ANTECEDENTS OF CONSUMER INTENTION TO USE PERSONAL HEALTH TECHNOLOGIES: REVISITING THE TECHNOLOGY ACCEPTANCE MODEL

SEMRA ÇALIŞKAN

BOĞAZİÇİ UNIVERSITY

2017

ANTECEDENTS OF CONSUMER INTENTION TO USE PERSONAL HEALTH TECHNOLOGIES: REVISITING THE TECHNOLOGY ACCEPTANCE MODEL

Thesis submitted to be

Institute for Graduate Studies in Social Sciences

in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in

Management

by

Semra Çalışkan

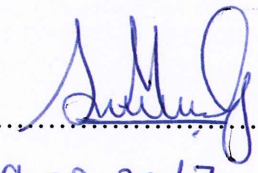
Boğaziçi University

2017

DECLARATION OF ORIGINALITY

I, Semra Çalışkan, certify that

- I am the sole author of this thesis and that I have fully acknowledged and documented in my thesis all sources of ideas and words, including digital resources, which have been produced or published by another person or institution;
- this thesis contains no material that has been submitted or accepted for a degree or diploma in any other educational institution;
- this is a true copy of the thesis approved by my advisor and thesis committee at Boğaziçi University, including final revisions required by them.

Signature 

Date 09.08.2017

ABSTRACT

Antecedents of Consumer Intention to Use Personal Health Technologies:

Revisiting the Technology Acceptance Model

This dissertation investigates the antecedents of consumer intention to use innovations, particularly health care innovations, from the perspective of diffusion of innovation and technology acceptance and use literature. We have witnessed substantial information technology (IT) innovations with everything from Internet of Things solutions to wearable technologies like smart watches. The possible effects of IT innovations like patient empowerment, self-health-management and health motivation make us curious about the underlying factors that lead to intention to use Personal Health Technologies (PHTs). This research contributes to the understanding of important phenomena, namely intention to use innovations, in consumer behavior context enriched with health related constructs. Besides perceived innovation attributes, contextual factors like health motivation and privacy were delineated in current study. One of the contributions of this study is investigating the mediation effects of ease of use and relative advantage over other innovation characteristics. In order to clarify the effects of individual characteristics, multi-group SEM analysis was conducted and discrepancies were discovered in the relationships. Users and potential users were compared to each other for conceiving divergence between pre-adoption and post-adoption beliefs. Clusters were created with respect to values of individuals and analyzed the variations in usage intentions. Both multi-group SEM and cluster analysis contribute to generalizability of technology acceptance and use models.

ÖZET

Tüketicinin Kişisel Sağlık Teknolojileri Kullanma Niyetini Etkileyen Faktörlerin Teknoloji Kabul Modeli ile İncelenmesi

Bu tez, Yeniliklerin Yayılımı Teorisi ve Teknoloji Kabul Modeli ışığında, tüketicinin yenilikleri kullanma niyetinin öncüllerini sağlık teknolojileri kapsamında incelemektedir. Yakın bir geçmişte nesnelerin Interneti'nden akıllı saatler gibi giyilebilir teknolojilere kadar birçok alanda bilgi teknolojisi yeniliklerine tanık olduk. Sağlık alanındaki bilgi teknolojileri yeniliklerinin; hastanın güçlenmesi, kişisel sağlık yönetimi ve artan sağlık motivasyonu gibi olası etkileri, Kişisel Sağlık Teknolojilerini kullanma niyetini etkileyen temel faktörler hakkında merak uyandırmaktadır. Tüketici davranışı bağlamında, araştırmamız yeni teknolojilerin kullanma niyetinin anlaşılmasına katkıda bulunmaktadır. Algılanan yenilik özeliklerinin yanı sıra, çalışmamızda sağlık motivasyonu ve gizlilik kaygısı gibi bağlamsal faktörler de incelenmiştir. Bu araştırmaya göreceli fayda ve kullanım kolaylığı özelliklerinin diğer yenilik özellikleri üzerindeki etkisi dahil edilmiştir. Bireysel özelliklerin etkilerini açıklamak için çok gruplu analizler yapılmıştır ve bulunan ilişkiler açıklanmıştır. Kullanıcılar ve potansiyel kullanıcılarının arasında teknoloji özellikleri ile ilgili inançları, kullanmaya yönelik tutumları ve niyetleri açısından karşılaştırma yapılmıştır. Bireylerin değerlerine göre kullanım niyetindeki farklar analiz edilmiştir. Yapılan çoklu grup ve kümeleme analizleri, teknoloji kabulü ve kullanım modellerinin genellenebilirliğine katkıda bulunmaktadır.

CURRICULUM VITAE

NAME : Semra Çalışkan
PLACES OF BIRTH : Adana, Turkey
DATE OF BIRTH : 20 April 1984

DEGREES AWARDED

PhD in Management, 2017, Boğaziçi University
MA in Management Information Systems, 2011, Boğaziçi University
BA in Management, 2006, Boğaziçi University

AREAS OF SPECIAL INTEREST

Technology acceptance, innovation diffusion, healthcare information technologies, digital marketing, social media marketing, online brand management

PROFESSIONAL EXPERIENCE

Associate, Department of Management, Boğaziçi University, 2016 - present
Marketing Consultant, Birebin.com, 2010-2011
Business Development Specialist, Invenoa Software, 2007-2010
Auditor, Deloitte Türkiye, 2006-2007

AWARDS AND HONORS

Highest Honors List, Boğaziçi University, 2011
Honors List, Boğaziçi University, 2006
TÜBİTAK PhD Scholarship, 2011-2016
BAP Academic Research Projects Grant for the research titled "The Antecedents of Intention to Use Personal Health Technologies"

PUBLICATIONS

Journal Articles

Caliskan, S., Kutlu, B., & Kimiloglu, H. (2012). Effects of Dynamic Packaging Systems on Travel Agencies: Case of Turkey, *International Journal of Business and Social Science*, *3*(20), 303-310

Caliskan, S., Kutlu, B., & Kimiloglu, H. (2013). The Contribution of Online Travel Agencies to the Profitability of Hotels: The Case of Turkey, *Interdisciplinary Journal of Research in Business*

ACKNOWLEDGMENTS

After an intensive period, today is the day: writing this note of thanks is the finishing touch on my dissertation. It has been a period of intense learning for me, not only in the academic arena, but also on a personal level. Undertaking this PhD has been a truly life-changing experience for me and it would not have been possible to do without the support and guidance that I received from many people. I would like to express my sincere gratitude to all of them.

