0.7 (Carmines & Zeller, 1979; Joseph F. Hair, Black, Babin, & Anderson, 2014; Kimberlin & Winterstein, 2008).

Table 4: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.913	0.918	39

Moreover, expert reviews done in this context resolutely maintained the validity of the instrument (Carmines & Zeller, 1979; Joseph F. Hair et al., 2014; Kimberlin & Winterstein, 2008).

Moreover, before applying the questionnaire to collect data, the Middle East Technical University's Human Subjects Ethics Committee review and approval of the instrument were ensured and fully satisfied. Related permission and approval file is given in Appendix E.

2.2. Dataset

By using the questionnaire authentically developed and refined in the context of this research, a moderately rich and original dataset, given in Appendix F, was collected from 1057 people from a developing country, namely Turkey.

With determination, it was aimed to collect a rich, representative, and ample dataset. As can be seen in pertinent tables, from Table 5 to Table 17, items from section 1 of the questionnaire, the collected data set is all-inclusive, and it ensures both homogeneousness and heterogeneity to draw fairly dependable and generalizable conclusions.

Table 5: Statistics for Educational Status of Participants

Educational Status	Frequency	Percent
Primary Education	61	5.8
High School	193	18.3
Bachelor	501	47.4
Master's	238	22.5
Doctorate	64	6.1
Total	1057	100

Table 6: Statistics for Gender of Participants

Gender	Frequency	Percent
Women	536	50.7
Men	521	49.3
Total	1057	100

Table 7: Statistics for Average Monthly Income of Participants

Average Monthly Income (TRY - Turkish Lira)	Frequency	Percent
0-2500	315	29.8
2501-4000	224	21.2
4001-7000	245	23.2
7001-10000	135	12.8
10001-15000	64	6.1
15001+	74	7.0
Total	1057	100

Table 8: Statistics for Average Monthly Income Category of Participants

Income Level	Frequency	Percent
Low *(TRY 0 – 4000)*	539	51.0
Mid *(TRY 4001 – 10,000)*	380	36.0
High *(TRY 10,001 or higher)*	138	13.1
Total	1057	100

Table 9: Statistics for Generation of Participants

Generation	Frequency	Percent
Gen Z (*Born between 1997 and 2015*)	202	19.1
Millennials (*Born between 1981 and 1996*)	439	41.5
Gen X (*Born between 1965 and 1980*)	207	19.6
Boomers (*Born between 1944 and 1964*)	209	19.8
Total	1057	100

Table 10: Statistics for Ages of Participants

Age	Frequency	Percent	Age	Frequency	Percent
16	6	0.6	50	16	1.5
17	12	1.1	51	14	1.3
18	15	1.4	52	8	0.8
19	33	3.1	53	4	0.4
20	40	3.8	54	4	0.4
21	35	3.3	55	27	2.6
22	61	5.8	56	17	1.6
23	23	2.2	57	5	0.5
24	23	2.2	58	8	0.8
25	23	2.2	59	9	0.9
26	20	1.9	60	6	0.6
27	35	3.3	61	13	1.2
28	38	3.6	62	10	.9
29	28	2.6	63	13	1.2
30	34	3.2	64	8	0.8
31	28	2.6	65	13	1.2
32	16	1.5	66	8	0.8
33	31	2.9	67	5	0.5
34	29	2.7	68	7	0.7
35	32	3.0	69	18	1.7
36	38	3.6	70	10	0.9
37	22	2.1	71	5	0.5
38	19	1.8	72	5	0.5
39	13	1.2	73	3	0.3
40	25	2.4	74	3	0.3
41	9	0.9	75	1	0.1
42	14	1.3	76	2	0.2
43	11	1.0	77	5	0.5
44	15	1.4	78	1	0.1
45	14	1.3	79	1	0.1
46	16	1.5	80	2	0.2
47	14	1.3	82	2	0.2
48	17	1.6	83	1	0.1
49	13	1.2	84	1	0.1
			Total	1057	100

Table 11: Statistics for Heights of Participants

Height	Frequency	Percent	Height	Frequency	Percent
150	7	0.7	173	35	3.3
151	1	0.1	174	31	2.9
152	1	0.1	175	54	5.1
153	4	0.4	176	26	2.5
154	3	0.3	177	17	1.6
155	16	1.5	178	45	4.3
156	6	0.6	179	20	1.9
157	11	1.0	180	65	6.1
158	16	1.5	181	16	1.5
159	8	0.8	182	23	2.2
160	79	7.5	183	22	2.1
161	14	1.3	184	8	0.8
162	23	2.2	185	20	1.9
163	26	2.5	186	6	0.6
164	27	2.6	187	5	0.5
165	77	7.3	188	2	0.2
166	20	1.9	189	2	0.2
167	50	4.7	190	10	0.9
168	54	5.1	191	1	0.1
169	28	2.6	192	2	0.2
170	96	9.1	195	2	0.2
171	30	2.8	197	2	0.2
172	45	4.3	198	1	0.1
			Total	1057	100

Table 12: Statistics for Body Mass Index Category of Participants

Body Mass Index Category [BMI = kg/m^2]	Frequency	Percent
Underweight (BMI < 18.5)	42	4.0
Normal weight (BMI >= 18.5 and BMI <= 24.9)	658	62.3
Obesity BMI (>= 25 and BMI <= 29.9)	61	5.8
Overweight (BMI >= 30)	296	28.0
Total	1057	100

Table 13: Statistics for Health Problem Status of Participants

Health Problem	Frequency	Percent	Health Problem	Frequency	Percent
Yes	266	25.2	No	791	74.8

Table 14: Statistics for Weights of Participants

Weight	Frequency	Percent	Weight	Frequency	Percent
43	1	0.1	78	25	2.4
44	1	0.1	79	10	0.9
45	3	0.3	80	46	4.4
46	1	0.1	81	10	0.9
47	8	0.8	82	15	1.4
48	8	0.8	83	20	1.9
49	8	0.8	84	8	0.8
50	22	2.1	85	35	3.3
51	7	0.7	86	11	1.0
52	17	1.6	87	6	0.6
53	17	1.6	88	12	1.1
54	13	1.2	89	6	0.6
55	27	2.6	90	25	2.4
56	26	2.5	91	4	0.4
57	24	2.3	92	8	0.8
58	22	2.1	93	8	0.8
59	24	2.3	94	4	0.4
60	69	6.5	95	10	0.9
61	28	2.6	96	3	0.3
62	19	1.8	97	1	0.1
63	22	2.1	98	6	0.6
64	17	1.6	100	2	0.2
65	69	6.5	101	1	0.1
66	27	2.6	102	2	0.2
67	22	2.1	104	1	0.1
68	30	2.8	105	2	0.2
69	16	1.5	106	1	0.1
70	54	5.1	108	1	0.1
71	33	3.1	109	1	0.1
72	20	1.9	110	5	0.5
73	25	2.4	112	2	0.2
74	17	1.6	115	2	0.2
75	44	4.2	120	2	0.2
76	11	1.0	130	2	0.2
77	8	0.8	Total	1057	100

Table 15: Statistics for Sports/Activity Status of Participants

Sports/Activity Status	Frequency	Percent
Everyday	117	11.1
Several Times a Week	372	35.2
Several Times a Month	204	19.3
Very Rare	231	21.9
Not at All	133	12.6
Total	1057	100

Table 16: Statistics for Tech Use of Participants

Tech Use	Frequency	Percent
I often use computers, smartphones, or technological products.	855	80.9
I rarely use computers, smartphones, or technological products.	202	19.1
Total	1057	100

Table 17: Statistics for How Participants Reached the Instrument

How	e-Mail	LinkedIn	Facebook	Instagram	Message	Whats App	Printed
#	132	128	28	24	121	84	540
%	12.5	12.1	2.6	2.3	11.4	7.9	51.1

2.3. Data Analysis

Both descriptive statistics and inferential statistics were used in this research for data analyses and interpretations. Summary of item statistics and item statistics of the collected data per Section 2 of the questionnaire are given in Table 18 and Table 19.

Table 18: Summary Item Statistics

	Mean	Min.	Max.	Range	Max. / Min.	Var.	N of Items
Item Means	4.478	3.814	4.702	0.888	1.233	0.047	39
Item Variances	0.513	0.262	1.252	0.990	4.774	0.054	39
Inter-Item Covariances	0.109	-0.047	0.924	0.971	-19.651	0.009	39
Inter-Item Correlations	0.224	-0.075	0.906	0.981	-12.039	0.021	39

Table 19: Item Statistics

Item	Mean	Std. Dev.	N
PEU1	4.53	0.682	1057
PEU2	4.64	0.610	1057
PEU3	4.59	0.635	1057
PUS1	4.59	0.621	1057
PUS2	4.57	0.630	1057
PUS3	4.56	0.631	1057
ATT1	4.25	0.842	1057
ATT2	4.27	0.822	1057
ATT3	4.25	0.862	1057
BIN1	4.05	0.995	1057
BIN2	3.99	1.024	1057
BIN3	4.23	0.891	1057
PCS1	4.60	0.653	1057
PCS2	4.65	0.583	1057
PCS3	4.63	0.605	1057
DPD1	4.65	0.593	1057
DPD2	4.70	0.539	1057
DPD3	4.70	0.541	1057
DPD4	4.64	0.574	1057
CMP1	4.50	0.677	1057
CMP2	4.56	0.663	1057
CMP3	4.42	0.750	1057
PRO1	4.29	0.851	1057
PRO2	4.37	0.783	1057
PRO3	4.54	0.660	1057
UCA2	3.81	1.119	1057
UCA3	4.31	0.848	1057
UCA4	4.24	0.860	1057
DES1	4.53	0.693	1057
DES3	4.42	0.773	1057
DES4	4.68	0.554	1057
DES5	4.63	0.607	1057
DCF1	4.69	0.512	1057
DCF2	4.38	0.815	1057
DCF4	4.58	0.599	1057
DCF5	4.55	0.632	1057
WOR1	4.67	0.543	1057
WOR2	4.67	0.529	1057
WOR3	4.70	0.537	1057

Vaguely, in this research, frequency statistics, exploratory factor analysis, confirmatory factor analysis, partial least squares structural equation modeling, descriptive statistics, multi-group analysis, and quasi-statistics were applied to attain results and draw conclusions.

Specifically, tables between Table 20 and Table 26 show the descriptive frequency statistics for some remarkable dimensions based on the collected data by means of the questionnaire moderately authentically developed and deployed in the scope of this research.

Table 20: Statistics for Wearable Medical Device Know of Participants

Wearable Medical Device You Know	Frequency	Percent
Body Sensor(s)	11	1.0
Smart Clothes	6	0.6
Smart Clothes;Smart Glass;Sports/Activity Tracker;Body Sensor(s)	1	0.1
Smart Clothes;Smart Watch	14	1.3
Smart Clothes;Smart Watch;Body Sensor(s)	3	0.3
Smart Clothes;Smart Watch;Smart Glass	11	1.0
Smart Clothes;Smart Watch;Smart Glass;Body Sensor(s)	1	0.1
Smart Clothes;Smart Watch;Smart Glass;Sports/Activity Tracker	17	1.6
Smart Clothes;Smart Watch;Smart Glass;Sports/Activity Tracker;Body Sensor(s)	114	10.8
Smart Clothes;Smart Watch;Sports/Activity Tracker	14	1.3
Smart Clothes;Smart Watch;Sports/Activity Tracker;Body Sensor(s)	13	1.2
Smart Clothes;Sports/Activity Tracker	1	0.1
Smart Glass	5	0.5
Smart Glass;Body Sensor(s)	2	0.2
Smart Glass;Sports/Activity Tracker	2	0.2
Smart Watch	237	22.4
Smart Watch;Body Sensor(s)	9	0.9
Smart Watch;Smart Glass	38	3.6
Smart Watch;Smart Glass;Body Sensor(s)	6	0.6
Smart Watch;Smart Glass;Sports/Activity Tracker	62	5.9
Smart Watch;Smart Glass;Sports/Activity Tracker;Body Sensor(s)	29	2.7
Smart Watch;Sports/Activity Tracker	174	16.5
Smart Watch;Sports/Activity Tracker;Body Sensor(s)	64	6.1
Sports/Activity Tracker	61	5.8
Sports/Activity Tracker;Body Sensor(s)	5	0.5
None	157	14.9
Total	1057	100

Table 21: Statistics for Wearable Medical Device Know Category of Participants

Know Category	Frequency	Percent
No	157	14.9
Yes	900	85.1
Total	1057	100

Table 22: Statistics for Wearable Medical Devices Known by the Participants

Device Known	N	%
Smart Clothes	195	18,4
Body Sensor(s)	258	24,4
Smart Glass	288	27,2
Activity Tracker	557	52,7
Smart Watch	806	76,3

Table 23: Statistics for Wearable Medical Device Use of Participants

Wearable Medical Device You Use	Frequency	Percent
Body Sensor(s)	13	1.2
Smart Clothes	1	0.1
Smart Clothes;Smart Watch;Smart Glass;Sports/Activity Tracker	1	0.1
Smart Clothes;Smart Watch;Sports/Activity Tracker	3	0.3
Smart Clothes;Sports/Activity Tracker	1	0.1
Smart Glass	2	0.2
Smart Glass;Sports/Activity Tracker	1	0.1
Smart Glass;Sports/Activity Tracker;Body Sensor(s)	1	0.1
Smart Watch	292	27.6
Smart Watch;Body Sensor(s)	4	0.4
Smart Watch;Smart Glass	1	0.1
Smart Watch;Smart Glass;Sports/Activity Tracker;Body Sensor(s)	1	0.1
Smart Watch;Sports/Activity Tracker	83	7.9
Smart Watch;Sports/Activity Tracker;Body Sensor(s)	8	0.8
Sports/Activity Tracker	98	9.3
Sports/Activity Tracker;Body Sensor(s)	1	0.1
None	546	51.7
Total	1057	100

Table 24: Statistics for Wearable Medical Device Use Category of Participants

Use Category	Frequency	Percent
No	546	51.7
Yes	511	48.3
Total	1057	100

Table 25: Statistics for Wearable Medical Devices Used by the Participants

Device Used	N	%
Smart Clothes	6	1.2
Smart Glass	7	1.4
Body Sensor(s)	28	5.5
Activity Tracker	198	38.7
Smart Watch	392	76.7

Table 26: Statistics for What is Important for Participants

What is Important Concerning Wearable Medical Devices	Frequency	Percent
Functionality	307	29.0
Nice Look	78	7.4
Both	672	63.6
Total	1057	100

Besides, as a fusion of factor analysis and path analysis (Hox & Bechger, 1998), structural equation modeling was applied with data collection, model specification, identification, estimation, evaluation, and modification steps (Chin, Peterson, & Brown, 2008; Weston & Gore, 2006). More specifically, partial least squares structural equation modeling (Joe F. Hair, Ringle, & Sarstedt, 2011; Joe F. Hair, Sarstedt, Ringle, & Mena, 2012; Oliver, Liehr-gobbers, & Krafft, 2010; Sarstedt, Ringle, & Hair, 2014; Wong, 2013), a nonparametric method requiring no distributional assumptions (Joseph F. Hair, Hult, Ringle, & Sarstedt, 2017; Lowry & Gaskin, 2014), supporting both exploratory and confirmatory research (Gefen, Rigdon, & Straub, 2011) was applied with seven steps: Data collection, exploratory factor Analysis 1, confirmatory factor analysis 1, model estimation and evaluation 1, exploratory factor analysis 2, confirmatory factor analysis 2, and model estimation and evaluation 2.

In order to explore and review the causal and principal correlational relations in the collected dataset, exploratory factor analyses (Matsunaga, 2010) were applied with IBM SPSS 23. In this context, firstly, the sample size adequacy was checked and ensured. As data collected from 1057 people, this research met the sample size requirement far above the recommended minimum values (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Joseph F. Hair et al., 2014; MacCallum, Widaman, Zhang, & Hong, 1999; Myers, Ahn, & Jin, 2011). After this, an anti-image correlation matrix, given in Appendix G, was analyzed to check if correlations among the individual items are strong enough to advocate that the correlation matrix is factorable (Pett, MA; Lackey, NR; Sullivan, 2003) and it was seen that this condition requiring all related values must be greater than 0.5 was met.

Moreover, Kaiser-Meier-Olkin (KMO) and Bartlett's tests were applied and extracted communalities were addressed. For good factor analysis, the KMO sampling adequacy

of 0.6 or above and Bartlett's test significance of 0.05 or less are required (Joseph F. Hair et al., 2014; Tabachnick & Fidell, 2001). For this research, the KMO is 0.884, and Bartlett's test significance is 0.000, given in Table 27 meeting the requirements.

Table 27: KMO and Bartlett's Test Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.884
Bartlett's Test of Sphericity	Approx. Chi-Square	24717.281
	df	741
	Sig.	0.000

Besides, extracted communality values for the items should be greater than 0.40 (Yong & Pearce, 2013) and this condition was also met in this research as these values ranged from 0.525 to 0.872, given in Table 28, for the 39 items included in the final model. Furthermore, the factor analysis extraction method and the rotation method were defined. For this research, the principal components method as the most frequently used one was used to reduce data to a set of factor scores, and as the best orthogonal rotation, varimax was set (Brown, 2009; Joseph F. Hair et al., 2014; Tabachnick & Fidell, 2001; Williams, Onsman, & Brown, 2012).

Table 28: Extracted Communalities

	Initial	Extraction		Initial	Extraction
PEU1	1.000	0.749	CMP1	1.000	0.740
PEU2	1.000	0.830	CMP2	1.000	0.722
PEU3	1.000	0.772	CMP3	1.000	0.744
PUS1	1.000	0.768	PRO1	1.000	0.714
PUS2	1.000	0.849	PRO2	1.000	0.749
PUS3	1.000	0.812	PRO3	1.000	0.664
ATT1	1.000	0.700	UCA2	1.000	0.662
ATT2	1.000	0.696	UCA3	1.000	0.712
ATT3	1.000	0.744	UCA4	1.000	0.750
BIN1	1.000	0.824	DES1	1.000	0.659
BIN2	1.000	0.813	DES3	1.000	0.525
BIN3	1.000	0.696	DES4	1.000	0.778
PCS1	1.000	0.742	DES5	1.000	0.748
PCS2	1.000	0.769	DCF1	1.000	0.605
PCS3	1.000	0.718	DCF2	1.000	0.643
DPD1	1.000	0.696	DCF4	1.000	0.753
DPD2	1.000	0.772	DCF5	1.000	0.696
DPD3	1.000	0.767	WOR1	1.000	0.831
DPD4	1.000	0.747	WOR2	1.000	0.872
			WOR3	1.000	0.779

Additionally, item main loadings (coefficients) were checked and the rotated component matrix was created where item main loadings (coefficients) whose absolute values below 0.4 were suppressed in the composition of factor structure to make it more interpretable (Joseph F. Hair et al., 2014). Table 29 shows the rotated component matrix with item loadings for the final model.