First and foremost I want to thank my advisor Professor Ayşegül Toker. It has been an honor to be her Ph.D. student. I appreciate all her contributions of time, ideas, and support to make my Ph.D. experience productive and stimulating. The joy and enthusiasm she has for her research and job was motivational for me. I am also thankful for being my role modal as a successful woman professor and dean.

I would like to express my special appreciation and thanks to my co-advisor Professor Aslıhan Nasır, she has been a tremendous mentor for me. I would like to thank her for encouraging my research and for allowing me to grow as a researcher. Her advice on both research as well as on my career has been priceless.

I would like to thank my defense committee members: Professor Stefan Koch, Professor Hayri Tongarlak, Professor Hande Türker, and Professor Şebnem Burnaz for their time, interest, insightful questions and helpful comments. I also thank Professor Selime Sezgin for valuable contributions in my progress committee.

My thanks also go out to the support I received from the collaborative work I undertook in the Department of Management. I am especially grateful to Professor Attila Odabaşı for his support and perceptiveness. I would also like to thank all of my friends and colleagues. We were not only able to support each other by

deliberating over our problems and findings, but also happily by talking about things other than just our papers.

This PhD study would not have been possible without the corporation and support of the students of management department and management information system department. Their patience during the pilot study as well as interviews is very much appreciated. I am also very grateful to Professor Özlem Hesapçı, Professor Neslihan Yılmaz, and Dr. Seda Uluçay for their help in the data collection phase of my study. I am also very grateful to Dr. Sertaç Doğanay and Bülent Bingül for their invaluable insights and brilliant comments during interviews. I would like to thank them for sharing their knowledge and expertise about personal health technologies.

I would like to thank my family for all their love and encouragement. I owe a lot to my parents Fatma and Eyub Gök, who encouraged and helped me at every stage of my personal and academic life, and longed to see this achievement come true. I also thank my sisters, Seval, Serpil, Fatma and Zeynep and their families for their good wishes and faith on me. I am very much indebted to my sons, Kuzey and Poyraz who gave happiness to me and supported me in every possible way to see the completion of this work. And most of all for my loving, supportive, encouraging, and patient husband Oğuz Çalışkan whose faithful support during the final stages of this Ph.D. is so appreciated.

I would especially like to thank Boğaziçi University for granting me the wisdom, knowledge and strength to undertake this research and enabling me to complete my Ph.D. I received scholarship from The Scientific and Technological Research Council of Turkey (TÜBİTAK) and I would like to express my gratitude for the financial support they have given me throughout this process.

DEDICATION

This dissertation is dedicated to my beloved family.

Thanks all of you, for being so proud of me…

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION 1

CHAPTER 2: RESEARCH OBJECTIVES AND OUTLINE 7

CHAPTER 3: THEORETICAL BACKGROUND 10

3.1 Innovation attributes 12

3.2 Individual characteristics 15

3.3 Contextual factors 18

3.4 Attitudes and intentions 20

3.5 Control variables 21

CHAPTER 4: QUALITATIVE STUDY: INTERVIEWS 22

CHAPTER 5: DEVELOPING AND TESTING THE PRELIMINARY RESEARCH MODEL 26

5.1 Preliminary research model and hypotheses 26

5.2 Measurement instrument and pretesting 29

5.3 Sampling and data collection procedure 32

5.4 Descriptive statistics of pilot study 32

5.5 Results of pilot study 34

5.6 Summary of pilot study results 46

CHAPTER 6: THE RESEARCH MODEL AND HYPOTHESES 49

6.1 Innovation attributes 49

6.2 Contextual factors 53

6.2 Individual characteristics 53

6.4 Control variables 55

CHAPTER 7: TESTING AND VALIDATING THE FINAL MODEL 57
7.1 Measurement instrument and questionnaire design 57
7.2 Sampling and data collection 58
7.3 Descriptive statistics of final study 59
7.4 Selection of data analysis method: Structural equation modeling 63
7.5 Data analysis and results 64
CHAPTER 8: DISCUSSION OF RESULTS 87
CHAPTER 9: IMPLICATIONS AND CONCLUSIONS 92
9.1 Summary and conclusions 92
9.2 Contribution to theory and implications for researchers 93
9.3 Implications for practitioners 95
9.4 Limitations and suggestions for future research 95
APPENDIX A: DETAILED INFORMATION OF INTERVIEWEES 97
APPENDIX B: SURVEY ITEMS FOR THE PILOT STUDY 99
APPENDIX C: PERSONAL HEALTH TECHNOLOGY EXAMPLE IN THE SURVEY FOR POTENTIAL ADOPTERS 103
APPENDIX D: SCALE RELIABILITIES IN THE PILOT STUDY 104
APPENDIX E: DETAILS OF FACTOR ANALYSIS IN THE PILOT STUDY 105
APPENDIX F: DETAILS OF LINEAR REGRESSION ANALYSIS IN THE PILOT STUDY 107
APPENDIX G: SURVEY USED IN THE FINAL STUDY 109
APPENDIX H: CONSTRUCT RELIABILITY AND VALIDITY FIGURES OF THE FINAL STUDY 114