Table 29: Rotated Component Matrix

	Component										
	1	2	3	4	5	6	7	8	9	10	11
BIN1	0.887										
BIN2	0.871										
ATT3	0.827										
BIN3	0.788										
ATT2	0.782										
ATT1	0.758										
DPD3		0.816									
DPD4		0.809									
DPD2		0.798									
DPD1		0.698									
DES4			0.807								
DES5			0.802								
DES1			0.714								
DES3			0.627								
DCF4				0.805							
DCF5				0.779							
DCF2				0.727							
DCF1				0.633							
WOR2					0.879						
WOR1					0.869						
WOR3					0.830						
PUS2						0.874					
PUS3						0.842					
PUS1						0.794					
PCS1							0.823				
PCS2							0.811				
PCS3							0.760				
PEU2								0.851			
PEU1								0.825			
PEU3								0.770			
CMP3									0.777		
CMP1									0.774		
CMP2									0.772		
PRO2										0.796	
PRO1										0.788	
PRO3										0.726	
UCA4											0.794
UCA3											0.754
UCA2											0.675

Accordingly, the number of factors was determined, and the total variance explained was evaluated. The Kaiser criterion, the number of factors to be extracted ought to be equal to the number of the eigenvalues of the correlation matrix that are larger than one, was used to decide the optimal number of factors (Tabachnick & Fidell, 2001), and 11 was determined. Moreover, the total variance explained was calculated as 73.884 for the final model, which is greater than the recommended 50 value (Beavers et al., 2013). Table 30 shows the total variance explained values.

Table 30: Total Variance Explained Values

#	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Var.	Cum. %	Total	% of Var.	Cum. %	Total	% of Var.	Cum. %
1	9.609	24.639	24.639	9.609	24.639	24.639	4.484	11.497	11.497
2	4.548	11.662	36.301	4.548	11.662	36.301	2.995	7.681	19.178
3	2.491	6.388	42.689	2.491	6.388	42.689	2.726	6.990	26.167
4	2.436	6.245	48.935	2.436	6.245	48.935	2.556	6.553	32.720
5	1.886	4.835	53.770	1.886	4.835	53.770	2.541	6.517	39.237
6	1.533	3.930	57.699	1.533	3.930	57.699	2.452	6.286	45.523
7	1.481	3.798	61.498	1.481	3.798	61.498	2.413	6.186	51.709
8	1.373	3.520	65.018	1.373	3.520	65.018	2.405	6.166	57.876
9	1.238	3.175	68.192	1.238	3.175	68.192	2.144	5.498	63.374
10	1.153	2.956	71.148	1.153	2.956	71.148	2.083	5.342	68.716
11	1.067	2.736	73.884	1.067	2.736	73.884	2.016	5.168	73.884
12	0.870	2.231	76.115						
13	0.736	1.886	78.001						
14	0.601	1.540	79.541						
15	0.542	1.390	80.932						
16	0.511	1.312	82.243						
17	0.486	1.245	83.488						
18	0.455	1.166	84.654						
19	0.451	1.156	85.810						
20	0.417	1.069	86.879						
21	0.393	1.007	87.886						
22	0.387	0.993	88.880						
23	0.372	0.955	89.835						
24	0.353	0.905	90.739						
25	0.337	0.865	91.604						
26	0.317	0.812	92.415						
27	0.313	0.803	93.218						
28	0.293	0.751	93.970						
29	0.281	0.720	94.689						
30	0.269	0.689	95.378						
31	0.260	0.668	96.046						
32	0.251	0.644	96.690						
33	0.241	0.618	97.307						
34	0.231	0.592	97.899						
35	0.214	0.549	98.448						
36	0.210	0.540	98.988						
37	0.162	0.416	99.403						
38	0.153	0.393	99.797						
39	0.079	0.203	100						
Extraction Method: Principal Component Analysis.									

Consequently, factors and items per factor were defined and analyzed.

By principle, three items per factor are enough for identification of the construct (Bollen, 2002; O'Brien, 1994), and for this research, this recommendation was also fully met. As shown in Table 29, there are at least three items for each construct.

Additionally, on the subject of confirmatory factor analyses (K. H. Lee & Che, 2013) in the scope of the applied partial least squares structural equation modeling approach, SmartPLS 3 (Ringle, Wende, & Becker, 2015) was utilized.

In this context, models were drawn with SmartPLS and PLS (Partial Least Squares) algorithms were run.

Structural and measurement models for initial and final models drawn with SmartPLS are shown in Figure 2, Figure 3, Figure 4, and Figure 5.

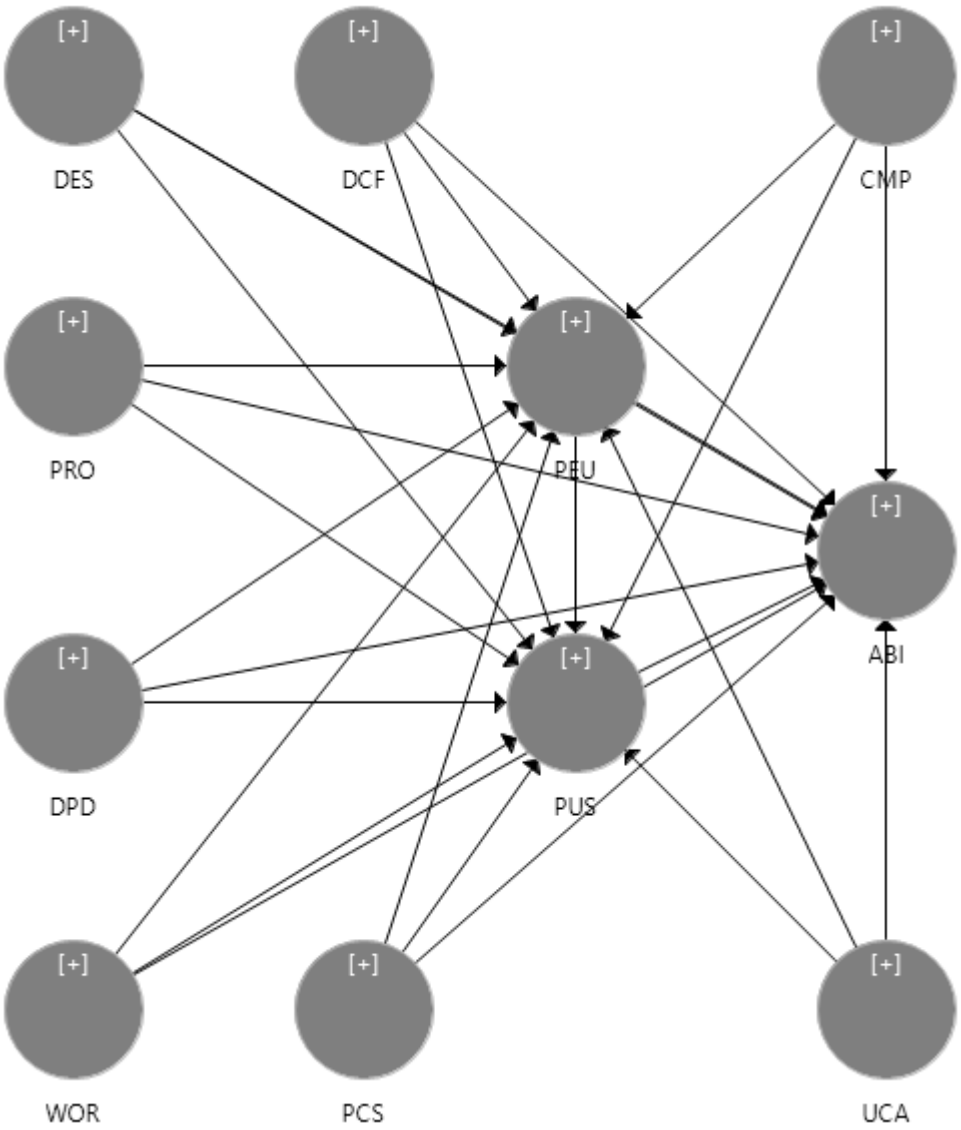

Figure 2: Initial structural model

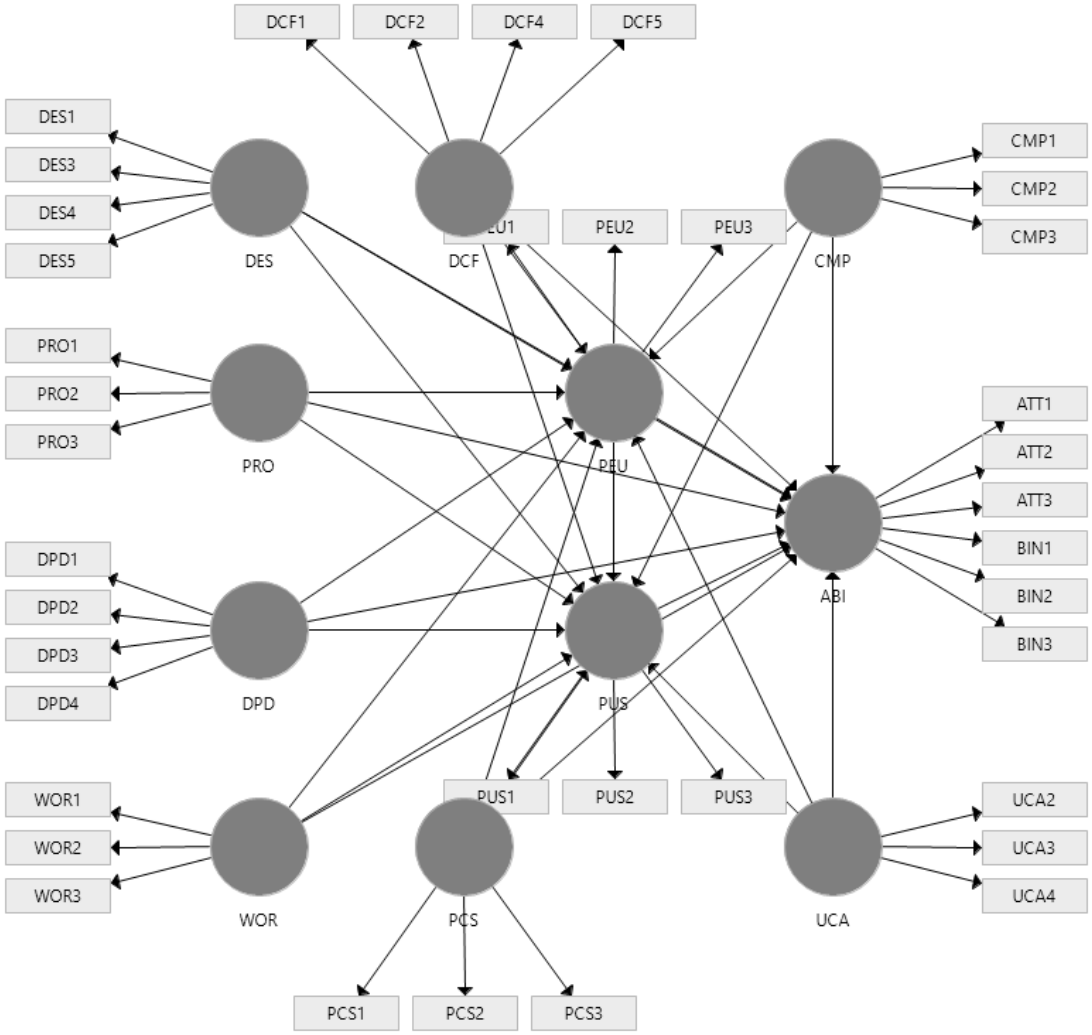

Figure 3: Initial measurement model

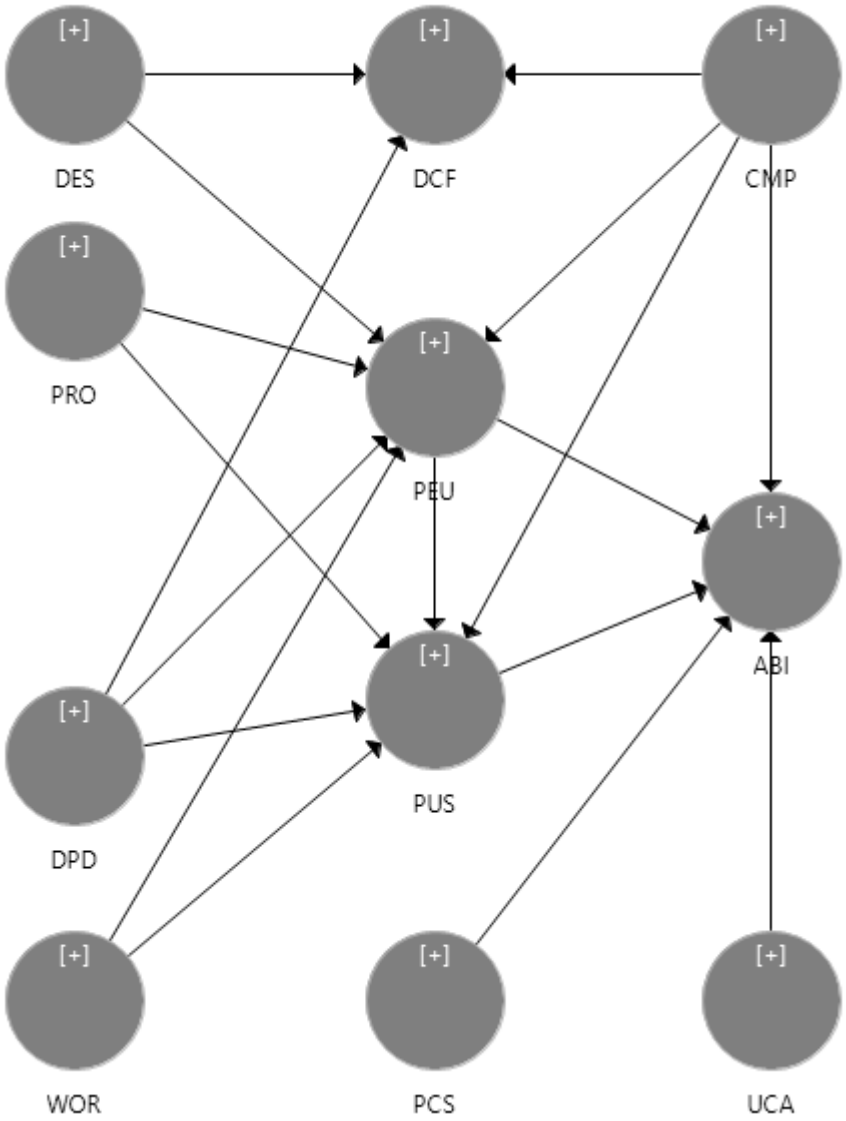

Figure 4: Final structural model

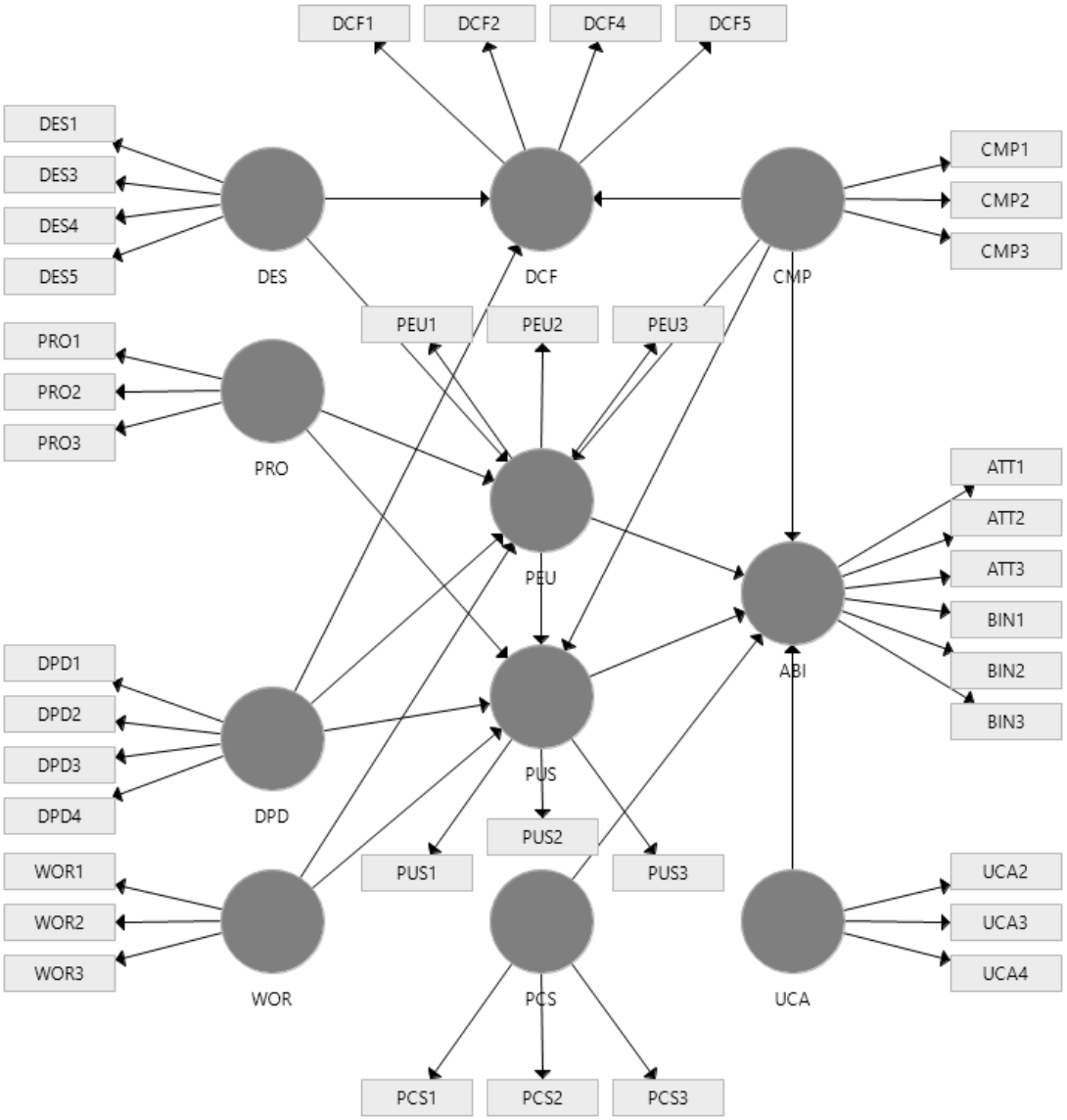

Figure 5: Final measurement model

Subsequently, factor loadings and composite reliabilities (CR) were checked.

Individual item reliabilities are evaluated by means of investigation of factor loadings (or basic correlations) of measures with corresponding factors (Hulland, 1999) and factor loadings should be greater than 0.6 (Bagozzi & Yi, 1988).

As shown in Table 31, the items' loadings on the factors met this recommendation.

Table 31: Items' Loadings on the Factors

	ABI	CMP	DCF	DES	DPD	PCS	PEU	PRO	PUS	UCA	WOR
ATT1	0.810										
ATT2	0.818										
ATT3	0.864										
BIN1	0.877										
BIN2	0.870										
BIN3	0.801										
CMP1		0.870									
CMP2		0.830									
CMP3		0.847									
DCF1			0.780								
DCF2			0.730								
DCF4			0.859								
DCF5			0.809								
DES1				0.811							
DES3				0.685							
DES4				0.869							
DES5				0.859							
DPD1					0.829						
DPD2					0.882						
DPD3					0.864						
DPD4					0.845						
PCS1						0.888					
PCS2						0.856					
PCS3						0.847					
PEU1							0.842				
PEU2							0.908				
PEU3							0.905				
PRO1								0.815			
PRO2								0.833			
PRO3								0.841			
PUS1									0.890		
PUS2									0.914		
PUS3									0.891		
UCA2										0.844	
UCA3										0.847	
UCA4										0.820	
WOR1											0.906
WOR2											0.940
WOR3											0.883

Moreover, the average variance extracted (AVE) values were checked. In this framework, both convergent validity and discriminant validity were checked and ensured. Composite reliability values larger than 0.6 are normally judged as satisfactory and average variance extracted values should be greater than 0.5 (Bagozzi & Yi, 1988; Costello & Osborne, 2005; Hulland, 1999).

Table 32 and Table 33 show satisfactory met values for this context.

Table 32: Composite Reliability and Average Variance Extracted Values

Constructs	Composite Reliability (CR)	Average Variance Extracted (AVE)
ABI	0.935	0.707
CMP	0.886	0.721
DCF	0.873	0.633
DES	0.883	0.655
DPD	0.916	0.732
PCS	0.898	0.746
PEU	0.916	0.784
PRO	0.869	0.689
PUS	0.926	0.807
UCA	0.876	0.701
WOR	0.935	0.828

Table 33: Discriminant Validity Values

	ABI	CMP	DCF	DES	DPD	PCS	PEU	PRO	PUS	UCA	WOR
ABI	**0.841**										
CMP	0.277	**0.849**									
DCF	0.218	0.391	**0.796**								
DES	0.152	0.384	0.434	**0.809**							
DPD	0.143	0.301	0.375	0.367	**0.855**						
PCS	0.153	0.243	0.274	0.245	0.529	**0.864**					
PEU	0.075	0.266	0.257	0.309	0.337	0.261	**0.885**				
PRO	0.165	0.357	0.333	0.393	0.334	0.244	0.289	**0.830**			
PUS	0.178	0.274	0.264	0.289	0.328	0.216	0.512	0.295	**0.898**		
UCA	0.511	0.280	0.258	0.283	0.129	0.086	0.089	0.344	0.159	**0.837**	
WOR	0.060	0.323	0.342	0.321	0.349	0.303	0.270	0.245	0.271	0.062	**0.910**

Bootstrapping with 5000 bootstrap samples (Joseph F. Hair et al., 2017) was performed meant for estimating the significance (t-values) of the paths (Gefen, Straub, & Boudreau, 2000).

Pertinent results are given in Table 34 and Table 35.

Table 34: Hypothesis Test Results for the Initial Model

Hypothesis	T Statistics	P Values	Test Result
CMP → ABI	3.743	0.000	Supported
CMP → PEU	2.157	0.031	Supported
CMP → PUS	1.534	0.125	Not Supported
DCF → ABI	1.958	0.050	Not Supported
DCF → PEU	0.883	0.377	Not Supported
DCF → PUS	0.866	0.387	Not Supported
DES → ABI	1.873	0.061	Not Supported
DES → PEU	2.863	0.004	Supported
DES → PUS	0.844	0.399	Not Supported
DPD → ABI	0.407	0.684	Not Supported
DPD → PEU	3.202	0.001	Supported
DPD → PUS	2.650	0.008	Supported
PCS → ABI	2.310	0.021	Supported
PCS → PEU	1.860	0.063	Not Supported
PCS → PUS	0.689	0.491	Not Supported
PEU → ABI	1.447	0.148	Not Supported
PEU → PUS	8.691	0.000	Supported
PRO → ABI	2.408	0.016	Supported
PRO → PEU	2.528	0.011	Supported
PRO → PUS	2.039	0.041	Supported
PUS → ABI	2.799	0.005	Supported
UCA → ABI	13.119	0.000	Supported
UCA → PEU	1.737	0.082	Not Supported
UCA → PUS	1.748	0.080	Not Supported
WOR → ABI	1.359	0.174	Not Supported
WOR → PEU	2.505	0.012	Supported
WOR → PUS	2.118	0.034	Supported

As shown in Table 34, 27 possible and meaningful relations among distilled constructs for the acceptance of wearable medical devices were tested in the initial model, given in Figure 2 and Figure 3.

Pertinent test results showed that 14 of the hypotheses were supported whereas 13 of them were not supported based on the analysis of the collected data.

After analyzing the results of the initial model, the final model, given in Figure 4 and Figure 5, was created and 18 possible and meaningful relations among distilled constructs for the acceptance of wearable medical devices were tested.

The pertinent results, given in Table 35, showed that the proposed 18 hypotheses were supported and verified based on the analysis of the collected data.

Table 35: Hypothesis Test Results for the Final Model

Hypothesis	T Statistics	P Values	Test Result
CMP → ABI	3.440	0.001	Supported
CMP → DCF	6.833	0.000	Supported
CMP → PEU	2.216	0.027	Supported
CMP → PUS	2.312	0.021	Supported
DES → DCF	7.565	0.000	Supported
DES → PEU	2.838	0.005	Supported
DPD → DCF	5.996	0.000	Supported
DPD → PEU	4.398	0.000	Supported
DPD → PUS	2.984	0.003	Supported
PCS → ABI	2.232	0.026	Supported
PEU → ABI	2.031	0.042	Supported
PEU → PUS	8.930	0.000	Supported
PRO → PEU	2.632	0.009	Supported
PRO → PUS	2.869	0.004	Supported
PUS → ABI	2.547	0.011	Supported
UCA → ABI	13.139	0.000	Supported
WOR → PEU	2.941	0.003	Supported
WOR → PUS	2.212	0.027	Supported

When the results given in Table 34 and 35 were examined collectively, it is seen that 13 of the proposed and tested relations (CMP → ABI, CMP → PEU, DES → PEU, DPD → PEU, DPD → PUS, PCS → ABI, PEU → PUS, PRO → PEU, PRO → PUS, PUS → ABI, UCA → ABI, WOR → PEU, WOR → PUS) were supported in both (the initial and the final) models. On the other hand, while PRO → ABI relation was supported in the initial model, it was not supported in the final model, based on the applied analysis of the collected dataset. Furthermore, even though PEU → ABI relation was not supported in the initial model, it was supported in the final model, based on the conducted analysis of the collected data.

Besides, four new relations (CMP → DCF, CMP → PUS, DES → DCF, DPD → DCF), which were not proposed and tested in the initial model, were established and supported in the final model.

Additionally, for the relations, common method bias was checked based on the variance inflation factor (VIF) values and it was seen that there is no common method bias for the identified relations among constructs.

To sum up, regarding the analysis of the collected data by means of section 1 and section 2 of the applied questionnaire, descriptive frequency statistics and partial least square structural equation modeling approach including exploratory and confirmatory factor analyses were applied. Pertinent results and discussion for these analyses results are given in Chapter 3.

CHAPTER 3

RESULTS AND DISCUSSION

3.1. Key Findings

On the subject of success factors to improve acceptance of wearable medical devices, 11 salient constructs with 39 items were distilled. These constructs are “attitude and behavioral intention,” “dependability,” “design,” “device characteristics and features,” “worthiness,” “perceived usefulness,” “privacy, confidentiality and security,” “perceived ease of use,” “compatibility,” “promotion,” and “user characteristics.” Additionally, 18 significant relationships among these constructs were identified. Figure 1 shows the final model reflecting the salient constructs and their relations to enhance the acceptance of wearable medical devices.

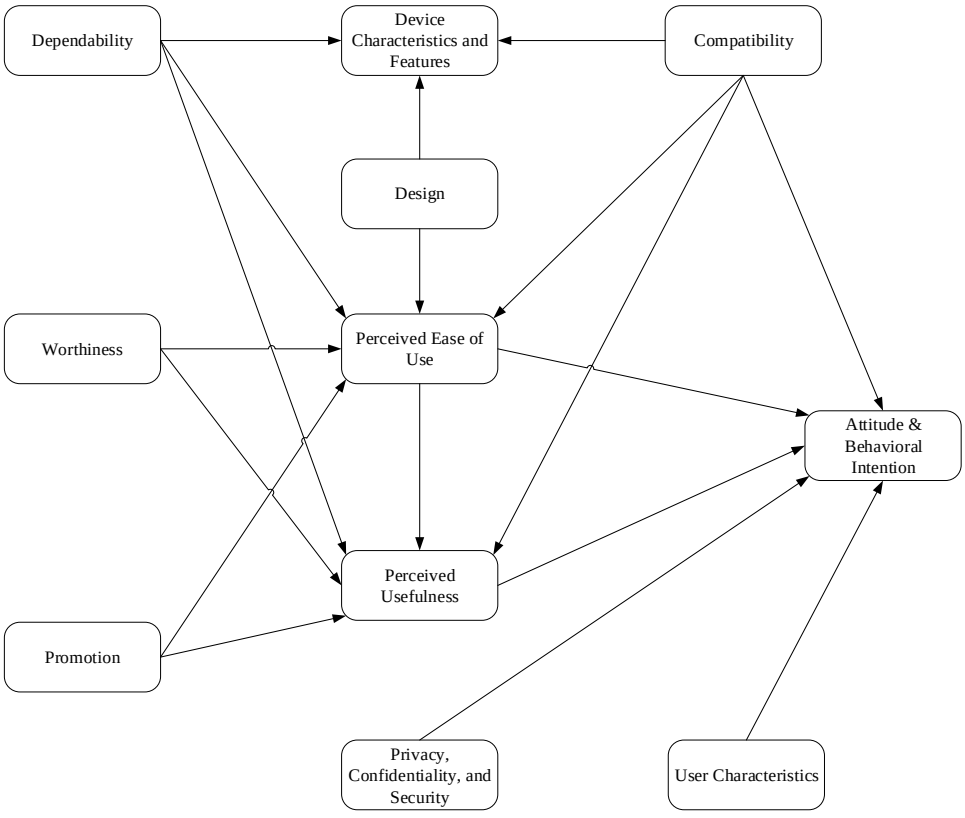

Figure 6: The developed model for the acceptance of wearable medical devices

On the other hand, as per the results of the pilot study, we removed the construct and items for "policy" (Erdmier et al., 2016). The reason was that people mostly rated items related to the policy construct either strongly disagree or disagree as they are not policymakers. In fact, we still think that policy may be a salient factor for enhancing the acceptance, yet this question has to be asked to related people. Instead of what we did (asking this to users/potential users), this needs to be asked to policymakers and/or members of the regulatory bodies to draw more dependable and effective conclusions.

Besides, in order to see whether the factors we distilled differ for different user groups (participants who are already using at least one of wearable medical devices vs. all sample), we applied the pertinent exploratory factor analysis for both of the groups (users vs. all sample). We concluded that there is no significant difference in this context. This may be stemming from that majority of participants from whom we collected data know at least one of the wearable medical devices.

3.1.1. Comprehensive Elucidations for Each of the Distilled Constructs

Attitude & behavioral intention, as a standard construct, can be explained with thoughts such that using wearable medical devices is a good & wise idea and will be valuable & beneficial. Moreover, in this context, people have positive feelings. Like so, people plan to use wearable medical devices in the future, and assuming they had access to wearable medical devices, they intend to use them.

Compatibility, as a modified and improved construct, means using a wearable medical device must be consistent with people's current preferences and habits. Specifically, wearable medical devices must be compatible with people's existing electronic devices (smartphones, tablets, computers, etc.) and all other aspects of their lives.

Device characteristics and features, as a modified and improved construct, consists of a number of elements. Primarily, battery and energy efficiency of wearable medical devices must be satisfactory for convenient use. Moreover, these devices must use sounds, visuals, and haptics for continuous feedback. Besides, these devices must offer detailed analytics and recommendations to users. Lastly, such devices must provide a variety of functionality and added value to manage and improve health.

Design, as a modified and improved construct, requires certain physiognomies. In this context, wearable medical devices must be lightweight and durable, and color & materials of wearable medical devices must be satisfying regarding aesthetics, convenience, and robustness. Moreover, comfort, interface convenience, and simplicity must be well-thought-out, and relevant and target users must be involved.

Dependability, as an originally introduced construct, is there as a vital element constituting availability, reliability, safety, and maintainability attributes. Unambiguously, these devices must ensure (1) readiness for correct service to let users use whenever they want to, (2) continuity of correct service to ensure reliable information, (3) absence of catastrophic consequences to letting users feel safe, and (4) ability for maintenance and repair to let users conveniently continue using them.

Privacy, confidentiality, and security, as a standard construct, necessitates three main themes. First, users must have the authority to determine what information to share, with whom, and how. Second, information must be used for the intended purpose only, and user consent must be taken first for any disclosure. Third, the protection to safeguard from unauthorized access to or modification, denial of service to unauthorized users, and provision of service to authorized users only must be ensured.

Perceived ease of use, as a standard construct, requires that interaction with wearable medical devices must be clear and understandable, and must not require a lot of mental and physical effort. In this context, wearable medical devices must be easy to use, and it must be easy to find information and functions people need from wearable medical devices.

Promotion, as an originally introduced construct, involves that the use of wearable medical devices must be supported with complementary goods and services, and the benefits and values of using must be clearly communicated. This construct also assumes that people take into account medical doctor's recommendation and views from their family, friends, and those whom they value to decide on use.

Perceived usefulness, as a standard construct, means that using wearable medical devices must be beneficial, enhance effectiveness, and improve performance in managing and improving health.

User characteristics, as a modified and improved construct, factor entails that people's authentic characteristics and expectations from wearable medical devices determine their attitude and behavior. This factor involves supporting the view of using wearable medical devices must be a routine. Moreover, with this factor, if people have health problems, they will more conceivably use wearable medical devices.

Worthiness, as an originally introduced construct, requires that using wearable medical devices must truly offer value for money and effort spent. Meanwhile, performance and quality must be satisfactory. Moreover, for this construct, purchasing and maintenance costs must be affordable for people.

3.1.2. Comprehensive Elucidations for Each of the Distilled Relations

Compatibility positively influences attitude & behavioral intention: The more compatible wearable medical devices are with people's current preferences and habits, the more possible people have positive feelings toward and intend to use wearable medical devices. Compatibility promotes attitude & behavioral intention as people have no major struggle or inconsistency, yet comfort and consistency owing to compatibility. That's why compatibility is the right enabler for attitude & behavioral intention.

Compatibility positively influences device characteristics and features: Compatibility can normally be interpreted as a device characteristic and feature. Elements ensuring compatibility like providing compatible interfaces or protocols to work with other

devices to ensure convenience is one example of device characteristics and features. Wearable medical devices must be developed and produced with expected compatibility characteristics and features. That's how and why the compatibility factor enhances device characteristics and features factor.

Compatibility positively influences perceived ease of use: As compatibility ensures consistency of using wearable medical devices with people's current preferences and habits (all aspects of their lives), it is fairly ordinary that people will find wearable medical devices easier to use thanks to confirmed compatibility. People will not need a lot of mental and physical effort as compatibility moderates the need for them owing to consistency and interoperability. Comfort and convenience boosted by compatibility will let people perceive that ease of use is heightened.

Compatibility positively influences perceived usefulness: When compatibility is straightforwardly confirmed, using wearable medical devices is going to enhance effectiveness and improve performance to a greater extent. More usable devices will be there as a result of improved and enhanced functionality boosted by compatibility. Compatibility is to bring about more functionality and usefulness on account of extended capabilities through other devices and this is going to particularly improve perceived usefulness.

Design positively influences device characteristics and features: Design can normally be perceived as a device characteristic and feature. Wearable medical devices must be developed and produced with respect to sound design principles and elements which are the essence of the design construct. Design considerations are truly part of device characteristics and features. That's how and why design factor augments device characteristics and features factor.

Design positively influences perceived ease of use: Good design principles and practices are going to give a rise to further ease of use regarding wearable medical devices. Owing to comprehensive concerns regarding comfort, interface convenience, simplicity, and involving users throughout the design, interaction with such devices are to be clear and understandable and not to require a lot of mental and physical effort. Good design makes it easier to find information and functions people need.

Dependability positively influences device characteristics and features: Dependability as a fusion of availability, reliability, safety, and maintainability can typically be perceived as a subdivision of device characteristics and features construct. Obviously, dependability conspicuously adds to device characteristics and features factor in terms of certain elements based on availability, reliability, safety, and maintainability attributes of wearable medical devices. Once dependability is completely ensured with such attributes, the construct of device characteristics and features is promoted.

Dependability positively influences perceived ease of use: Impartially dependable wearable medical devices do not require loads of mental and physical struggle while using. Readiness for correct service, continuity of correct service, absence of catastrophic consequences, and the ability for maintenance and repair on account of

the main theme of dependability firmly develops perceived ease of use since all these characteristics of dependability deliver additional convenience end effortlessness.

Dependability positively influences perceived usefulness: Availability, reliability, safety, and maintainability dimensions covered fully by the dependability of wearable medical devices let people use wearable medical devices whenever they want to, have reliable information, feel safe, and conveniently continue using, and this definitely increases usefulness as a result of enhanced effectiveness and improved performance in managing and improving health. Perceived usefulness requires enhanced effectiveness and improved performance in managing and improving health, and these are improved as long as wearable medical devices are satisfactorily available, reliable, safe, and maintainable.