APPENDIX I: ITEMS AND STANDARDIZED FACTOR LOADINGS IN THE FINAL STUDY 115

APPENDIX J: MODERATED MEDIATION RESULTS IN THE FINAL STUDY: GENDER 117

APPENDIX K: MODERATED MEDIATION RESULTS IN THE FINAL STUDY: EDUCATION 118

APPENDIX L: MODERATED MEDIATION RESULTS IN THE FINAL STUDY: IT COMPETENCE 119

APPENDIX M: MODERATED MEDIATION RESULTS IN THE FINAL STUDY: USAGE FREQUENCY 120

APPENDIX N: MODERATED MEDIATION RESULTS IN THE FINAL STUDY: SES GROUPS 121

APPENDIX O: SUMMARY OF THE HYPOTHESES IN THE FINAL STUDY . 122

REFERENCES 124

LIST OF TABLES

Table 1. Theories and Models Utilized in Innovation Diffusion and Acceptance Studies 11
Table 2. PHT Categories in the Pilot Study 33
Table 3. Reasons for Usage in the Pilot Study 33
Table 4. Usage Frequencies in the Pilot Study 34
Table 5. Sampling Adequacy Measures for Innovation Characteristics in the Pilot Study 36
Table 6. Rotated Matrix of Innovation Characteristics in the Pilot Study 37
Table 7. Pattern Matrix of Innovation Characteristics in the Pilot Study 38
Table 8. KMO and Bartlett's Test for Individual Characteristics in the Pilot Study .. 39
Table 9. Rotated Component Matrix of Individual Characteristics and Contextual Factors in the Pilot Study 40
Table 10. Pattern Matrix of Individual Characteristics and Contextual Factors in the Pilot Study 41
Table 11. Normality Tests for the Pilot Study 42
Table 12. Regression Coefficients for Total Sample in the Pilot Study 44
Table 13. Regression Coefficients for Users in the Pilot Study 44
Table 14. Regression Coefficients for Potential Users in the Pilot Study 45
Table 15. Regression Coefficients for Users in the Pilot Study 46
Table 16. Regression Coefficients for Potential Users in the Pilot Study 46
Table 17. Hypothesis Testing Results of the Pilot Study 48
Table 18. Definitions of Constructs in the Final Study 50
Table 19. Demographic Characteristics of the Final Study Participants 60

Table 20. Other Characteristics of the Final Study Participants 61
Table 21. Usage Characteristics of the Final Study Participants 62
Table 22. The List of Most Frequently Reported PHTs..... 63
Table 23. Goodness of Fit Indices in the Measurement Model 67
Table 24. Structural Model Estimates..... 69
Table 25. Results of Mediation Analysis for All Data..... 71
Table 26. Moderation Results for Gender..... 74
Table 27. Moderation Results for Education 75
Table 28. Moderation Results for IT Competence..... 76
Table 29. Moderation Results for Usage Frequency..... 77
Table 30. Moderation Results for SES Group 78
Table 31. Final Cluster Centers for Social/External values 79
Table 32. Mean of Intention across Social/External Values 79
Table 33. Independent Samples T-test for Social/External Values..... 80
Table 34. Final Cluster Centers for Internal/Non-Hedonistic Values..... 80
Table 35. Mean of Intention across Internal/Non-Hedonistic Values..... 80
Table 36. Independent Samples T-test for Internal/Non-Hedonistic Values 81
Table 37. Final Cluster Centers for Hedonistic Values..... 81
Table 38. Mean of Intention across Hedonistic Values 81
Table 39. Independent Samples T-test for Hedonistic Values..... 81
Table 40. Independent Samples T-test for Users and Potential Users 82
Table 41. Independent Samples T-test for Health Motivation..... 83
Table 42. Independent Samples T-test for Health Status..... 84
Table 43. Independent Samples T-test for Household Income 85
Table 44. ANOVA Results for Age Level Comparisons..... 86

LIST OF APPENDIX TABLES

Table A1. List of items in the Pilot Study 99

Table A2. Cronbach's Alpha Statistics in the Pilot Study 104

Table A3. Communalities for Innovation Characteristics 105

Table A4. Total variance explained statistics of Innovation Characteristics 105

Table A5. Communalities of Individual Characteristics and Contextual Factors 106

Table A6. Total variance explained statistics of Individual Characteristics and Contextual Factors 106

Table A7. Regression Model Summary for Attitude 107

Table A8. Regression Model Summary for Attitude of Users 107

Table A9. Regression Model Summary for Attitude of Potential Users 108

Table A10. Regression Model Summary for Intention of Users 108

Table A11. Regression Model Summary for Intention of Potential Users 108

Table A12. Construct Reliability and Validity Figures of the Final Study 114

Table A13. Standardized Factor Loadings in the Final Study 115

Table A14. Moderated Mediation Results in the Final Study: Gender 117

Table A15. Moderated Mediation Results in the Final Study: Education 118

Table A16. Moderated Mediation Results in the Final Study: IT Competence 119

Table A17. Moderated Mediation Results in the Final Study: Usage Frequency 120

Table A18. Moderated Mediation Results in the Final Study: SES Groups 121

Table A19. Summary of the Hypotheses in the Final Study 122

CHAPTER 1

INTRODUCTION

Underlying reasons for the convergence of technology and health industry is to attain healthier lives, universalize preventive care, decrease healthcare costs, improve public health and raise awareness of individuals about their own health. Although every country has different dynamics in their health system, there are common health issues that every country faces at certain rates.