Privacy, confidentiality, and security factor positively influences attitude & behavioral intention: Normally and expectedly, people want to have the essential authority to determine what information to share, with whom, and how. Likewise, people want that information must be used for the intended purpose only, and user consent must be taken first for any disclosure. Above and beyond, people expect the protection to safeguard from unauthorized access to or modification, denial of service to unauthorized users, and provision of service to authorized users only. All these prospects are addressed by privacy, confidentiality, and security construct and this construct improves positive feelings toward and intent to use these devices.

Perceived ease of use positively influences attitude & behavioral intention: As the interaction with wearable medical devices is clearer and effortlessly understandable, people are usually going to have extra encouraging feelings toward and intend to use wearable medical devices. Additionally, if it is not legitimately easy for people to use wearable medical devices, this will influence their pertinent attitude and behavioral intention damagingly. Provided that people find it easy to find information and functions people need from wearable medical devices, they typically have judgments such that using wearable medical devices is a good & wise idea and will be valuable & beneficial. Ease of use is going to improve the intention to use on the subject of using wearable medical devices.

Perceived ease of use positively influences perceived usefulness: When it is confirmed that wearable medical devices are easy to use, people’s views regarding wearable medical devices’ usefulness increases. As people moderately easily take advantage of information and functions they need from wearable medical devices, people’s perception regarding enhanced effectiveness and improved performance in managing and improving health fairly expands. Actually, guaranteed ease of use will let people straightforwardly experience enhanced effectiveness and improved performance in managing and improving health.

Promotion positively influences perceived ease of use: Thanks to complementary goods and services, well-communicated benefits and values, and recommendations, people more potentially think wearable medical devices are easy to use. Such promotional practices honestly moderate people’s perception of ease of use of

wearable medical devices since they are supported and vindicated in the related content and context by means of promotion construct attributes.

Promotion positively influences perceived usefulness: With the help of promotion construct involving provisions regarding benefits, briefings, and propositions, perceived usefulness notably enhances. As people become further aware of the benefits of wearable medical devices and reinforced by the people they value, their discernment on their interpretation that these devices are useful increasingly advances. Moreover, provisions regarding benefits, briefings, and propositions will let people experience enhanced effectiveness and improved performance in managing and improving health.

Perceived usefulness positively influences attitude & behavioral intention: When people think using wearable medical devices is useful, and use of wearable medical devices enhance effectiveness and improve performance in managing and improving their health, their pertinent attitude & behavioral intention growths in a remarkably positive manner. Boosted effectiveness and enhanced performance in managing and improving health by means of perceived usefulness will end in views such that using wearable medical devices is a good idea and will be beneficial, and, in this context, people are going to have more positive feelings toward and to a greater extent intend to use wearable medical devices in the future.

User characteristics construct positively influences attitude & behavioral intention: People's characteristics and expectations from wearable medical devices unquestionably affect their attitude and behavioral intention regarding these devices. Unambiguously, if people have the view of using wearable medical devices must be a routine or if they have any prominent health problems, they more decisively think that using wearable medical devices is a good & wise idea and will be valuable & beneficial. In this context, appropriate user characteristics possibly will increase encouraging feelings toward and intend to use wearable medical devices in the future.

Worthiness positively influences perceived ease of use: As long as people contemplate that using wearable medical devices offer actual value for money and effort spent, their discernment on ease of use impartially cultivates. Owing to that they find wearable medical devices satisfactory and affordable; they more conceivably perceive wearable medical devices easy to use in a better manner. The justification for this interconnection may be that tangible value and clear worth make it easier to use as people are pleased and justified. Satisfied and pleased people thanks to attributes of worthiness construct will perceive more ease of use regarding these devices.

Worthiness positively influences perceived usefulness: Satisfactory, reasonable, and affordable wearable medical devices, offering tangible and true value for money and effort spent in the relevant contexts elevates perceived usefulness thanks to that using wearable medical devices are useful, and they enhance effectiveness and improve performance in managing and improving health. The foremost reasoning for this relationship might be that worthiness and usefulness are accurately interrelated based on their emphasis on real value and benefit. If people think that it is worth, their perception of usefulness markedly progresses.

3.1.3. Checklist for Wearable Medical Devices Product Developers and Managers

Regarding the distilled factors and relevant items, a novel and comprehensive checklist was crafted, given in Table 36. This checklist can be used by product developers and managers to assess the capabilities and maturities of their products, and regarding relevant items, they can identify main points to improve to enhance their success.

Table 36: Crafted Checklist for Wearable Medical Devices Product Developers and Managers

Factors and Pertinent Items	**+ / -**
Dependability	
Ensures readiness for correct service to let users use them whenever they want to.	
Ensures continuity of correct service to let users have reliable information.	
Ensures absence of catastrophic consequences on users and the environment to let users feel safe.	
Ensures ability for maintenance and repair to let users conveniently continue using.	
Design	
The color and materials are satisfying regarding aesthetics, convenience, and robustness.	
Relevant and target users are involved throughout the design.	
Lightweight and durable.	
Comfort, interface convenience and simplicity are considered during the design.	
Device Characteristics and Features	
Battery and energy efficiency are satisfactory for convenient use.	
Uses sounds, visuals, and haptics for continuous feedback.	
Provides a variety of functionality and added value to manage and improve health.	
Offers detailed analytics and recommendations to users.	
Worthiness	
Offers value for money and effort spent.	
Performance and quality value are satisfactory.	
Purchasing and maintenance costs are affordable for users.	
Perceived Usefulness	
Enhances effectiveness in managing health.	
Improves performance in managing health.	
Privacy, Confidentiality, and Security	
Users have the authority to determine what information to share, with whom, and how.	
Information is used for the intended purpose only, and user consent is taken first for any disclosure.	
The protection to safeguard from unauthorized access to or modification, denial of service to unauthorized users, and provision of service to authorized users only are ensured.	
Perceived Ease of Use	
Interaction is clear and understandable, and does not require a lot of mental and physical effort.	
Finding information and functions is easy.	
Compatibility	
Consistent with users' current preferences and habits.	
Compatible with users' existing electronic devices (smartphones, tablets, computers, etc.).	
Promotion	
Supported by complementary goods and services.	
Benefits and values are clearly communicated.	

3.2. Additional Findings

3.2.1. Findings based on Descriptive Statistics

Comprehensive statistics based on the descriptive statistics are given in Section 2.2 and Section 2.3. On the other hand, the following three items are noteworthy as additional findings.

- Wearable medical devices of smartwatch and sports/activity trackers are the most frequently known and used wearable medical devices by participants in this research. In point of fact, this conclusion is not that surprising since wearable medical devices of smartwatch and sports/activity trackers are the most mature and disseminated categories of wearable medical devices in the industry and in the community.

- Wearable medical devices of smart clothes and smart glass are the least frequently known and used wearable medical devices by participants in this research. Similarly, this finding is not shocking owing to the fact that these wearable medical devices are the least mature in the industry and the least disseminated in the community.

- We asked people what (functionality, nice look, or both) is important for them concerning wearable medical devices. The majority of the participants in this research request and expect not only functionality but also a nice look relating to wearable medical devices. This needs to be taken into account predominantly by wearable medical devices product developers since people want to have both functionality and a nice look to ensure the acceptance of wearable medical devices.

3.2.2. Findings based on Multi-group Analysis

To draw comprehensive findings, we applied partial least squares multi-group (PLS-MGA) analyses (Joseph F. Hair et al., 2017) with Smart PLS 3 (Ringle et al., 2015) in order to determine whether degrees of relations (paths) among constructs diverge regarding different groups (gender, body mass index category, education status, generation's category, wearable use status, activity status, and income levels of the participants).

Parenthetically, before conducting PLS-MGA tests and analyses, common method bias was checked based on the variance inflation factor (VIF) values and it was observed that there is no common method bias for the identified relations among constructs.

The PLS-MGA technique, the analysis method we used in this paper, is a non-parametric significance assessment practice used for detecting potential differences of group-specific results based on bootstrapping results of partial least squares structural equation modelling practices. Specifically, for these tests, a result is accepted as

significant at the 5% probability of error level, if the p-value is smaller than 0.05 or larger than 0.95 for a certain difference of group-specific path (relations) coefficients (Henseler, Ringle, & Sinkovics, 2009).

The main mechanism of the PLS-MGA process is that the subsamples (groups) to be compared are exposed to distinct bootstrap explores, and the bootstrap results function as a basis for the hypothesis tests of relevant group differences. In this manner, rather than depending on distributional assumptions, the PLS-MGA approach that we followed estimates the observed distribution of the bootstrap results. Moreover, the PLS-MGA method necessitates no distributional expectations (Henseler et al., 2009).

Owing to these explanations and justifications, we used the PLS-MGA methodology to identify and test how degrees of relations among factors differ in relation to different groups. In this context, unambiguously, gender, body mass index category, education status, generation's category, wearable use status, activity status, and income levels of the participants were treated as different groups to detect and understand any possible differences.

Our explorations and test results concluded that there are nine significant differences concerning degrees of relations among success factors for wearable medical devices. To detect relevant differences, we created different groups based on gender, body mass index category, education status, generation's category, wearable use status, activity status, and income levels of the participants.

Table 37 shows the pertinent results on any significantly differing relations for the applied analyses for this context. Additionally, full outcomes, including both significant and insignificant results, are given in Appendix G.

The relationship between the perceived ease of use factor and the perceived usefulness factor significantly differs regarding men (M = 0.303) and women (M = 0.481) groups (p = 0.981). That is, women participants in our research more firmly think that perceived ease of use factor supports perceived usefulness factor. One conceivable justification for this position may be that ease of use is something more important for women, when compared to men in our research. More precisely, women participants more resolutely look for perceived ease of use to govern perceived usefulness.

The association between the promotion factor and the perceived ease of use factor statistically diverges concerning people with normal body mass index (M = 0.058) and people with non-normal body mass index (M = 0.247) groups (p = 0.978). Explicitly, in our research, participants with normal body mass index less firmly think that promotion leads to perceived ease of use, when compared to participants with non-normal body mass index (underweight, overweight, or obesity). A potential explanation for this case might be that people with normal body mass index look for less need of a promotion for perceived ease of use since they are somehow healthy and normal. Furthermore, people with non-normal body mass index look for more need for promotion for perceived ease of use since they are somehow unhealthy and non-normal.

Table 37: Multi-group Analysis Results

	Path Coefficients Mean (Men)	Path Coefficients Mean (Women)	p-Value (Men vs. Women)
Perceived Ease of Use → Perceived Usefulness	0.303	0.481	0.981
	Path Coefficients Mean (BMI Normal)	Path Coefficients Mean (BMI Other)	p-Value (BMI Normal vs. BMI Other)
Promotion → Perceived Ease of Use	0.058	0.247	0.978
	Path Coefficients Mean (Lower Edu.)	Path Coefficients Mean (Higher Edu.)	p-Value (Lower Edu. vs. Higher Edu.)
Perceived Ease of Use → Perceived Usefulness	0.627	0.260	0.000
	Path Coefficients Mean (Gen B)	Path Coefficients Mean (Gen M)	p-Value (Gen B vs. Gen M)
Dependability → Perceived Usefulness	0.028	0.245	0.988
	Path Coefficients Mean (Gen B)	Path Coefficients Mean (Gen X)	p-Value (Gen B vs. Gen X)
Promotion → Perceived Usefulness	0.010	0.221	0.976
	Path Coefficients Mean (Gen M)	Path Coefficients Mean (Gen X)	p-Value (Gen X vs. Gen M)
Dependability → Perceived Usefulness	0.247	0.001	0.986
	Path Coefficients Mean (Non-user)	Path Coefficients Mean (User)	p-Value (Non-user vs. User)
User Characteristics → Attitude & Behavioral Intention	0.524	0.287	0.000
	Path Coefficients Mean (No-activity)	Path Coefficients Mean (Activity)	p-Value (No-activity vs. Activity)
Promotion → Perceived Usefulness	0.274	0.068	0.020
	Path Coefficients Mean (Low Income)	Path Coefficients Mean (High Income)	p-Value (Low Income vs. High Income)
Perceived Ease of Use → Perceived Usefulness	0.490	0.271	0.018

The link between the perceived ease of use factor and the perceived usefulness factor meaningfully varies concerning people with lower (primary and high school) education (M = 0.627) and people with higher (undergraduate degree, master's or doctorate) education (M = 0.260) groups (p = 0.000). More precisely, participants whose education status are primary or high school more resolutely think that perceived ease of use empowers perceived usefulness to a greater extent when compared to participants whose education status are bachelors, master's, or doctorate. A conceivable rationalization for this may be that higher levels of education like bachelors, master's, or doctorate degrees decrease the need for ease of use for perceived usefulness to a certain extent. In other words, in our research, when compared to participants whose education statuses are bachelor's, master's, or doctorate, participants whose education status are primary or high school look for more ease of use, stemmed from their lower education status.

The connection between the dependability factor and the perceived usefulness factor significantly diverges for boomers (M = 0.028) and millennials (M = 0.245) generation groups (p = 0.988). That is to say, in our research, millennial generation participants more resolutely think that dependability advances perceived usefulness when compared to boomer generation participants. This might be caused by the fact that boomer people witnessed the development of technologies and experienced them to a better extent, and this might be leading that they are more assured with the present circumstances concerning dependability that promotes perceived usefulness. On the other hand, since millennials are more unconvinced and they experienced the established technologies only, they more decisively hunt for dependability in promoting perceived usefulness.

The relationship between the promotion factor and the perceived usefulness factor for the acceptance of wearable medical devices statistically fluctuates regarding boomers generation (M = 0.010) and generation X (M = 0.221) groups (p = 0.976). That is to say, generation X participants need more promotion to decide on a higher degree of perceived usefulness when compared to boomer participants in our research. This may well be clarified with the boomer's greater degree of life experiences and given readiness. Moreover, another plausible justification for this case might be that generation X participants expect more shreds of evidence and information to decide on the usefulness.

The connection between the dependability factor and the perceived usefulness factor meaningfully differs concerning millennials (M = 0.247) and generation X (M = 0.001) groups (p = 0.986). To be exact, in our research, when compared to generation X participants, millennial participants more resolutely think that dependability enhances perceived usefulness. This might be triggered by the fact that generation X people witnessed the development of technologies and experienced them from the very start, and this may be leading that they are more confident with the current situation on the subject of dependability promoting the perceived usefulness. On the other hand, as millennials are more skeptical and they only experienced the moderately mature technologies and devices, they more firmly look for dependability in supporting perceived usefulness regarding the acceptance of wearable medical devices.

The association between the user characteristics factor and the attitude & behavioral intention factor significantly diverges regarding non-users (M = 0.524) and users (M = 0.287) groups (p = 0.000). In other words, in our research, participants who are not already using any of the wearable medical devices (none of smartwatches, smart clothes, smart glasses, sports/activity trackers or various sensors placed on bodies) more firmly think that the user characteristics factor is important in determining attitude & behavioral intention when compared to participants who are already using at least one wearable medical device. This may be a result of that people who are already using at least one wearable medical device may already pose relevant user characteristics and they did not specifically want to mention the importance of user characteristics construct.

The relationship between the promotion factor and the perceived usefulness factor significantly differs regarding people with no-activity/sports (M = 0.274) and people with some amount of activity/sports (M = 0.068) groups (p = 0.020). Specifically, in our research, participants doing no activity or sports need more promotion to agree on the degree of perceived usefulness when compared to participants doing some sort of activity or sports. This may be explained with the given nature of people with activity/sports as they are already motivated and promoted owing to that they do some sort of activity or sports. As these people are promoted and motivated by nature, for perceived usefulness, they need lesser importance on promotion regarding the acceptance of wearable medical devices.

The link between the perceived ease of use factor and the perceived usefulness factor meaningfully differ concerning people with low-income level (M = 0.490) and people with high-income level (M = 0.271) groups (p = 0.018). Indeed, in our research, participants with low-income level more decisively think that perceived ease of use construct sustains perceived usefulness construct when compared to participants with high-income level. One possible reason for this circumstance may be that people with low-income level favor ease of use to a greater extent. Their lesser economic comfort, when compared to the ones of people with high-income level, might be causing this.

3.2.3. Findings based on Qualitative Data Analysis

In order to draw additional conclusions, the qualitative data collected by means of section 3 of the questionnaire were analyzed by means of quasi-statistics. Section 3 of the questionnaire was optional for participants to fill out. Table 38 shows the summary of the analysis of data collected in the qualitative part of the research.

For qualitative data analysis, a table, given in Appendix H, was composed to list and manage the qualitative data gathered through the questionnaire. After populating the table, the quasi-statistics were used to determine the possible additional factors for the acceptance of wearable medical devices. In this context, in the analysis of the collected qualitative data, if there was something mentioned by participants related to already covered constructs (the 11 constructs distilled via the partial least squares structural equation modeling), relevant codes are assigned, and Table 39 shows the analysis results for expressions mentioning related already covered constructs.

Table 38: Summary of Qualitative Part Data Analysis

	#	%	
Total Number of Participants	1057		
Number of Participants Writing Something in Section 3 of the Questionnaire	216	20.4	1057
Number of Participants Whose Expression is Somehow Related and Meaningful	166	15.7	1057
Number of Participants Mentioning Already Covered Constructs	118	71.1	166
Number of Times Already Covered Constructs Mentioned by Participants	197		
Number of Participants Mentioning Somehow New Constructs	71	42.8	166
Number of Times Somehow New Constructs Mentioned by Participants	74		

Table 39: Statistics for Number of Times Already Covered Constructs Mentioned

Related Constructs	#	%
PRO	43	24.7
WOR	38	21.8
DES	32	18.4
DPD	26	14.9
PUS	20	11.5
DCF	13	7.5
PEU	8	4.6
PCS	7	4.0
CMP	6	3.4
UCA	4	2.3
Total	197	100

As shown in Table 39, promotion, worthiness, design, dependability, and perceived usefulness constructs for the acceptance of wearable medical devices are the top five mentioned already covered constructs.

Exactly, meant for promotion construct, the participants specifically asked for more information and demonstration to enhance awareness. Intended for worthiness, the participants reiterated the importance of affordable cost and cheapness. For design, the participants highlighted the need for convenience and easy interaction. About dependability, the participants underlined the reliability and correctness. Regarding perceived usefulness, the participants restated the absolute need for useful functionalities.

In the analysis of the collected qualitative data, if there was something noteworthy mentioned which were not already covered constructs, relevant new names and codes are assigned, and Table 40 shows the analysis results for expressions mentioning new constructs while full details are included in the file given in Appendix H.

Table 40: Statistics for Number of Times Somehow New Constructs Mentioned

New Constructs	#	%
Special Functions (SPF)	38	51.4
Government Support (GOS)	11	14.9
Data Sharing Feature (DSF)	5	6.8
Proactive Alerts and Notifications (PAN)	5	6.8
After-sales Support (ASS)	3	4.1
Balanced Notifications (BAN)	3	4.1
Customization (CUS)	3	4.1
Development Level of the Country (DLC)	1	1.4
Environmental Friendliness (ENF)	1	1.4
Explanations for Side Effects (ESE)	1	1.4
Involving Doctors (IDO)	1	1.4
Robust to Environmental Conditions (REC)	1	1.4
Use of Nanotechnology (UNA)	1	1.4
Total	74	100

As given in Table 40, special functions, government support, data sharing feature, proactive alerts and notifications, after-sales support, balanced notifications, customization, development level of the country, environmental friendliness, explanations for side effects, involving doctors, robust to environmental conditions, and use of nanotechnology are the identified new constructs as a result of the analysis of the collected qualitative data. In this context, special functions, government support, data sharing feature, proactive alerts, and notifications are the most frequently mentioned constructs for the acceptance of wearable medical devices.

For the new construct of special functions, desired special functions were also distilled, and Table 41 shows the analysis results for desired special functions determined by means of the applied qualitative data analysis. It is concluded that people ask for these features to enhance the acceptance of wearable medical devices.

By the new construct of government support, to increase the acceptance of wearable medical devices, participants in this research evidently mentioned that they expect the government or related authorities to supply them wearable medical devices or ask them to support their purchases of these wearable medical devices with incentives and/or reductions. In reality, this sort of support and incentives can truly be economically advantageous for the government in the middle or long run by decreasing related health spending and costs, as these devices are truly instrumental for managing and improving health.

Moreover, by means of the new construct of data sharing feature to enhance the acceptance of wearable medical devices, participants clearly underlined that they want to be able to share the relevant collected data via wearable medical devices with doctors or others as long as they want. In fact, this item can be interrelated with the already covered compatibility and device characteristics & features constructs regarding the acceptance of wearable medical devices. However, while integrating this construct, privacy, confidentiality, and security construct must also be fully addressed.

Table 41: Statistics for Desired Special Functions

Desired Special Functions	#	%
SFP - Body Building	7	17.5
SFP - Weight Losing	6	15.0
SFP - Weight Control	5	12.5
SFP - Pain Relieving	4	10.0
SFP - Location Finding	2	5.0
SFP - Becoming Taller	2	5.0
SPF - Call Help	2	5.0
SPF - Fat Burning	2	5.0
SPF - Thermal Control	2	5.0
SFP - Improve Eyesight/Vision	1	2.5
SFP - Weight Measuring	1	2.5
SPF - Internet Connection	1	2.5
SPF - Making Sport	1	2.5
SPF - Medical Tests	1	2.5
SPF - Motivating to Sport	1	2.5
SPF - Pregnancy Management	1	2.5
SPF - Show Health Index	1	2.5
Total	40	100

Besides, for the new construct of proactive alerts and notifications about enhancing the acceptance of wearable medical devices, participants in this research plainly claimed that they expect their wearable medical devices to offer proactive and preventive alerts and notifications for managing and improving their health. This construct can also be treated as a subcategory of special functions construct, yet we preferred to define and treat it as a sole construct regarding its importance mentioned by the participants in this research.

Regarding the results we drew as a result of the applied quasi-statistics, we need to critically underline that these drawings must be interpreted in caution. As the sample size is relatively low when compared to our main work, the results only reflect the views of our relatively small sample for the qualitative part of our work.

3.3. Implications

The results of this research are going to be helpful both for researchers in the field of technology acceptance and wearable medical devices and for wearable medical devices product developers.

Interested researchers in the pertinent study field may benefit from this research regarding study design, methods, and distilled results about the factors, accompanying items, and interactions of factors about enhancing the acceptance of wearable medical devices.

Our results resolutely contribute to the acceptance of wearable medical devices literature and other researchers may benefit from the distilled results to expand and refine the pertinent body of knowledge.

Furthermore, with the intention of attracting more people and improving user satisfaction, customer loyalty, and user experience, product developers in the wearable medical devices business might take advantage of extracted outcomes.

Obviously, by using the distilled constructs and relevant items (elements, features, and/or situations) as a checklist or worksheet, product developers can appraise maturities of their products and can identify main points to improve in order to boost their successes.

For example, regarding our distilled results, product developers are now able to know what the dependability is and what must be specifically addressed to ensure the dependability of wearable medical devices. Additionally, for instance, product managers or marketers now be able to appreciate the importance of worthiness for wearable medical devices. Explicitly, for worthiness, they need to ensure that using wearable medical devices must truly offer value for money and effort spent. Namely, performance and quality must be satisfactory, and purchasing and maintenance costs must be affordable for success. These are accurately valid for all of the distilled 11 constructs (attitude and behavioral intention; dependability; design; device characteristics and features; worthiness; perceived usefulness; privacy, confidentiality, and security; perceived ease of use; compatibility; promotion; user characteristics) on account of distilled pertinent 39 items.

Additionally, by considering the distilled significant relationships among constructs, product developers are going to be able to know how to exploit certain main and central constructs in relation to other constructs. For instance, regarding our distilled results, product developers are now capable of seeing how the compatibility of wearable medical devices influences perceived ease of use of wearable medical devices. Moreover, for example, product developers and managers now know how the dependability of wearable medical devices influences the perceived usefulness of wearable medical devices. That is, perceived usefulness requires enhanced effectiveness and improved performance in managing and improving health, and these are improved as long as wearable medical devices are satisfactorily available, reliable, safe, and maintainable. These are truly valid for all of the distilled 18 significant relationships among constructs for enhancing the acceptance of wearable medical devices.

Moreover, by taking into consideration the additional constructs identified as a result of analysis of the collected qualitative data and group (gender, body mass index category, education status, generation’s category, wearable use status, activity status, and income levels) differences, researchers in the field and wearable medical devices product developers are going to be able to know further about the success factors for acceptance of wearable medical devices.

3.4. Limitations and Potential for Future Research

Despite the fact that this research is an authentic and theoretically and practically prominent one in exploring constructs to enhance the acceptance of wearable medical devices, there are a number of limitations for this research and these can be addressed in future explorations.

At the outset, we need to draw attention to that the concept of wearable medical devices is fairly broad-spectrum and it may possibly cover diverse tools for diverse purposes. Though, in this research, we set and limited the definition of wearable medical devices with smartwatches, smart clothes, smart glasses, sports/activity trackers, or various sensors placed on bodies for health-related purposes. This delimitation must firmly be taken into account while interpreting and implementing the results of this research.

To begin with, we intentionally limited our sample with a developing country, Turkey, and we collected data only from people in Turkey. Nonetheless, it might be thought-provoking to collect data by using the same instrument (questionnaire) from other developing and/or developed countries and compare and contrast the results after repeating the analyses conducted in this research.

Additionally, by design, this research addressed the salient factors for the acceptance of wearable medical devices. Nevertheless, another accompanying research may also be conducted to address the additional, if any, salient factors for the adoption of wearable medical devices. We know that acceptance and adoption are closely interrelated, yet especially by considering the actual use behavior, further salient factors may be distilled by concentrating on the adoption.

What's more, additional constructs identified as a result of the qualitative data analysis can be transferred to a new or extended questionnaire, and their validity can be tested with larger samples. We evidently note that when compared to the sample size of our main analysis for the quantitative part, the sample size for our work's qualitative part is relatively lower. Hence, there is a net need to support or refute our pertinent drawings with larger samples.

Still another opportunity for further related researches may be collecting more data from people satisfactorily representing generation Z (people born between 1997 and 2015) and comparing and contrasting them with other generation groups. Although we collected data from 202 people categorically belong to generation Z, our related sample does not satisfactorily represent generation Z since our youngest participants were at the age of 16 in 2019. There is a need to include even younger people to confidently draw conclusions about generation Z people.

Furthermore, this research studied wearable medical devices (smartwatches, smart clothes, smart glasses, sports/activity trackers, or various sensors placed on bodies) in a general sense. But then again, it is also conceivable to study on different categories of wearable medical devices one at a time. Unambiguously, for each category, i.e. smartwatches, smart clothes, smart glasses, sports/activity trackers, or various sensors

placed on bodies, different researches may be conducted, and their results may be compared and contrasted. Especially, regarding the least frequently known and used wearable medical devices (smart clothes and smart glass), a devoted study might be conducted to better understand the relevant success factors.

Moreover, future researches might also be steered in a longitudinal manner and with semi-structured interview portions to draw more comprehensive and loyal conclusions and theoretical/practical implications on the way to enhance the acceptance of wearable medical devices. Collecting data from the same people at different timeframes and accumulating further details with interviews might improve the reliability and validity of the conclusions.

Accordingly, what the results actually indicate is that as the central item of success factors for wearable medical devices, the pertinent attitude & behavioral intention construct can be achieved and improved employing the factors and relations we distilled. These results are beneficial for both researchers and product developers to improve the success of wearable medical devices. However, the results we distilled must be refined with contextual realities, if any, to ensure seamless fitting. Naturally, there might be certain political, economic, socio-cultural, and technological dynamics fairly applicable to different contexts and circumstances, and such dynamics must definitely be taken into account while interpreting and implementing the results we distilled.

CHAPTER 4

CONCLUSION

With this research, we determinedly tried to answer further research calls by some other salient researches (Baig et al., 2017; Gücin & Berk, 2015; Holden & Karsh, 2010; Iqbal et al., 2016; K. J. Kim & Shin, 2015; S. Y. Lee & Lee, 2018; Legris et al., 2003; H. Li et al., 2016; J. Li et al., 2019; Lunney et al., 2016; Marakhimov & Joo, 2017; Nascimento et al., 2018; Or & Karsh, 2009; Renaud & van Biljon, 2008; Ward, 2013; Yang et al., 2016; M. Zhang et al., 2017), and to the best extent of our reviews and knowledge, this research is the first of its kind on account of its sample characteristics with applied comprehensive methodology and distilled results. As a fairly transdisciplinary addition to other related and noteworthy studies, this research lets us move quite rapidly forward in the relevant field. As wearable medical devices are becoming more popular and ubiquitous not only for users but also for developers and researchers, the results of this research are going to be valuable for all the pertinent stakeholders.

The results of this research concerning commonplace factors (attitude and behavioral intention; perceived ease of use; perceived usefulness) of the technology acceptance are typically in parallel with the ones of the well-established technology acceptance studies (Davis, 1989; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Venkatesh et al., 2003). Besides, our results are moderately similar to the marks of (Gao et al., 2015; Koo & Fallon, 2018; Pfeiffer et al., 2016) regarding the prominent effects of usefulness, design, ease of use factors. Moreover, our results are similar to the results of (Nasir & Yurder, 2015), based on the fact that they also concluded that perceived risk and compatibility constructs along with the original technology acceptance model constructs are imperative for success. Besides, from the privacy and risks perspective, just like (H. Li et al., 2016; Marakhimov & Joo, 2017; Yang et al., 2016), we concluded that privacy, confidentiality, and security of wearable medical devices are vital for the acceptance and success. Nevertheless, truly in contrast to one relevant study (L.-H. Wu et al., 2016), we found attitude as a strong mediator and ease of use as a significant construct for the acceptance and success of wearable medical devices. Furthermore, similar to the perceived value and benefit factors in noticeable studies (K. J. Kim & Shin, 2015; H. Li et al., 2016; Nascimento et al., 2018; Yang et al., 2016), we found moderately related factors such as worthiness and perceived usefulness as significant constructs for the acceptance of wearable medical devices. Above and beyond, like the results of other associated prominent researches (K. J. Kim & Shin, 2015; S. Y. Lee &

Lee, 2018), we found factors such as behavioral intention & attitude and user characteristics as significant for the acceptance of wearable medical devices. Moreover, regarding convenience and usefulness, the results of this research are in agreement with the ones of still other related studies (Lunney et al., 2016; Nascimento et al., 2018; M. Zhang et al., 2017).

This research resolutely differentiates itself from the other relevant studies owing to the comparatively rich dataset, the applied comprehensive methodology, and quite newly introduced factors and relations for success. With this research, we not only purposefully added and improved some meaningful dots but also intelligently connected all pertinent dots to draw a comprehensive big picture regarding the success of wearable medical devices.

To put it briefly, regarding distilled constructs to enhance the acceptance of wearable medical devices in the scope of this research, there are three main categories. The first category includes the constructs well-established and verified in the pertinent literature and applications, and these are attitude and behavioral intention; perceived ease of use; perceived usefulness; privacy, confidentiality, and security. The second category includes the constructs that are to some extent modified and improved in the scope of this research, and these are compatibility; design; device characteristics and features; user characteristics. The third category includes the constructs originally introduced in the scope of this research, and these are dependability; promotion; worthiness.

This research contributes to the body of knowledge concerning the acceptance of wearable medical devices with 11 salient constructs (attitude and behavioral intention; dependability; design; device characteristics and features; worthiness; perceived usefulness; privacy, confidentiality, and security; perceived ease of use; compatibility; promotion; user characteristics) by means of 39 items and 18 significant relationships.

Additionally, this research adds to the pertinent body of knowledge about results reflecting the most and the least frequently known and used wearable medical devices, people's expectations from medical devices, how identified relations among constructs for different groups (gender, body mass index category, education status, generation's category, wearable use status, activity status, and income levels) diverge, and additional 13 new constructs (special functions, government support, data sharing feature, proactive alerts and notifications, after-sales support, balanced notifications, customization, development level of the country, environmental friendliness, explanations for side effects, involving doctors, robust to environmental conditions, and use of nanotechnology) distilled as a result of the analysis of the collected qualitative data.

These contributions advance the understanding regarding critical success factors for the acceptance of wearable medical devices. We hope our findings are going to be useful for researchers in the field to develop and refine the body of knowledge and wearable medical devices product developers to attract more people and improve user satisfaction, customer loyalty, and user experience on the way to understand and enhance the acceptance.

The summary of this research regarding previously known and contributions can be itemized as:

Previously Known

- Wearables are becoming more ubiquitous and they have many functions and benefits concerning healthy living and aging.

- The acceptance of wearable medical devices is truly vital and the acceptance of any systems in the healthcare domain banks on user-acceptance

- Existing understanding regarding the acceptance of wearable medical devices needs firm improvement.

- Original constructs of the technology acceptance model ought to be refined with some alterations and additions in order to better understand the acceptance of wearable medical devices.

Contributions of This Research

- On the subject of constructs to enhance the acceptance of wearable medical devices, mainly, 11 constructs with 39 items and 18 associations among constructs were distilled and explained, a checklist was crafted, and a novel model was developed.

- This research, additionally, distilled people's expectations from medical devices, how relations among constructs for different groups diverge, and supplementary 13 new constructs.

- This research advances the understanding regarding the critical success factors for the acceptance of wearable medical devices.

- This research provides implications for researchers to develop and refine the body of knowledge and wearable medical devices product developers to attract more people and improve user satisfaction, customer loyalty, and user experience.

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APPENDICES

APPENDIX A

FIRST VERSION OF THE QUESTIONNAIRE (IN TURKISH)

ANKET

İnsanların Giyilebilir Medikal (Tıbbi) Cihazlar Hakkındaki Farkındalık ve Tutumlarının Anlaşılması
&
Giyilebilir Medikal Cihazların İnsanlar Tarafından Kabulü ve Başarısının İyileştirilmesi için Kritik Ögelerin Belirlenmesi

Araştırmanın Amacı

Günümüz dünyasında, giyilebilir teknolojiler giderek daha yaygın bir hâle gelmektedir. Öte yandan, giyilebilir medikal (tıbbi) cihazlar, sağlıklı yaşama ve yaşlanma için potansiyel olarak umut verici araçlardır. Bu nedenlerle, sağlıkla ilgili bu tür teknolojileri insanların ihtiyaçları ve beklentileri ile hizalamak çok önemlidir.

Bu araştırmanın amacı, Türkiye'deki insanların giyilebilir medikal (tıbbi) cihazlar hakkındaki farkındalık ve tutumlarını anlamak ve giyilebilir medikal cihazların insanlar tarafından kabulü ve başarısının iyileştirilmesi için kritik ögeleri belirlemektir.

Anket Hakkında

Bu anket üç bölümden oluşmaktadır ve anketin tamamlanması ortalama 13 dakika sürmektedir. Birinci bölüm, ankete katılan kişiler hakkında genel verilerin toplanması amacı ile tasarlanan bölümdür. İkinci bölüm ise, ankete katılan kişilerin, özel olarak giyilebilir medikal (tıbbi) cihazların insanlar tarafından kabulü ve başarısının iyileştirilmesi için olası kritik ögelere ilişkin, çeşitli ifadeler, yargılar ve/veya düşünceler hakkındaki görüşlerini veya değerlendirmelerini Likert ölçeğini temel alarak (verilen ifade, yargı ve/veya düşünceye katılıp katılmamama durumuna göre birden beşe kadar olan numaralardan birini seçerek) yansıtması beklenen bölümdür. Üçüncü bölüm, ankete katılan kişilerin giyilebilir medikal (tıbbi) cihazların insanlar tarafından kabulü ve başarısının iyileştirilmesi için ikinci bölümde belirtilenler dışında varsa ek önerilerini yazabilecekleri bir alandır.

Ankete katılanların, anketi doğru ve eksiksiz bir şekilde doldurmaları, araştırmanın amacına ulaşabilmesi ve sonuçların değeri/anlamlılığı açısından büyük bir önem taşımaktadır. Araştırmada elde edilen veriler kümülatif olarak değerlendirip, yorumlanacaktır ve elde edilen veriler ve sonuçlar sadece bilimsel amaçlarla kullanılacaktır.

Bu ankete katılmak tamamen gönüllülük esasına bağlıdır ve dileyen katılımcı dilediği zaman anketi tamamlamaktan vazgeçebilir. Diğer taraftan, araştırmaya katkı sağlayanlara teşekkür amacıyla, araştırmacı bu araştırma kapsamında doldurulacak her bir anket için, günümüzde babası veya annesi hayatta olmayan, maddi olanakları yetersiz, yetenekli çocuklara eğitimde fırsat eşitliği sağlanabilmesi için Darüşşafaka Cemiyeti'ne bağış yapacaktır. Araştırma sonunda, anket doldurarak araştırmaya destek sağlayan kişi sayısı beş ile çarpılacak, ortaya çıkan rakam araştırmacı tarafından katılımcılar adına Darüşşafaka Cemiyeti'ne bağışlanacaktır.