According to OECD indicators stated in Health at a Glance 2015 and WHO Global Health and Aging Report, increase in life expectancy at birth, aging population, rising need for long-term care, insufficient health workforce, limited access to care, low quality of care, higher health spending per capita, increase in non-communicable diseases are some of significant issues that need the attention of all stakeholders including governments, non-governmental institutions, health-care providers, pharmaceuticals industry, insurance companies and health-care receivers.

If we look through important health indicators in detail, WHO states "Based on a threshold of 4.45 skilled health professionals per 1000 population, it has been estimated that the needs-based shortage of health-care workers globally would be about 17.4 million of which almost 2.6 million are doctors and over 9 million are nurses and midwives." In addition, according to WHO reports, about 44% of WHO Member States report to have less than 1 health professional per 1000 population. In Turkey, although the number of health professionals per person has increased compared to previous years, there are only 1.79 health professionals per 1000 people in 2015. (Turkey Ministry of Health, 2015). Regarding life expectancy indicator, "Life expectancy continues to increase steadily in OECD countries, rising on average

by 3-4 months each year. In 2013, life expectancy at birth reached 80.5 years on average, an increase of over ten years since 1970." (OECD, 2015, pp .9) According to global expenditure data announced by WHO, in 2014, Turkey spent 43 billion USD on health care. The government funded 77% of this spending.

These indicators underscore that countries have huge health expenditures and should generate effective health strategies in order to decrease the health and economic burden of chronic diseases (obesity, diabetes, cardiovascular diseases, etc.), aging population, long-term care and so on. With the proliferation of technological and scientific innovations, connected health, telemedicine and preventive healthcare technologies/applications are considered as potential remedies for the current situation. Connected health is one of the most exciting use cases for Internet of Things (IoT) with amazing list of potential advantages for operators, vendors and society. New technologies provide a great prospect for healthcare, opening the potential for connected devices to take glucose readings and remotely monitor patients, virtual appointments, and even remote surgery. Telemedicine refers to the use of IT to support healthcare services and activities via electronic transmission of information or expertise among geographically dispersed parties, including physicians and patients, in order to improve service effectiveness and resource allocation efficiency (Bashshur, 1995). On the other hand, preventive health care refers to behaviors that will augment one's healthy life or practices that decrease the effects of infectious disease or chronic illnesses (Jayanti & Burns, 1998). Therefore, healthcare goes beyond the boundaries of health institutions, becomes digitalized and part of our everyday lives. In addition, most of the countries and healthcare institutions started to build their strategies upon the digitalization of healthcare. As a result, digital technology is seen as a resource for health

information, a medium for interaction, and a tool for the delivery of healthcare. With these new resources, healthcare providers began to engage, coordinate care and manage care with the individuals as they leave or discharged from the healthcare system. In order to achieve this healthcare revolution with technology, people should be encouraged to work together, as innovators, as patients, as policy makers, as contributors, as trainers and as consumers. That is to say, users and producers should go hand in hand while building IT innovations about health.

From the consumer side of the health revolution, health technology market is driven by consumer preference for health and wellness mobile applications, integrated consumer wearable devices such as smart watches and wristbands with fitness or medical purposes. These new technologies will allow in-home care, at-workplace care and in-car care, thereby improving prevention, detection, health promotion and caregiver support. An increasing array of diagnostics will conduct real-time monitoring in everyday lives. Healthcare solutions built around smartphones, cloud computing, and big data have the potential to shorten the official works and empower the consumers. Consumers will reach healthcare more direct, personal, and timely. Therefore, this wide range of personal health technologies bring along the consumerization of medical devices and the medicalization of consumer devices (Dishman, 2012). People will increasingly conduct virtual visits with doctors, nurses and care coaches through their cell phones, tablets and laptops. Sensors will look for changes in how they move to detect neurological risk and tiny implantable devices will analyze blood chemistry in real time and let a doctor know if their drugs are not metabolized correctly (Dishman, 2012).

From the healthcare supporters and providers' side, there are various programs and projects in health care industry to encourage technology usage.

Governments, health-care companies, other private companies try to replace paper medical records with electronic health records and introduce a range of point-of-care, mobile and patient-controlled technology. Apple, Google, Microsoft, IBM are technology giants that are investing in healthcare technologies. IBM has recently developed an artificial intelligence technology, called Watson, which represents a new partnership between humanity and technology. The purpose of Watson project is to help healthcare providers and researchers to achieve remarkable outcomes, accelerate discovery, and solve the world's biggest health challenges. For instance, IBM Watson makes collaborations with healthcare providers to establish cognitive health management and data-driven personalized healthcare. Another example is that The Patient Protection and Affordable Care Act (ACA), nicknamed Obamacare, was enacted in 2010 by USA Congress to transform health industry, for the purpose of achieving better health outcomes, lowering costs, and improving the methods of distribution and accessibility of healthcare with the help of technology (hhs.gov, 2017). As estimation for outcome of this new system, Rand Corporation found that the adoption of electronic health records (EHRs) by most doctors and hospitals would save up to $77 billion annually (Adler-Milstein, 2009).

GV, the venture capital company, invests in areas ranging from the Internet, software, and hardware to life science, healthcare, artificial intelligence, transportation, cyber security and agriculture. GV announced a new $230 million fund that will focus on health care investments. Krishna Yeshwant, General Partner at GV quoted "When you look at what's happening with life science right now, it's almost like watching the industrial revolution—but in fast-forward. Modern technologies for analyzing large-scale health care data offer unprecedented opportunity to provide a better quality of life, across the globe" (GV web-site,

14.4.2017). In addition, Blake Byers, General Partner at GV, quoted “Gene editing, cell therapy, rapid analysis of genetic data—these advances will help millions of people, and they’re quickly becoming a reality” (GV web-site, 14.4.2017).