Araştırmanın sonuçları hakkında, dileyen katılımcılar verilen e-posta adresini kullanarak araştırmacıdan bilgi isteyebilecekler, bu durumda çalışma tamamlandığında araştırma sonuçları kendileriyle paylaşılacaktır.

Araştırmacı Hakkında

Araştırma ve/veya sonuçları ile ilgili her türlü soru, bilgi ve/veya önerileriniz için aşağıdaki iletişim bilgileriyle araştırmacıya ulaşabilirsiniz.

Göstereceğiniz ilgi ve sağlayacağınız değerli katkı için çok teşekkür ederim.

Mustafa Değerli

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Bölüm 1: *Lütfen, bu bölümde yer alan soruları, sizin için en uygun olan seçeneği/seçenekleri işaretleyerek (x) veya uygun boş alanlara yazarak cevaplayınız***.**

Yaşınız	**Uzunluğunuz**	**Ağırlığınız**
……	~ …… cm	~ …… kg

Öğrenim Durumunuz				
İlköğretim	Lise	Lisans	Y. Lisans	Doktora

Cinsiyetiniz		
Kadın	Erkek	Diğer

Sağlık Sorununuz		**Engel Durumunuz**	
Yok	Var	Yok	Var

Ortalama Aylık Geliriniz (TL)					
1-2500	2501-4000	4001-7000	7001-10000	10001-15000	15001 +

Yaşam Şekliniz		
Oldukça Hareketli ve Aktif	Normal	Çok Durağan ve Düzensiz

Kiminle birlikte yaşıyorsunuz?			
Yalnız	Aile	Arkadaş	Diğer

Spor/Egzersiz Yapma Durumunuz				
Her Gün	Haftada Birkaç Kez	Ayda Birkaç Kez	Çok Nadir	Hiç

Hayattan Memnun Olma Durumunuz				
Çok Memnun	Memnun	Nötr	Memnun Değil	Hiç Değil

Giyilebilir medikal cihazlar hakkında bilgi sahibiyim.		**Giyilebilir medikal cihazlarda sizin için önemli olan nedir?**		
		İşlevsellik	Güzel Görünüm	İkisi De
Evet	Hayır			

Bilgi Sahibi Olduğum Giyilebilir Medikal Cihaz(lar)					
Akıllı Giysiler	Akıllı Saat	Akıllı Gözlük	Spor/Aktivite Takip Cihazı	Vücuda Yerleştirilen Sensör(ler)	Hiçbiri

Kullandığım Giyilebilir Medikal Cihaz(lar)					
Akıllı Giysiler	Akıllı Saat	Akıllı Gözlük	Spor/Aktivite Takip Cihazı	Vücuda Yerleştirilen Sensör(ler)	Hiçbiri

Teknoloji Kullanımınız	
	Bilgisayar, akıllı telefon, giyilebilir teknoloji vb. sıklıkla kullanıyorum.
	Bilgisayar, akıllı telefon, giyilebilir teknoloji vb. dengeli ve mantıklı kullanıyorum.
	Bilgisayar, akıllı telefon, giyilebilir teknoloji vb. kullanımına karşıyım, reddediyorum.

Anket size nasıl ulaştı?							
Kâğıt	e-Posta	LinkedIn	Facebook	Instagram	Twitter	WhatsApp	iMessage /SMS

*Lütfen, **tüm** soruları cevapladığınızdan emin olduktan sonra, Bölüm 2'ye geçiniz.*

Bölüm 2: *Bu bölümde yer alan giyilebilir medikal (tıbbi) cihazların insanlar tarafından kabulü ve başarısının iyileştirilmesi için olası kritik ögelere ilişkin, çeşitli ifadeler, yargılar ve/veya düşünceler hakkındaki görüşlerinizi verilen ilgili ifade, yargı ve/veya düşünceye katılıp katılmamama durumunuza göre birden beşe kadar olan numaralardan birini seçerek lütfen belirtiniz.*

#	Giyilebilir Medikal (Tıbbi) Cihazların İnsanlar Tarafından Kabulü ve Başarısının İyileştirilmesi için Olası Kritik Ögelere İlişkin İfade, Yargı ve/veya Düşünce	1 = Hiç Katılmıyorum	2 = Katılmıyorum	3 = Kararsızım	4 = Katılıyorum	5 = Tamamen Katılıyorum
1	Giyilebilir medikal (tıbbi) cihazlar sağlığımla ilgili hedeflerim için faydalı olmalıdır.					
2	Giyilebilir medikal (tıbbi) cihazların kullanımı sağlığımı yönetmek ve iyileştirmek için yararlı olmalıdır.					
3	Giyilebilir medikal (tıbbi) cihazların kullanımı sağlığımı yönetmedeki etkinliğimi arttırmalıdır.					
4	Giyilebilir medikal (tıbbi) cihazların kullanımı sağlığımı yönetme performansımı arttırmalıdır.					
5	Giyilebilir medikal (tıbbi) cihazlarla etkileşimlerim net ve anlaşılır olmalıdır.					

#	İfade, Yargı ve/veya Düşünce	1	2	3	4	5
6	Giyilebilir medikal (tıbbi) cihazlarla etkileşim kurmak, çok fazla zihinsel ve fiziksel çaba gerektirmemelidir.					
7	Giyilebilir medikal (tıbbi) cihazların kullanımı kolay olmalıdır.					
8	Giyilebilir medikal (tıbbi) cihazlardan ihtiyaç duyduğum bilgi ve işlevleri bulmak kolay olmalıdır.					
9	Giyilebilir medikal (tıbbi) cihazların kullanılması iyi ve akıllıca bir fikirdir.					
10	Giyilebilir medikal (tıbbi) cihazlar kullanma fikrini seviyorum.					
11	Giyilebilir medikal (tıbbi) cihazların kullanılması değerli ve faydalı olacaktır.					
12	Giyilebilir medikal (tıbbi) cihazlara karşı olumlu hislerim var.					
13	Gelecekte giyilebilir medikal (tıbbi) cihazlar kullanmak niyetindeyim.					
14	Gelecekte giyilebilir medikal (tıbbi) cihazlar kullanmayı planlıyorum.					
15	Giyilebilir medikal (tıbbi) cihazlara erişimim olduğunu varsayarak, onları kullanmayı düşünüyorum.					
16	Giyilebilir medikal (tıbbi) cihazlara erişimim olduğu göz önüne alındığında, onları kullanacağımı tahmin ediyorum.					
17	Giyilebilir medikal (tıbbi) cihazların kullanımı harcanan para ve emeğe değmelidir.					
18	Giyilebilir medikal (tıbbi) cihazlar makul bir şekilde fiyatlandırılmalıdır.					
19	Giyilebilir medikal (tıbbi) cihazların performans ve kalite açısından tatmin edici olmalıdır.					
20	Giyilebilir medikal (tıbbi) cihazların satın alma ve bakım maliyetleri kullanıcıların karşılayabileceği seviyede olmalıdır.					
21	Kullanıcılar hangi bilgileri, kiminle ve nasıl paylaşacaklarını belirleme yetkisine sahip olmalıdır.					
22	Bilgiler yalnızca ilgili amaç için kullanılmalı ve herhangi bir paylaşım/dağıtım için öncelikle kullanıcı onayı alınmalıdır.					

#	İfade, Yargı ve/veya Düşünce	1	2	3	4	5
23	Herhangi bir yetkisiz erişime veya değiştirmeye karşı koruma, yetkisiz kullanıcılara hizmet vermeme ve yetkili kullanıcılara hizmet sunma sağlanmalıdır.					
24	Mahremiyet, gizlilik ve güvenlik sağlanmalıdır.					
25	Kararları yönlendirmek ve sonuçlara ulaşmak için giyilebilir medikal (tıbbi) cihazlarla ilgili özel bir ilkeler sistemi bulunmalıdır.					
26	Hükümetler ve ilgili kuruluşlar, bir giyilebilir medikal (tıbbi) cihaz politikasını tanımlamalı ve yaşatmalıdır.					
27	Giyilebilir medikal (tıbbi) cihazlar politikası hem engelleri hem de kolaylaştırıcıları hesaba katmalıdır.					
28	Eşitliği ve etkinliği sağlamak için giyilebilir medikal (tıbbi) cihazlar endüstrisinde rehberlere ihtiyaç vardır.					
29	Giyilebilir bir medikal (tıbbi) cihaz kullanmak, mevcut tercihlerim ve alışkanlıklarım ile tutarlı olmalıdır.					
30	Giyilebilir medikal (tıbbi) cihazlar veri paylaşımı, donanım ve yazılım açısından mevcut akıllı telefonumla uyumlu olmalıdır.					
31	Giyilebilir medikal (tıbbi) cihazlarımı mevcut elektronik cihazlarımla (akıllı telefon, masa, bilgisayar vb.) yönetebilmeliyim.					
32	Giyilebilir medikal (tıbbi) cihazlar kullanmak hayatımın tüm yönleriyle uyumlu olmalıdır.					
33	Giyilebilir medikal (tıbbi) cihazlar, kullanıcıların istedikleri zaman kullanabilmeleri için doğru servis sağlamak üzere hazır olmalarını sağlamalıdır.					
34	Giyilebilir medikal (tıbbi) cihazlar, kullanıcıların güvenilir bilgi sahibi olmalarını sağlamak için doğru servisin sürekliliğini sağlamalıdır.					
35	Giyilebilir medikal (tıbbi) cihazlar, kullanıcıların kendilerini güvende hissetmelerini sağlamak için kullanıcılara ve çevreye feci etkilerinin olmamasını sağlamalıdır.					
36	Giyilebilir medikal (tıbbi) cihazlar, bütünlüğü korumak için uygun olmayan değişiklik yapılmamasını sağlamalıdır.					

#	İfade, Yargı ve/veya Düşünce	1	2	3	4	5
37	Giyilebilir medikal (tıbbi) cihazlar, kullanıcıların gerektiğinde onları rahatça muhafaza etmelerini sağlamak için bakım ve onarım imkanı sağlamalıdır.					
38	Giyilebilir medikal (tıbbi) cihazlar güvenilebilir olmalıdır.					
39	Yenilikçi insanlar giyilebilir tıbbi cihazlar kullanmaya daha isteklidir.					
40	Teknoloji tehditleri hakkında daha fazla şey bilmek, insanları giyilebilir tıbbi cihazlardan uzak tutacaktır.					
41	Giyilebilir tıbbi cihazların kullanımı bir alışkanlık olmalıdır.					
42	Giyilebilir tıbbi cihazların kullanılması eğlenceli, zevk verici ve mutlu edici olmalıdır.					
43	Sağlık sorunlarım varsa, giyilebilir tıbbi cihazları daha yüksek olasılıkla kullanırım.					
44	Özgün özelliklerim ve giyilebilir tıbbi cihazlardan beklentilerim, bu bağlamdaki tutum ve davranışlarımı belirler.					
45	Giyilebilir medikal (tıbbi) cihazlar sürekli izleme özelliğine sahip olmalıdır.					
46	Giyilebilir medikal (tıbbi) cihazların pil ve enerji verimliliği, rahat kullanım için yeterli olmalıdır.					
47	Giyilebilir medikal (tıbbi) cihazlar, sürekli geri bildirim için sesleri, görselleri ve titreşimleri kullanmalıdır.					
48	Giyilebilir medikal (tıbbi) cihazların oyunlaştırma (hedef belirleme ve ödüller) özelliği olması gerekir.					
49	Giyilebilir medikal (tıbbi) cihazların depolama kapasitesi uygun kullanım için yeterli olmalıdır.					
50	Giyilebilir medikal (tıbbi) cihazlar kablosuz ve Bluetooth iletişimine sahip olmalıdır.					
51	Giyilebilir medikal (tıbbi) cihazlar bulut senkronizasyonu ve bulut teknolojileri kullanmalıdır.					
52	Giyilebilir medikal (tıbbi) cihazlar sağlığı yönetmek ve iyileştirmek için çeşitli fonksiyonlar ve katma değer sağlamalıdır.					
53	Giyilebilir medikal (tıbbi) cihazlar, kullanıcılara ayrıntılı analizler ve öneriler sunmalıdır.					
54	Giyilebilir medikal (tıbbi) cihazların genel tasarımı benim için çekici olmalıdır.					

#	İfade, Yargı ve/veya Düşünce	1	2	3	4	5
55	Giyilebilir medikal (tıbbi) cihazların kullanıcı etkileşimi iyi tasarlanmalıdır.					
56	Giyilebilir medikal (tıbbi) cihazlar profesyonelce tasarlanmış görünmelidir.					
57	Giyilebilir medikal (tıbbi) cihazların renkleri ve malzemeleri estetik, rahatlık ve sağlamlık açısından tatmin edici olmalıdır.					
58	Giyilebilir medikal (tıbbi) cihazların tasarımında insan faktörleri standartları uygulanmalıdır.					
59	Giyilebilir medikal (tıbbi) cihazların tasarımında ilgili ve hedef anahtar kullanıcılar dâhil edilmelidir.					
60	Giyilebilir medikal (tıbbi) cihazlar hafif ve dayanıklı olmalıdır.					
61	Giyilebilir medikal (tıbbi) cihazların tasarımında konfor ve arayüz rahatlığı dikkate alınmalıdır.					
62	Giyilebilir medikal (tıbbi) cihazlar için sadelik ana tasarım teması olmalıdır.					
63	Giyilebilir medikal (tıbbi) cihazları kullanmak için destek ve eğitim almak faydalı olacaktır.					
64	Tıp doktorunun tavsiyesi, giyilebilir medikal (tıbbi) cihaz kullanımımı büyük ölçüde belirler.					
65	Ailemden, arkadaşlarımdan ve değer verdiğim kişilerden gelen görüşleri, giyilebilir medikal (tıbbi) cihazları kullanma kararı vermemde dikkate alırım.					
66	Giyilebilir medikal (tıbbi) cihazların kullanımı tamamlayıcı ürünler ve servislerle ile desteklenmelidir.					
67	Ailemden, arkadaşlarımdan ve değer verdiklerimden çoğu insan giyilebilir medikal (tıbbi) cihazlar kullanırsa, muhtemelen ben de kullanırım.					
68	Giyilebilir medikal (tıbbi) cihazlar kullanmak için gerekli bilgi ve deneyime sahibim.					
69	Giyilebilir medikal (tıbbi) cihaz kullanmanın yararları ve değerleri, benimseme ve kullanımı arttırmak için net bir şekilde açıklanmalı ve paylaşılmalıdır.					

*Lütfen, **tüm** ifade, yargı ve/veya düşünceler için, katılıp katılmamama durumunuza göre birden beşe kadar olan numaralardan birini seçtiğinizden emin olunuz.*

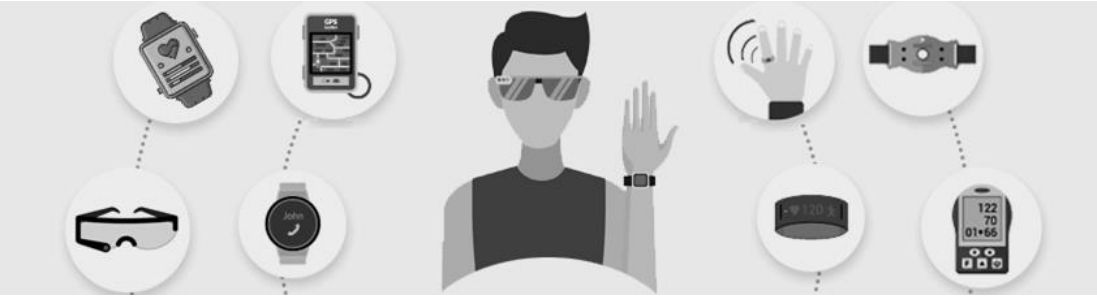
Bölüm 3: *Lütfen, bu bölümde giyilebilir medikal (tıbbi) cihazların insanlar tarafından kabulü ve başarısının iyileştirilmesi için ikinci bölümde belirtilenler dışında varsa ek önerilerinizi belirtiniz. Ekleyeceğiniz bir şey yok ise bu bölümü boş bırakabilir veya araştırmaya dair varsa genel önerilerinizi belirtebilirsiniz.*

Gösterdiğiniz ilgi ve sağladığınız değerli katkı için çok teşekkürler.

APPENDIX B

SECOND VERSION OF THE QUESTIONNAIRE (IN TURKISH)

İnsanların Giyilebilir Medikal (Tıbbi) Cihazlar Hakkındaki Farkındalık ve Tutumlarının Anlaşılması ile Giyilebilir Medikal Cihazların İnsanlar Tarafından Kabulü ve Başarısının İyileştirilmesi için Kritik Ögelerin Belirlenmesi



Giyilebilir Medikal Cihaz: İnsanların sağlıklarını yönetmek ve iyileştirmek için giyerek kullandıkları özellikle medikal (tıbbi) izleme ve destek sağlayan cihazlardır. Bu cihazlara verilebilecek örnekler: Akıllı saat, akıllı giysiler, akıllı gözlük, spor/aktivite takip cihazı veya vücut üzerine yerleştirilen çeşitli algılayıcılar (sensörler).

Araştırmanın Amacı

Günümüz dünyasında, giyilebilir teknolojiler giderek daha yaygın bir hâle gelmektedir. Öte yandan, giyilebilir medikal (tıbbi) cihazlar, sağlıklı yaşama ve yaşlanma için potansiyel olarak umut verici araçlardır. Bu nedenlerle, sağlıkla ilgili bu tür teknolojileri insanların ihtiyaçları ve beklentileri ile hizalamak çok önemlidir.

Bu araştırmanın amacı, Türkiye'deki insanların giyilebilir medikal (tıbbi) cihazlar hakkındaki farkındalık ve tutumlarını anlamak ve giyilebilir medikal cihazların insanlar tarafından kabulü ve başarısının iyileştirilmesi için kritik ögeleri belirlemektir.

Anket Hakkında

Bu anket üç bölümden oluşmaktadır ve anketin tamamlanması ortalama 10 dakika sürmektedir. Birinci bölüm, ankete katılan kişiler hakkında genel verilerin toplanması amacı ile tasarlanan bölümdür. İkinci bölüm, ankete katılan kişilerin, çeşitli ifadeler, yargılar ve/veya düşünceler hakkındaki görüşlerini veya değerlendirmelerini Likert ölçeğini temel alarak (verilen ifade, yargı ve/veya düşünceye katılıp katılmamama durumuna göre birden beşe kadar olan numaralardan birini seçerek) yansıtması

beklenen bölümdür. Üçüncü bölüm ise, ankete katılan kişilerin varsa önerilerini iletebilecekleri bir alandır.
Ankete katılanların, anketi doğru ve eksiksiz bir şekilde doldurmaları, araştırmanın amacına ulaşabilmesi ve sonuçların değeri/anlamlılığı açısından büyük bir önem taşımaktadır. Araştırmada elde edilen veriler kümülatif olarak değerlendirip, yorumlanacaktır ve elde edilen veriler ve sonuçlar sadece bilimsel amaçlarla kullanılacaktır. Bu ankete katılmak tamamen gönüllülük esasına bağlıdır ve dileyen katılımcı dilediği zaman anketi tamamlamaktan vazgeçebilir.

Diğer taraftan, araştırmaya katılımı teşvik etmek ve araştırmaya katkı sağlayanlara teşekkür amacıyla, araştırmacı bu araştırma kapsamında doldurulacak her bir anket için, günümüzde babası veya annesi hayatta olmayan, maddi olanakları yetersiz, yetenekli çocuklara eğitimde fırsat eşitliği sağlanabilmesi için Darüşşafaka Cemiyeti'ne bağış yapacaktır. Araştırma sonunda, anket doldurarak araştırmaya destek sağlayan kişi sayısı beş Türk Lirası ile çarpılacak, ortaya çıkan rakam araştırmacı tarafından katılımcılar adına Darüşşafaka Cemiyeti'ne bağışlanacaktır.

Araştırmacı Hakkında
Araştırma ve/veya sonuçları ile ilgili her türlü soru, bilgi ve/veya önerileriniz için aşağıdaki iletişim bilgileriyle araştırmacıya ulaşabilirsiniz.
Göstereceğiniz ilgi ve sağlayacağınız değerli katkı için çok teşekkür ederim.
Dr. Mustafa Değerli
mustafa.degerli@odtu.edu.tr
https://tr.linkedin.com/in/mustafadegerli

Bölüm 1: *Lütfen, bu bölümde yer alan soruları, sizin için en uygun olan ve sizi en iyi ifade eden seçeneği/seçenekleri işaretleyerek (x) veya uygun boş alanlara yazarak cevaplayınız***.**

Yaşınız	**Uzunluğunuz**	**Ağırlığınız**	**Mesleğiniz**
……	~ …… cm	~ …… kg	……

Öğrenim Durumunuz				
İlköğretim	Lise	Lisans	Y. Lisans	Doktora

Cinsiyetiniz		
Kadın	Erkek	Diğer

Medeni Hâliniz				**Sağlık Sorununuz**		**Engel Durumunuz**	
Bekar	Evli	Ayrıldım	Eşim Vefat Etti	Yok	Var	Yok	Var

Ortalama Aylık Geliriniz (TL)					
0-2500	2501-4000	4001-7000	7001-10000	10001-15000	15001 +

Yaşam Şekliniz		
Oldukça Hareketli ve Aktif	Normal	Çok Durağan ve Düzensiz

Yaşam Yeriniz				
Evde Yalnız	Evde Aile / Arkadaşla	Yurt/Pansiyon	Hastane	Huzurevi/Bakımevi

Spor/Egzersiz Yapma Durumunuz				
Her Gün	Haftada Birkaç Kez	Ayda Birkaç Kez	Çok Nadir	Hiç

Hayattan Memnun Olma Durumunuz				
Çok Memnun	Memnun	Nötr	Memnun Değil	Hiç Değil

Giyilebilir medikal cihazlar hakkında bilgi sahibiyim.	
Evet	Hayır

Giyilebilir medikal cihazlarda sizin için önemli olan nedir?		
İşlevsellik	Güzel Görünüm	İkisi De

Bilgi Sahibi Olduğum Giyilebilir Medikal Cihaz(lar)					
Akıllı Giysiler	Akıllı Saat	Akıllı Gözlük	Spor/Aktivite Takip Cihazı	Vücuda Yerleştirilen Sensör(ler)	Hiçbiri

Kullandığım Giyilebilir Medikal Cihaz(lar)					
Akıllı Giysiler	Akıllı Saat	Akıllı Gözlük	Spor/Aktivite Takip Cihazı	Vücuda Yerleştirilen Sensör(ler)	Hiçbiri

Teknoloji Kullanımınız	
	Bilgisayar, akıllı telefon, giyilebilir teknoloji vb. sıklıkla kullanıyorum.
	Bilgisayar, akıllı telefon, giyilebilir teknoloji vb. dengeli ve mantıklı kullanıyorum.
	Bilgisayar, akıllı telefon, giyilebilir teknoloji vb. kullanımına karşıyım, reddediyorum.

Anket size nasıl ulaştı?							
Kâğıt	e-Posta	LinkedIn	Facebook	Instagram	Twitter	WhatsApp	iMessage /SMS

*Lütfen, **tüm** soruları cevapladığınızdan emin olduktan sonra, Bölüm 2'ye geçiniz.*

Bölüm 2: *Bu bölümde yer alan ifade, yargı ve/veya düşüncelere katılıp katılmamama durumunuza göre, her bir ifade için lütfen birden beşe kadar olan numaralardan birini seçiniz.*

(1=Hiç Katılmıyorum; 2=Katılmıyorum; 3=Kararsızım; 4=Katılıyorum; 5=Tamamen Katılıyorum)

#	*İfade, Yargı ve/veya Düşünce*	*1*	*2*	*3*	*4*	*5*
1	Giyilebilir medikal cihazlarla etkileşimim açık ve anlaşılabilir olmalı, çok fazla zihinsel ve fiziksel çaba gerektirmemelidir.					
2	Giyilebilir medikal cihazların kullanımı kolay olmalıdır.					
3	İhtiyaç duyduğum bilgi ve işlevleri giyilebilir medikal cihazlardan bulmak kolay olmalıdır.					
4	Giyilebilir medikal cihazların kullanımı sağlığımı yönetmek ve iyileştirmek için yararlı olmalıdır.					
5	Giyilebilir medikal cihazların kullanımı sağlığımı yönetmedeki etkinliğimi arttırmalıdır.					
6	Giyilebilir medikal cihazların kullanımı sağlığımı yönetme performansımı arttırmalıdır.					
7	Giyilebilir medikal cihaz kullanmak iyi ve akıllıca bir fikirdir.					
8	Giyilebilir medikal cihazlar kullanmak değerli ve faydalı olacaktır.					
9	Giyilebilir medikal cihazlara karşı olumlu hislerim var.					
10	Gelecekte giyilebilir medikal cihazlar kullanmak niyetindeyim.					
11	Gelecekte giyilebilir medikal cihazlar kullanmayı planlıyorum.					
12	Giyilebilir medikal cihazlara sahip olursam, onları kullanacağımı düşünüyorum.					
13	Kullanıcılar hangi bilgileri, kiminle ve nasıl paylaşacaklarını belirleme yetkisine sahip olmalıdır.					
14	Bilgiler yalnızca ilgili amaç için kullanılmalı ve herhangi bir paylaşım/dağıtım için öncelikle kullanıcı onayı alınmalıdır.					
15	Herhangi bir yetkisiz erişim veya değiştirmeye karşı koruma, yetkisiz kullanıcılara hizmet vermeme ve yalnızca yetkili kullanıcılara hizmet sunma koşulları sağlanmalıdır.					
16	Giyilebilir medikal cihazlar, doğru servis sağlayacak şekilde, kullanıcıların istedikleri zaman kullanabilmeleri için hazır durumda olmalıdır.					

(1=Hiç Katılmıyorum; 2=Katılmıyorum; 3=Kararsızım; 4=Katılıyorum; 5=Tamamen Katılıyorum)

#	*İfade, Yargı ve/veya Düşünce*	*1*	*2*	*3*	*4*	*5*
17	Giyilebilir medikal cihazlar, doğru servisi sürekli sağlayacak şekilde, kullanıcılara güvenilir bilgi vermelidir.					
18	Giyilebilir medikal cihazların kullanıcılara ve çevreye feci etkileri olmamalı ve bu sayede kullanıcılar kendilerini güvende hissetmelidir.					
19	Giyilebilir medikal cihazlar, kullanıcıların bunları uygun şekilde kullanmaya devam etmelerini sağlamak için, bakım ve onarım olanağı sağlamalıdır.					
20	Giyilebilir bir medikal cihaz kullanmak, mevcut tercihlerim ve alışkanlıklarım ile tutarlı olmalıdır.					
21	Giyilebilir medikal cihazlar mevcut elektronik cihazlarımla (akıllı telefon, tablet, bilgisayar vb.) uyumlu olmalıdır.					
22	Giyilebilir medikal cihazlar kullanmak hayatımın tüm yönleriyle uyumlu olmalıdır.					
23	Tıp doktorunun tavsiyesi ve ailem, arkadaşlarım ile değer verdiğim kişilerin görüşlerini, giyilebilir medikal cihazları kullanma kararı verirken dikkate alırım.					
24	Giyilebilir medikal cihazların kullanımı tamamlayıcı ürünler ve servislerle desteklenmelidir.					
25	Kabul ve benimsemeyi arttırmak için, giyilebilir medikal cihaz kullanmanın yararları ve değerleri net bir şekilde açıklanmalı ve paylaşılmalıdır.					
26	Yenilikçi insanlar giyilebilir medikal cihazlar kullanmaya daha isteklidir.					
27	Giyilebilir medikal cihazların kullanımı bir alışkanlık olmalıdır.					
28	Sağlık sorunlarım varsa, giyilebilir medikal cihazları daha yüksek olasılıkla kullanırım.					
29	Kişisel özelliklerim ve giyilebilir medikal cihazlardan beklentilerim, bu bağlamdaki tutum ve davranışlarımı belirler.					
30	Kararları yönlendirmek ve ilgili amaçlara ulaşmak için giyilebilir medikal cihazlarla ilgili özel bir ilkeler sistemi (prensipler) bulunmalıdır.					
31	Hükümetler ve ilgili organizasyonlar, bir giyilebilir medikal cihaz politikasını tanımlamalı ve yaşatmalıdır.					

(1=Hiç Katılmıyorum; 2=Katılmıyorum; 3=Kararsızım; 4=Katılıyorum; 5=Tamamen Katılıyorum)

#	*İfade, Yargı ve/veya Düşünce*	*1*	*2*	*3*	*4*	*5*
32	Giyilebilir medikal cihazlar politikası hem engelleri hem de kolaylaştırıcıları hesaba katmalıdır.					
33	Giyilebilir medikal cihazların renkleri ve malzemeleri estetik, rahatlık ve sağlamlık açısından tatmin edici olmalıdır.					
34	İnsan faktörleri (ergonomi) standartları giyilebilir medikal cihazların tasarımında uygulanmalıdır.					
35	İlgili ve hedef kullanıcılar giyilebilir medikal cihazların tasarım aşamalarına dâhil edilmelidir.					
36	Giyilebilir medikal cihazlar hafif ve dayanıklı olmalıdır.					
37	Konfor ve arayüz rahatlığı giyilebilir medikal cihazların tasarımında dikkate alınmalıdır.					
38	Giyilebilir medikal cihazların pil ve enerji verimliliği, uygun kullanım için tatmin edici olmalıdır.					
39	Giyilebilir medikal cihazlar, sürekli geri bildirim için sesleri, görselleri ve titreşimleri kullanmalıdır.					
40	Giyilebilir medikal cihazların oyunlaştırma (hedef belirleme ve ödüller) özelliği olması gerekir.					
41	Giyilebilir medikal cihazlar sağlığı yönetmek ve iyileştirmek için çeşitli fonksiyonlar ve katma değer sağlamalıdır.					
42	Giyilebilir medikal cihazlar, kullanıcılara ayrıntılı analizler ve öneriler sunmalıdır.					
43	Giyilebilir medikal cihazların kullanımı harcanan para ve emeğe değmelidir.					
44	Giyilebilir medikal cihazlar performans ve kalite açısından tatmin edici olmalıdır.					
45	Giyilebilir medikal cihazların satın alma ve bakım maliyetleri kullanıcıların karşılayabileceği seviyede olmalıdır.					

*Lütfen, **tüm** ifade, yargı ve/veya düşünceler için, katılıp katılmamama durumunuza göre birden beşe kadar olan numaralardan birini seçtiğinizden emin olunuz.*

Bölüm 3: *Lütfen, bu bölümde giyilebilir medikal (tıbbi) cihazların insanlar tarafından kabulü ve başarısının iyileştirilmesi için ikinci bölümde belirtilenler dışında varsa ek önerilerinizi belirtiniz. Ekleyeceğiniz bir şey yok ise bu bölümü boş bırakabilir veya araştırmaya dair varsa genel önerilerinizi belirtebilirsiniz.*

Gösterdiğiniz ilgi ve sağladığınız değerli katkı için çok teşekkürler.

APPENDIX C

FINAL VERSION OF THE QUESTIONNAIRE (IN TURKISH)

İnsanların Giyilebilir Medikal (Tıbbi) Cihazlar Hakkındaki Farkındalık ve Tutumlarının Anlaşılması ile Giyilebilir Medikal Cihazların İnsanlar Tarafından Kabulü ve Başarısının İyileştirilmesi için Kritik Ögelerin Belirlenmesi

Giyilebilir Medikal Cihaz: İnsanların sağlıklarını yönetmek ve iyileştirmek için giyerek kullandıkları özellikle medikal (tıbbi) izleme ve destek sağlayan cihazlardır. Bu cihazlara verilebilecek örnekler: Akıllı saat, akıllı giysiler, akıllı gözlük, spor/aktivite takip cihazı veya vücut üzerine yerleştirilen çeşitli algılayıcılar (sensörler).

Araştırmanın Amacı: Günümüz dünyasında, giyilebilir teknolojiler giderek daha yaygın bir hâle gelmektedir. Öte yandan, giyilebilir medikal (tıbbi) cihazlar, sağlıklı yaşama ve yaşlanma için potansiyel olarak umut verici araçlardır. Bu nedenlerle, sağlıkla ilgili bu tür teknolojileri insanların ihtiyaçları ve beklentileri ile hizalamak çok önemlidir. Bu araştırmanın amacı, Türkiye'deki insanların giyilebilir medikal cihazlar hakkındaki farkındalık ve tutumlarını anlamak ve giyilebilir medikal cihazların insanlar tarafından kabulü ve başarısının iyileştirilmesi için kritik ögeleri belirlemektir.

Anket Hakkında: Bu anket üç bölümden oluşmaktadır ve anketin tamamlanması ortalama 7 dakika sürmektedir. Araştırmada elde edilen veriler kümülatif olarak değerlendirip, yorumlanacaktır ve elde edilen veriler ve sonuçlar sadece bilimsel amaçlarla kullanılacaktır. Bu ankete katılmak tamamen gönüllülük esasına bağlıdır ve dileyen katılımcı dilediği zaman anketi tamamlamaktan vazgeçebilir.

Araştırmacı Hakkında: Her türlü soru, bilgi ve/veya önerileriniz için aşağıdaki iletişim bilgileriyle araştırmacıya ulaşabilirsiniz. **Göstereceğiniz ilgi ve sağlayacağınız değerli katkı için çok teşekkür ederim.** Dr. Mustafa Değerli - mustafa.degerli@odtu.edu.tr - https://tr.linkedin.com/in/mustafadegerli

Bölüm 1: *Lütfen, bu bölümde yer alan soruları, sizin için en uygun olan ve sizi en iyi ifade eden seçeneği/seçenekleri işaretleyerek (x) veya uygun boş alanlara yazarak cevaplayınız***.**

Öğrenim Durumunuz				
İlköğretim	Lise	Lisans	Y. Lisans	Doktora

Cinsiyetiniz		
Kadın	Erkek	Diğer

Ortalama Aylık Geliriniz (TL)					
0-2500	2501-4000	4001-7000	7001-10000	10001-15000	15001 +

Yaşınız	**Boyunuz**	**Ağırlığınız**	**Sağlık Sorununuz**			
……	~ …… cm	~ …… kg	Yok		Var	

Spor/Egzersiz Yapma Durumunuz				
Her Gün	Haftada Birkaç Kez	Ayda Birkaç Kez	Çok Nadir	Hiç

Bilgi Sahibi Olduğum Giyilebilir Medikal Cihaz(lar)					
Akıllı Giysiler	Akıllı Saat	Akıllı Gözlük	Spor/Aktivite Takip Cihazı	Vücuda Yerleştirilen Sensör(ler)	Hiçbiri

Kullandığım Giyilebilir Medikal Cihaz(lar)					
Akıllı Giysiler	Akıllı Saat	Akıllı Gözlük	Spor/Aktivite Takip Cihazı	Vücuda Yerleştirilen Sensör(ler)	Hiçbiri

Giyilebilir medikal cihazlarda sizin için önemli olan nedir?		
İşlevsellik	Güzel Görünüm	İkisi De

Teknoloji Kullanımınız	
	Bilgisayar, akıllı telefon veya teknolojik ürünleri sıklıkla kullanıyorum.
	Bilgisayar, akıllı telefon veya teknolojik ürünleri nadiren kullanıyorum.
	Bilgisayar, akıllı telefon veya teknolojik ürünlere uzağım.