The possible effects of using health IT innovations like patient empowerment, self-health-management, health motivation, improvement of individual wellness, data-driven personalized healthcare make us curious about the underlying factors that lead to the use of PHT, which is one of sub-categories of health IT innovations. In the context of this research, personal health technologies (PHTs) are defined as “near-body devices or applications designed for use by a single individual, principally outside healthcare facilities” (Fox, 2017). They enable users to monitor physiological processes or body activity, are frequently communication-enabled and sometimes intervene therapeutically (Fox, 2017). PHTs measure and track weight, blood pressure, blood sugar, blood oxygen levels, heart rate, electrocardiograms and forward these data to health professionals. Some PHT examples are digital stethoscopes, portable electrocardiogram, diabetes management apps, connected glucose meter, nutrition management apps, electronic health records apps, sleep cycle tracking apps, smart watches and so on. PHTs are connected devices or applications and one of the greatest applications of Internet of Things (IoT). According to Business Insider’s IoT report 2017, the total of IoT devices increase from 6.6 billion in to 22.5 billion in 2021 (Newman, 2017). It will not be wrong to say that the number of PHTs will increase and their usage will spread in the near future. According to Ipsos international survey on connected health, 37% of adults in the USA, together with 26% in the UK and 13% in Japan believe that connected health devices will form part of treatment plans in the near future. Another study of Ipsos and Personal Connected Health Alliance, 30% of doctors believe that

patient generated data can be used to replace more formal data collection processes in clinical trials. (PHCAlliance, 20.04.2017)

In summary, PHTs are promising innovations for the humanity and researchers should focus on the antecedents as well as the consequences of the adoption of these innovations from consumer behavior perspective. Comprehending consumers' perceptions and characteristics guides the innovators in designing PHTs, the distributers in reaching targeted audience, the policy makers in enacting the regulations, the contributors in building strategies and the health professionals in promoting health and improving patient-doctor relationship. Researchers can utilize relevant theories and models in information systems (IS) literature in building their research models in this context.

CHAPTER 2

RESEARCH OBJECTIVES AND OUTLINE

The primary objective of this doctoral thesis is to investigate the antecedents of the intention to use personal health technologies (PHTs). Therefore, this research aimed to answer the following research questions:

- Do the perceived attributes of information technology (IT) innovations positively affect attitude toward the usage / usage intentions of IT innovations in the context of PHTs?
- Do individual characteristics, innovativeness and domain specific self-efficacy, positively moderate the relationship between the innovation attributes and attitude toward the usage / usage intention in the context of PHTs?
- Do contextual factors, health motivation, health information seeking behavior and health status, have impacts on the relationship between the innovation attributes and attitude toward the usage / intention to use in the context of PHTs? Do the health information privacy concerns negatively affect the intention to use PHTs?
- Are attitudes toward the usage of IT innovations and intention to use IT innovations explained by values of individuals?
- Do the relationships in the research model vary in terms of the age, gender, education, income and socio-economic status?
- Do the usage differences in terms of frequency and types of technologies have impact on the relationships proposed in the research model?

A theoretical background was established as described in Chapter 3, followed by an exploratory qualitative study to form a preliminary conceptual model of the relationships among innovation attributes, individual characteristics, attitudes toward innovations, intention to use innovations and contextual factors. During this exploratory phase, described in detail in Chapter 4, the interviews with the professionals and the end-users were utilized.

Upon determining the general conceptual model, main propositions and preliminary research model were developed along with hypotheses. This section is followed by a field-based model test through pilot study focusing on information technology innovations, specifically healthcare innovations. Factor analysis and linear regression analysis are the method of analysis in pilot study. The findings of pilot study, which are outlined in Chapter 5, were used in refining the hypotheses and constructing the final research model.

Chapter 6 includes the final research model and hypotheses. Chapter 7 describes the testing and validation of the final model through survey-based field study. Customer surveys were developed focusing on information technology innovations recently introduced in health care industry, namely personal health technologies (PHTs). The primary method of analysis was Structural Equation Modeling (SEM). The measurement model and structural model were developed and hypotheses were tested. The constructs in the measurement model were validated by confirmatory factor analysis (CFA), where reliability and validity were established through composite reliability (CR), average variance extracted (AVE), maximum shared variance (MSV) and average shared variance (ASV). Harman's single factor test was used to test for common method bias in the measurement model. The relationships in the structural model were tested through path analysis. Mediated

relationships were analyzed by the standardized estimates of direct effects and standardized estimates indirect effects. The significance of indirect effect was investigated by bootstrapping technique. Moderations were analyzed via multi-group SEM. Moderated mediations for each groups were also analyzed.

The results are discussed in Chapter 8, followed by implications and conclusions in Chapter 9, where the theoretical contribution and implications of the dissertation are discussed as well as implications for practitioners. Limitations of the study and the suggestions for future research are also included in Chapter 9.

CHAPTER 3

THEORETICAL BACKGROUND

There is an extensive and robust literature investigating the behavioral characteristics of technology adoption and usage, building upon multiple theoretical perspectives such as the technology acceptance models (TAM, TAM2, TAM3), theory of reasoned action (TRA), theory of planned behavior (TPB), the unified theory of acceptance and use of technology (UTAUT & UTAUT2) and diffusion of innovation (DIT) (Agarwal & Prasad, 1998b; Davis, 1989; Davis, 1989; Davis, Bagozzi & Warshaw, 1992; Fishbein & Ajzen, 1975; Ajzen, 1985; Rogers, 1983; Venkatesh & Davis, 2000; Venkatesh & Bala, 2008; Venkatesh, Morris, Davis & Davis, 2003; Venkatesh, Thong & Xu, 2012). TRA and TPB are general theories developed in social psychology that attempts to explain and predict individual behavior across a variety of domains (Ajzen & Fishbein, 1975; Ajzen, 1985), whereas TAM and UTAUT models has been proposed specifically for the domain of IT (Davis et al., 1992; Davis, 1989).

These theories and the successive stream of research contains many similar hypothesized predictors of intention to use and usage, such as individual beliefs or perceptions about innovation attributes, demographic attributes and contextual factors. Since user reactions to technologies are complex and multi-faceted, the impact of various factors on the adoption of innovations was investigated. The fundamental ones were summarized under the title of theories and models utilized in innovation adoption studies in Table 1.

Table 1. Theories and Models Utilized in Innovation Diffusion and Acceptance Studies

Theory of Reasoned Action (TRA)	Fishbein and Ajzen (1975)
An individual's intention to adopt new technologies is determined by the individual's personal attitude toward adopting the technology and subjective norm (the individual's perceptions of what others expect him or her to do and the strength of the motivation to comply with those expectations).	
Theory of Planned Behavior (TPB)	Ajzen (1985)
An individual's intention to adopt new technologies is determined by the individual's personal attitude toward adopting the technology, subjective norm and perceived behavioral control (the individual's perceptions of resource and technology facilitating conditions and perceptions of ability).	
Theory of Innovation Diffusion (DIT)	Rogers (1983)
Individuals adopt new technologies in a sequence and can be classified into categories on the basis of their adoption behavior: innovators, early adopters, early majority, late majority and laggards. Innovation attributes are relative advantage, compatibility, complexity, trialability and observability.	
Technology Acceptance Model (TAM)	Davis (1989)
An individual's intention to adopt new technologies is determined by perceived usefulness and perceived ease of use of the new technologies.	
Technology Acceptance Model 2 (TAM2)	Venkatesh and Davis (2000)
An individual's intention to adopt new technologies is determined by perceived usefulness and perceived ease of use of the new technologies. Apart from TAM, TAM2 included job relevance, output quality, result demonstrability, image and subjective norm as the determinants of perceived usefulness. Experience and voluntariness were added as moderators.	
Technology Acceptance Model 3 (TAM3)	Venkatesh and Bala (2008)
An individual's intention to adopt new technologies is determined by perceived usefulness and perceived ease of use of the new technologies. As TAM2, job relevance, output quality, result demonstrability, image and subjective norm were included the determinants of perceived usefulness. Experience and voluntariness were as moderators. Apart from TAM and TAM2, computer self-efficacy, perceptions of external control, computer anxiety, computer playfulness, perceived enjoyment and objective usability were included to the acceptance model.	
The Unified Theory of Acceptance and Use of Technology (UTAUT)	Venkatesh et al. (2003)
An individual's intention to adopt new technologies is determined by the performance expectancy, effort expectancy, and social influence, facilitating conditions moderated by gender, age, experience and voluntariness of use.	
The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)	Venkatesh et al. (2012)
An individual's intention to adopt new technologies is determined by the performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit moderated by gender, age, and experience.	

3.1 Innovation attributes

According to DIT, innovation attributes are relative advantage, compatibility, complexity, trialability and observability. Firstly, relative advantage is "the degree to which an innovation is perceived as better than the idea it supersedes" (Rogers, 1983, p. 15). Relative advantage measures how improved an innovation is over a competing option or the previous version of a product. Potential users need to see how an innovation improves their current situation. Improvements can be in one or many of these areas: better service, new functions, new extensions, empowerment of users, improved interface, increased customizability, increased durability, increased productivity, high efficiency, reduced user effort, low environmental impact, low cost, saving of space, saving of time and so on. In TAM, relative advantage attribute was included as perceived usefulness defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). Both TRA and TAM hypothesized that expected performance (perceived usefulness) would be major determinant of intention.

Secondly, compatibility is "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" (Rogers, 1983, p. 15). Compatibility is one of the significant requirements in the process of innovation diffusions. The innovations should fit into users' lives, beliefs and attitudes regarding the issue the innovation address. Thirdly, complexity is "the degree to which an innovation is perceived as relatively difficult to understand and to use" (Rogers, 1983, p. 15). The innovations that are simpler to understand are adopted more rapidly than the innovations that require the adopter to develop new skills and understandings. In TAM, complexity was included as perceived ease of use in opposite direction. Perceived ease of use was defined as "the degree to which

a person believes that using a particular system would be free of effort" by Davis (1989, p. 320). In the meta-analysis study of Tornatzky and Klein (1982), it was found that three innovation aspects, namely compatibility, relative advantage, and complexity, had the most consistent significant relationships to innovation adoption.

Fourthly, trialability is "the degree to which an innovation can be experimented with on a limited basis" (Rogers, 1983, p. 15). An innovation that is trialable represents less risk to the individual who is considering it. In the scale generation study of Moore and Benbasat (1991), it was stated that although trialability was one of the weak predictors of adoption for their particular study, trialability should be a significant predictor for those who would adopt an innovation at their own risk.

Fifthly, observability is "the degree to which the results of an innovation are visible to others" (Rogers, 1983, p. 16). The easier it is for individuals to see the results of an innovation, the more likely they are to adopt it. Visible results lower uncertainty and also improve the communication of a new idea, as relatives, friends and neighbors of an adopter often request information about it. Moore and Benbasat (1991) divided observability into two different constructs, namely result demonstrability and visibility in their scale development process. Result demonstrability focused on the tangibility of results of using innovation, whereas visibility concentrated on the actual presence of the innovation. Venkatesh and Davis (2000) included result demonstrability to TAM2 as a predictor of perceived usefulness.

Apart from these five innovation attributes, other characteristics of innovations were studied in successive research. One of them was image defined as "the degree to which use of an innovation is perceived to enhance one's image or

status in one's social system" (Moore & Benbasat, 1991, pp. 195). Venkatesh and Davis (2000) included image to TAM2 as a predictor of perceived usefulness. Social prestige factor was considered as a component of relative advantage (Rogers, 1983).