Anket size nasıl ulaştı?						
Kâğıt	e-Posta	LinkedIn	Facebook	Instagram	WhatsApp	Mesaj

*Lütfen, **tüm** soruları cevapladığınızdan emin olduktan sonra, Bölüm 2'ye geçiniz.*

Bölüm 2: *Lütfen, bu bölümde yer alan ifade, yargı ve/veya düşüncelere katılıp katılmamama durumunuza göre, her bir ifade için birden beşe kadar olan numaralardan birini işaretleyiniz.*

(1=Hiç Katılmıyorum; 2=Katılmıyorum; 3=Kararsızım; 4=Katılıyorum; 5=Tamamen Katılıyorum)

#	*İfade, Yargı ve/veya Düşünce*	*1*	*2*	*3*	*4*	*5*
1.	Giyilebilir medikal cihazlarla etkileşimim açık ve anlaşılabilir olmalı, çok fazla zihinsel ve fiziksel çaba gerektirmemelidir.					
2.	Giyilebilir medikal cihazların kullanımı kolay olmalıdır.					
3.	İhtiyaç duyduğum bilgi ve işlevleri giyilebilir medikal cihazlardan bulmak kolay olmalıdır.					
4.	Giyilebilir medikal cihazların kullanımı sağlığımı yönetmek ve iyileştirmek için yararlı olmalıdır.					
5.	Giyilebilir medikal cihazların kullanımı sağlığımı yönetmedeki etkinliğimi arttırmalıdır.					
6.	Giyilebilir medikal cihazların kullanımı sağlığımı yönetme performansımı arttırmalıdır.					
7.	Giyilebilir medikal cihaz kullanmak iyi ve akıllıca bir fikirdir.					
8.	Giyilebilir medikal cihazlar kullanmak değerli ve faydalı olacaktır.					
9.	Giyilebilir medikal cihazlara karşı olumlu hislerim var.					
10.	Gelecekte giyilebilir medikal cihazlar kullanmak niyetindeyim.					
11.	Gelecekte giyilebilir medikal cihazlar kullanmayı planlıyorum.					
12.	Giyilebilir medikal cihazlara sahip olursam, onları kullanacağımı düşünüyorum.					
13.	Kullanıcılar hangi bilgileri, kiminle ve nasıl paylaşacaklarını belirleme yetkisine sahip olmalıdır.					
14.	Bilgiler yalnızca ilgili amaç için kullanılmalı ve herhangi bir paylaşım/dağıtım için öncelikle kullanıcı onayı alınmalıdır.					
15.	Herhangi bir yetkisiz erişim veya değiştirmeye karşı koruma, yetkisiz kullanıcılara hizmet vermeme ve yalnızca yetkili kullanıcılara hizmet sunma koşulları sağlanmalıdır.					

(1=Hiç Katılmıyorum; 2=Katılmıyorum; 3=Kararsızım; 4=Katılıyorum; 5=Tamamen Katılıyorum)

#	*İfade, Yargı ve/veya Düşünce*	*1*	*2*	*3*	*4*	*5*
16.	Giyilebilir medikal cihazlar, doğru servis sağlayacak şekilde, kullanıcıların istedikleri zaman kullanabilmeleri için hazır durumda olmalıdır.					
17.	Giyilebilir medikal cihazlar, doğru servisi sürekli sağlayacak şekilde, kullanıcılara güvenilir bilgi vermelidir.					
18.	Giyilebilir medikal cihazların kullanıcılara ve çevreye feci etkileri olmamalı ve bu sayede kullanıcılar kendilerini güvende hissetmelidir.					
19.	Giyilebilir medikal cihazlar, kullanıcıların bunları uygun şekilde kullanmaya devam etmelerini sağlamak için, bakım ve onarım olanağı sağlamalıdır.					
20.	Giyilebilir bir medikal cihaz kullanmak, mevcut tercihlerim ve alışkanlıklarım ile tutarlı olmalıdır.					
21.	Giyilebilir medikal cihazlar mevcut elektronik cihazlarımla (akıllı telefon, tablet, bilgisayar vb.) uyumlu olmalıdır.					
22.	Giyilebilir medikal cihazlar kullanmak hayatımın tüm yönleriyle uyumlu olmalıdır.					
23.	Tıp doktorunun tavsiyesi ve ailem, arkadaşlarım ile değer verdiğim kişilerin görüşlerini, giyilebilir medikal cihazları kullanma kararı verirken dikkate alırım.					
24.	Giyilebilir medikal cihazların kullanımı tamamlayıcı ürünler ve servislerle desteklenmelidir.					
25.	Kabul ve benimsemeyi arttırmak için, giyilebilir medikal cihaz kullanmanın yararları ve değerleri net bir şekilde açıklanmalı ve paylaşılmalıdır.					
26.	Giyilebilir medikal cihazların kullanımı bir alışkanlık olmalıdır.					
27.	Sağlık sorunlarım varsa, giyilebilir medikal cihazları daha yüksek olasılıkla kullanırım.					
28.	Kişisel özelliklerim ve giyilebilir medikal cihazlardan beklentilerim, bu bağlamdaki tutum ve davranışlarımı belirler.					
29.	Giyilebilir medikal cihazların renkleri ve malzemeleri estetik, rahatlık ve sağlamlık açısından tatmin edici olmalıdır.					

(1=Hiç Katılmıyorum; 2=Katılmıyorum; 3=Kararsızım; 4=Katılıyorum; 5=Tamamen Katılıyorum)

#	*İfade, Yargı ve/veya Düşünce*	*1*	*2*	*3*	*4*	*5*
30.	İlgili ve hedef kullanıcılar giyilebilir medikal cihazların tasarım aşamalarına dâhil edilmelidir.					
31.	Giyilebilir medikal cihazlar hafif ve dayanıklı olmalıdır.					
32.	Konfor ve arayüz rahatlığı giyilebilir medikal cihazların tasarımında dikkate alınmalıdır.					
33.	Giyilebilir medikal cihazların pil ve enerji verimliliği, uygun kullanım için tatmin edici olmalıdır.					
34.	Giyilebilir medikal cihazlar, sürekli geri bildirim için sesleri, görselleri ve titreşimleri kullanmalıdır.					
35.	Giyilebilir medikal cihazlar sağlığı yönetmek ve iyileştirmek için çeşitli fonksiyonlar ve katma değer sağlamalıdır.					
36.	Giyilebilir medikal cihazlar, kullanıcılara ayrıntılı analizler ve öneriler sunmalıdır.					
37.	Giyilebilir medikal cihazların kullanımı harcanan para ve emeğe değmelidir.					
38.	Giyilebilir medikal cihazlar performans ve kalite açısından tatmin edici olmalıdır.					
39.	Giyilebilir medikal cihazların satın alma ve bakım maliyetleri kullanıcıların karşılayabileceği seviyede olmalıdır.					

*Lütfen, **tüm** ifade, yargı ve/veya düşünceler için, katılıp katılmamama durumunuza göre birden beşe kadar olan numaralardan birini seçtiğinizden emin olunuz.*

Bölüm 3: *Lütfen, bu bölümde giyilebilir medikal (tıbbi) cihazların insanlar tarafından kabulü ve başarısının iyileştirilmesi için ikinci bölümde belirtilenler dışında varsa ek önerilerinizi belirtiniz. Ekleyeceğiniz bir şey yok ise bu bölümü boş bırakabilir veya araştırmaya dair varsa genel önerilerinizi belirtebilirsiniz.*

Gösterdiğiniz ilgi ve sağladığınız değerli katkı için çok teşekkürler.

APPENDIX D

FINAL VERSION OF THE QUESTIONNAIRE (IN ENGLISH)

Understanding People's Attitudes towards Wearable Medical Devices and Identifying Critical Success Factors to Improve the Acceptance of Wearable Medical Devices

Wearable Medical Device: Devices, which especially provide medical monitoring and support, those people wear to manage and improve their health. Examples of these devices are: Smartwatches, smart clothes, smart glasses, sports/activity trackers, or various sensors placed on bodies.

Purpose of the Research: In today's world, wearable technologies are becoming more ubiquitous. Moreover, wearable medical devices are potentially promising instruments for healthy living and aging. For these reasons, it is very important to align these health-related technologies with people's needs and expectations. The goal of this research is to understand the awareness and attitudes of people in Turkey towards wearable medical devices and to identify critical factors to improve the success of wearable medical devices and the acceptance of wearable medical devices by people.

About the Questionnaire: This questionnaire consists of three sections and takes approximately 7 minutes to complete. The data to be obtained in this research will be evaluated and interpreted cumulatively, and the data and results obtained will be used for scientific purposes only. Participation in this questionnaire is completely voluntary and the participants may opt to complete the survey at any time they want.

About the Researcher: For any questions, information, and/or suggestions, you can reach the researcher with the contact information given below. **Thank you very much for your interest and valuable contribution.** Dr. Mustafa Değerli - mustafa.degerli@odtu.edu.tr - https://tr.linkedin.com/in/mustafadegerli

Section 1: *In this section, please answer the questions with information that is most appropriate for you and best describes you by selecting the option/options (x) or by writing in the appropriate blank fields.*

Educational Status				
Prim. Edu.	High Sch.	Bachelor	Master's	Doctorate

Gender		
Women	Men	Other

Average Monthly Income (TRY)					
0-2500	2501-4000	4001-7000	7001-10000	10001-15000	15001 +

Age	**Height**	**Weight**	**Health Problem**			
……	~ …… cm	~ …… kg	No		Yes	

Sports / Exercise Status				
Everyday	Several Times a Week	Several Times a Month	Very Rare	Not at All

Wearable Medical Device(s) You Know					
Smart Clothes	Smart Watch	Smart Glass	Sports/Activity Tracker	Body Sensor(s)	None

Wearable Medical Device(s) You Use					
Smart Clothes	Smart Watch	Smart Glass	Sports/Activity Tracker	Body Sensor(s)	None

What is important for you with wearable medical devices?		
Functionality	Nice Look	Both

Technology Use	
	I often use computers, smartphones, or technological products.
	I rarely use computers, smartphones, or technological products.
	I'm far away from using computers, smartphones, or technological products.

How did you reach the questionnaire?						
Printed	e-Mail	LinkedIn	Facebook	Instagram	WhatsApp	Message

Please make sure you have answered all the questions, then go to Section 2.

Section 2: *In this section, please mark one of the numbers from one to five for each sentence, depending on whether you agree or disagree with the statements, judgments, and/or thoughts.*

(1=Strongly Disagree; 2=Disagree; 3=Undecided; 4=Agree; 5=Strongly Agree)

#	*Statement, Judgment and/or Thought*	*1*	*2*	*3*	*4*	*5*
1.	My interaction with wearable medical devices must be clear & understandable and must not require a lot of mental and physical effort.					
2.	Wearable medical devices must be easy to use.					
3.	It must be easy to find information and functions I need from wearable medical devices.					
4.	Using wearable medical devices must be useful in managing and improving my health.					
5.	Using wearable medical devices must enhance my effectiveness in managing my health.					
6.	Using wearable medical devices must improve my performance in managing my health.					
7.	Using wearable medical devices is a good and wise idea.					
8.	Using wearable medical devices will be valuable and beneficial.					
9.	I have positive feelings toward wearable medical devices.					
10.	I intend to use wearable medical devices in the future.					
11.	I plan to use wearable medical devices in the future.					
12.	Assuming I had access to wearable medical devices, I intend to use them.					
13.	Users must have the authority to determine what information to share, with whom, and how.					
14.	The information must be used for the intended purpose only, and user consent must be taken first for any disclosure.					
15.	The protection to safeguard from unauthorized access to or modification, denial of service to unauthorized users, and provision of service to authorized users only must be ensured.					

(1=Strongly Disagree; 2=Disagree; 3=Undecided; 4=Agree; 5=Strongly Agree)

#	*Statement, Judgment and/or Thought*	*1*	*2*	*3*	*4*	*5*
16.	Wearable medical devices must ensure readiness for correct service to let users use them whenever they want to.					
17.	Wearable medical devices must ensure continuity of correct service to let users have reliable information.					
18.	Wearable medical devices must ensure the absence of catastrophic consequences on the user(s) and the environment to let users feel safe.					
19.	Wearable medical devices must ensure the ability for maintenance and repair to let users conveniently continue using them.					
20.	Using a wearable medical device must be consistent with my current preferences and habits.					
21.	Wearable medical devices must be compatible with my existing electronic devices (smartphone, tablet, computer, etc.).					
22.	Using wearable medical devices must be compatible with all aspects of my life.					
23.	I take into account medical doctor's recommendation and views from my family, friends, and those whom I value to decide on the use of wearable medical devices.					
24.	The use of wearable medical devices must be supported by complementary goods and services.					
25.	The benefits and values of using wearable medical devices must be clearly communicated to improve acceptance and adoption.					
26.	The use of wearable medical devices must be a habit.					
27.	If I have health problems, I will more probably use wearable medical devices.					
28.	My authentic characteristics and expectations from wearable medical devices determine my attitude and behavior in this context.					
29.	The color and materials of wearable medical devices must be satisfying regarding aesthetics, convenience, and robustness.					
30.	Relevant and target users must be involved throughout the design phases of wearable medical devices.					

(1=Strongly Disagree; 2=Disagree; 3=Undecided; 4=Agree; 5=Strongly Agree)

#	*Statement, Judgment and/or Thought*	*1*	*2*	*3*	*4*	*5*
31.	Wearable medical devices must be lightweight and durable.					
32.	Comfort, interface convenience and simplicity must be considered during the design of wearable medical devices.					
33.	Battery and energy efficiency of wearable medical devices must be satisfactory for convenient use.					
34.	Wearable medical devices must use sounds, visuals, and haptics for continuous feedback.					
35.	Wearable medical devices must provide a variety of functionality and added value to manage and improve health.					
36.	Wearable medical devices must offer detailed analytics and recommendations to users.					
37.	Using wearable medical devices must offer value for money and effort spent.					
38.	The performance and quality value of wearable medical devices must be satisfactory.					
39.	Purchasing and maintenance costs for wearable medical devices must be affordable for users.					

*Please make sure to select one of the numbers from one to five, depending on whether you agree or not, for **all** statements, judgments, and/or thoughts.*

Section 3: *In this section, please provide any additional recommendations to improve the acceptance and success of wearable medical devices by people, if any, other than those specified in Section 2. If you don't have anything to add, you can leave this section blank or provide general suggestions for the research, if any.*

Thank you very much for your interest and valuable contribution.

APPENDIX E

METU HUMAN SUBJECTS ETHICS COMMITTEE APPROVAL

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MIDDLE EAST TECHNICAL UNIVERSITY

Sayı: 28620816 / 328

21 AĞUSTOS 2019

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr. Sevgi Özkan YILDIRIM

Danışmanlığını yaptığınız **Mustafa DEĞERLİ'nin** **"İnsanların Giyilebişir Medikal (Tıbbi) Cihazlar Hakkındaki Farkındalık ve Tutumlarının Anlaşılması & Giyilebilir Medikal Cihazların İnsanlar Tarafından Kabulü ve Başarısının İyileştirilmesi için Kritik Ögelerin Belirlenmesi"** başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve **328 ODTÜ 2019** protokol numarası ile onaylanmıştır.

Saygılarımızla bilgilerinize sunarız.

Prof. Dr. Tülin GENÇÖZ
Başkan

Prof. Dr. Tolga CAN
Üye

İZİNLİ
Doç.Dr. Pınar KAYGAN
Üye

Dr. Öğr. Üyesi Ali Emre TURGUT
Üye

Dr. Öğr. Üyesi Şerife SEVİNÇ
Üye

Dr. Öğr. Üyesi Müge GÜNDÜZ
Üye

Dr. Öğr. Üyesi Süreyya Özcan KABASAKAL
Üye

APPENDIX F

COLLECTED DATASET

The collected dataset in digital format is provided at the following web pages:

https://sites.google.com/view/MD-MI-PhD-D

https://MD-MI-PhD-D.weebly.com

Password for the files given at the web pages is: MD-MI-PhD-D@*

APPENDIX G

DETAILED ANALYSIS RESULTS

Detailed analysis results in digital format are provided at the following web pages:

https://sites.google.com/view/MD-MI-PhD-D

https://MD-MI-PhD-D.weebly.com

Password for the files given at the web pages is: MD-MI-PhD-D@*

APPENDIX H

QUALITATIVE DATA AND ANALYSIS RESULTS

Qualitative data and analysis results in digital format are provided at the following web pages:

https://sites.google.com/view/MD-MI-PhD-D

https://MD-MI-PhD-D.weebly.com

Password for the files given at the web pages is: MD-MI-PhD-D@*

CURRICULUM VITAE

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Dr. Mustafa Değerli is a Chief Researcher at the Scientific and Technological Research Council of Turkey (TÜBİTAK). Dr. Değerli holds double Ph.D. degrees. Mustafa is a certified PMP, PMI-RMP, PSM, CMMI Associate, and Lead Auditor. Dr. Değerli conducts research and disseminates in various fields such as business process and performance improvement and management, systems engineering, software engineering, management and organization, management information systems, project management, health/medical informatics, and technology, innovation, and research management. Mustafa enjoys classical and acoustic music, theatre, opera, and ballet. Visit Dr. Değerli's personal Internet page to get contact information and further particulars: sites.google.com/view/mustafadegerli

EDUCATION

2015 – 2020	Doctor of Philosophy (Ph.D.) Medical Informatics Middle East Technical University (Graduated)
2014 – 2017	Doctor of Philosophy (Ph.D.) Management Information Systems Gazi University (Graduated)
2009 – 2012	Master of Science (M.Sc). Information Systems Middle East Technical University (Graduated)
2003 – 2008	Bachelor of Science (B.Sc.) Computer Education & Instructional Technology Middle East Technical University (Graduated)

CERTIFICATIONS HOLD

- PMI Project Management Professional (PMP)
- PMI Risk Management Professional (PMI-RMP)
- Professional Scrum Master (PSM)
- IRCA Certified Quality Management Systems (QMS) Lead Auditor
- CMMI Institute Certified CMMI Associate (The First in Turkey)
- ITIL Foundation Certificate in IT Service Management

PROFESSIONAL EXPERIENCE

October 2012 – Present
Chief Researcher
The Scientific and Technological Research Council of Turkey (TÜBİTAK)

February 2015 – September 2015
Manager
OBSS (Open Business Software Solutions)

June 2010 – September 2012
Specialist
MilSOFT Software Technologies

July 2006 – June 2008 and June 2009 – June 2010
Specialist
SEBIT Education & Information Technologies (A Turk Telekom Company)

COURSES SATISFACTORILY COMPLETED AT GRADUATE LEVEL

- Strategic Planning and Management (Ph.D.)
- Project Management (Ph.D.)
- Portfolio Management (Ph.D.)
- Management and Organizations (Ph.D.)
- Marketing Management (Ph.D.)
- Design Management (Ph.D.)

- Technology Entrepreneurship and Lean Startups (Ph.D.)
- Technology and Innovation Management (Ph.D.)
- Customer Relationship Management (Ph.D.)
- e-Transformation and Management (Ph.D.)
- Organizational Design and Applied Systems Thinking (Ph.D.)
- Mathematics for Information Systems (Ph.D.)
- Medical Informatics (Ph.D.)
- Mobile Health (m-Health) (Ph.D.)
- Object-Oriented Programming and Data Structures (Ph.D.)
- Statistics, Methods, and Ethics in Research (Ph.D.)
- Software Engineering (M.Sc.)
- Software Quality Management (M.Sc.)
- Data Base Concepts and Applications (M.Sc.)
- Information Systems and Information Systems Project (M.Sc.)
- Research Methods (M.Sc.)
- Information Technology Acceptance in Organizations (M.Sc.)
- Information Technology Governance (M.Sc.)

PUBLICATIONS & DISSEMINATIONS

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