Moore and Benbasat (1991) argued that the cost of innovations may be perceived differently among adopters according to their income levels. So they mentioned that it is relative cost which has the greatest effect on buying behavior. In UTAUT2 model, Price Value was integrated into the technology acceptance model to address the cost issue of technology use in the consumer setting. Price value is an important predictor when it comes a consumer use setting (Venkatesh et al, 2012). Since consumers usually bear the monetary cost of the innovations, the cost and pricing structure may have a significant impact on consumers' intention to use innovations.

Consumer behavior literature distinguishes between utilitarian and hedonic consumption (Hirschman & Holbrook, 1982). On the other hand, IS literature studied on utilitarian and hedonic information systems and attempted to clarify the differences by applying technology acceptance models. Davis et al. (1992) reported a study about extrinsic (perceived usefulness) and intrinsic (enjoyment) motivation to use innovations. They placed emphasis on enjoyment construct and found that significant impact of enjoyment on intention to use the technologies pointed in their study. According to Davis et al. (1992) enjoyment refers to "the extent to which activity of using the computer perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated" (p. 1113). Venkatesh (2000) define enjoyment as "the extent to which the activity of using a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from system use" (p. 351). Venkatesh et al. (2012) defined hedonic

motivation as “as the fun or pleasure derived from using a technology” (p. 161). As seen from these definitions, hedonic motivation and enjoyment are used interchangeably to define intrinsic motivation of individuals. Van der Heijden (2004) compared the acceptance of utilitarian information systems and hedonic information systems. He stated that former one aims to increase the user's task performance while encouraging efficiency and the latter one is a function of the degree to which the user experiences fun when using the system. Van der Heijden (2004) found that perceived enjoyment and perceived ease of use are stronger determinants of intention to use a hedonic information system than perceived usefulness. Venkatesh et al. (2012) included hedonic motivation to UTAUT2 in order to consumers’ acceptance and use of technology. They postulated that hedonic motivation is a critical determinant of behavioral intention and it was found to be a more crucial factor than performance expectancy is in non-organizational contexts.

In most studies, perceptions of using the innovation were examined rather than the innovation itself. Moore and Benbasat (1991) explained the reason for focusing on the perceived characteristics of innovations, as the findings of many studies, which have examined the primary characteristics of innovations, have been inconsistent. Current study focused on the perceived characteristics of innovations too.

3.2 Individual characteristics

With the individual characteristics, researchers planned to measure instinct motivation of individuals to adopt innovations. Rogers (1983) defined innovativeness as the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than the other members of a system and divided adopters into 5

categories as innovators, early adopters, early majority, late majority and laggards according to the time of adoption. Agarwal and Prasad (1998a) examined the notion of Rogers' innovativeness and they developed and validated a construct namely "personal innovativeness in the domain of IT" (PIIT) that conceptually defined as the willingness of an individual to try out any new information technology. Agarwal and Prasad (1998a) proposed that PIIT serves as a key moderator for the antecedents as well as the consequences of perceptions. PIIT is similar construct with computer playfulness developed by Webster and Martocchio (1992) and included in TAM3. However, as stated by Agarwal and Prasad (1998a), computer playfulness measures how an individual will behave when interacting with a particular innovation, whereas PIIT provides insights into the probability of an individual selecting to interact with any innovation or not. People who are willing to try new products and technologies, tend to be potential users of PHTs. Goldsmith (2001) developed one of the domain specific innovativeness scales. In the study of Goldsmith (2001), it was hypothesized that high level of innovativeness was associated positively with more hours of Internet use, greater Internet purchasing, higher likelihood of future Internet purchase, and so on.

TPB contained perceived behavioral control as one of the determinant of the behavioral intention with the attitude toward behavior and subjective norm (Ajzen, 1991). Perceived behavioral control is parallel with Bandura (1982)'s concept of perceived self-efficacy, which "is concerned with the judgments of how well one can execute courses of action required to deal with prospective situations" (p. 122), that is a component of social cognitive theory (SCT). He stated that self-efficacy is the most important precondition for behavioral change, since it determines the initiation of coping behavior. On the other hand, Venkatesh and Bala (2008) added computer

self-efficacy, the degree to which an individual believes that he or she has the ability to perform a specific task/job using the computer to the technology acceptance model as one of the antecedents of perceived ease of use. In UTAUT model, self-efficacy was modeled as indirect determinants of intention fully mediated by perceived ease of use and utilized as a specific self-efficacy toward a particular technology (Venkatesh & Davis, 2000; Venkatesh, Morris, Davis & Davis, 2003). This research did not contain social influence, which was another determinant of the behavioral intention in current study, although it was included to TRA, TPB, TAM and UTAUT. Because social influence became a complicated and multi-faceted construct in highly communicative digital era that requires comprehensive analysis of digital communities, the engagement of innovations, weak ties among potential adopter and adopters. So, it would be difficult to measure the social influence with a simple scale.

The term value has been defined as an enduring prescriptive or proscriptive belief that a specific end state of existence or specific mode of conduct is preferred to an opposite end state or mode of conduct for living one's life (Kahle, Beatty & Homer 1986; Rokeach 1968). Values are defined as deeply held feelings about what is important in life (Goldsmith, Freiden & Henderson, 1995). Values are thought an important variable in understanding consumer behavior because they represent the fundamental goals that consumers are ultimately seeking to satisfy with regard to their market choices (Divine & Lepisto, 2005). Kahle et al. (1986) generated new values scale, namely List of Values (LOV) based on Rokeach's values scale and Maslow's need hierarchy. LOV scale contained 9 values that are sense of belonging, being well respected, being warm relationships with others, self-respect, self-fulfillment, sense of accomplishment, security, fun and enjoyment and excitement. Divine and Lepisto (2005) categorized 9 values into 3 groups, hedonistic (fun and

enjoyment, excitement), internal/non-hedonistic (self-respect, self-fulfillment, sense of accomplishment) and external/social (sense of belonging, being well respected, being warm relationships with others).

3.3 Contextual factors

Because the adoption of new health technologies involves risk and uncertainty, health information privacy becomes an important construct in the acceptance models. In literature, there are many studies addressing patients' privacy concerns. For health systems, the greatest challenge is providing protection of privacy and confidentiality of the health information that is being stored. E-health, specifically PHTs, involves new forms of patient-physician interaction and poses new challenges and threats. Furthermore, data ownership is often a unclear issue in PHTs, with many users unaware who owns the data collected by a device, what that data can be used for and who can receive that data (Kerr, Butler-Henderson & Sahama, 2016). The perceptions about health information privacy would be a significant determinant in the adoption decisions.

Angst and Agarwal (2009) found that the concern for information privacy is one of the important influences on individuals' attitudes toward the use of electronic health records technologies (EHRs) and influences the likelihood of making his/her health-related data available in a digital artifact.

Rosenstock (1974) stated the influential factors for a decision to take a health action and one of them is the individual's motivation. Health motivation refers to consumers' goal-directed arousal to engage in preventive health behaviors (Moorman & Matülich, 1993). As postulated in the study of Moorman and Matülich (1993) related to the consumers' preventive health behavior, consumers with higher health

motivation levels perform more health behaviors than consumers with lower health motivation levels. They found that health motivation would influence preventive health behaviors. In various technology adoption studies, the inclusion of contextual factors was recommended. Jayanti and Burns (1998) indicated health motivation influences preventive health care behaviors in their study included health belief model. Since the adoption of PHTs would be considered as health behavior, health motivation of individuals was included to the research model.

Health motivated people are defined as individuals' reading, writing and numeracy skills in terms of accessing, processing, and utilizing health information, which contributes to healthier lifestyle, better stress coping, and a range of positive health outcomes (Berkman, Davis & McCormack, 2010). Health information seeking was included to the research model. Chen and Lee (2014) included seeking health information online as a part of informational eHealth behaviors and they found that there was a relationship between eHealth literacy and informational eHealth behaviors. About 72% of adult American Internet users searched health information online within the past year (Fox & Duggan, 2013). A large-scale survey shows that 32% of Americans have used social networking sites for health-related activities (Thackeray, Crookston and West, 2013).

As stated in one of Ipsos report titled as "*A healthy understanding? Global attitudes to health*" (2017), Canadian Public Health Association defined health literacy as "the ability to access, understand, evaluate and communicate information as a way to promote, maintain and improve health in a variety of settings across the life-course". On the other hand, according to same report, WHO defined health literacy as "the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which

promote and maintain good health". As seen from the health information seeking and reading is the core of health literacy and health behavior phenomena. So the improvements in health behavior would be possible increase in access to health information.

3.4 Attitudes and intentions

Actual behavior, adoption, behavioral intention, attitude and beliefs have been examined in various studies. TAM adapted attitude construct from social psychology, specifically TRA and TPB. In the model, attitude serves as a key mediating construct between beliefs and behavioral intentions. In TAM, perceived usefulness is hypothesized as exhibiting a direct effect on intentions in addition to its indirect effect through attitude. Relevant literature suggests that attitude is an effective response that mediates between beliefs and intentions to use; attitude is regarded as an outcome of individuals' beliefs about the characteristics of the system. Attitude toward adopting (or continuing to use) an IT is generated by the individual's salient beliefs about the consequences of adopting (continuing to use) the IT (behavioral beliefs) and evaluation of these consequences (Karahanna, Straub & Chervany, 1999).

TRA suggests that the best predictor of adoption (or continued use) behavior is intention to adopt (or continue to use) the IT. The best predictor of intention to adopt (or continue to use) is attitude toward adoption (or continue to use). A positive relationship between attitudes and intentions is well documented (Ajzen 1985, Ajzen 1991; Fishbein & Ajzen, 1975), including an extensive literature examining this link in the context of IT adoption (Agarwal & Prasad 1998b; Davis 1989; Davis, Bagozzi & Warshaw, 1992; Taylor & Todd, 1995; Venkatesh et al., 2003).

3.5 Control variables

In technology acceptance studies, control variables were utilized. For instance, in UTAUT2, they postulated the moderating effects of age and gender on the relationship between price value and intention (Venkatesh et al 2012). Venkatesh and Morris (2000) hypothesized the moderating effect of age on the relationship between perceived ease of use and behavioral intention. Both demographics and usage variables were included. Demographics are gender, age, household income, education, SES (socio-economic) grouping. On the other hand, usage, usage frequency and PHT categories were added as control variables to the model.

CHAPTER 4

QUALITATIVE STUDY: INTERVIEWS

As the qualitative data collection method, interviews have been conducted with end-users and health professionals in order to obtain detailed information about the experience, perceptions and expectations about personal health technologies. In-depth interviews provided new or hidden issues not stated in relevant literature.

We discussed innovations in healthcare industry with Dr. Sertaç Doğanay, a prominent opinion leader in digital marketing and social media and Bülent Bingül, an entrepreneur in health-care technologies. Profiles of interviewees were added to Appendix A.

Dr. Sertaç Doğanay summarized the advancements in health-care under four broad categories that are data analytics, digital healthcare technologies, wearable technologies and health-care communication channels. He attached importance to big data analytics and exemplified the success of Healthmap, a sophisticated online mapping tool. Healthmap detected Ebola outbreak nine days before the WHO issued its first statement on the outbreak. Healthmap algorithm crawls social media sites, news reports, health professionals' social networks and government websites to track information about diseases and plots them on a map. Furthermore, he stressed the claim of Wikipedia that most of people initially search and read about diseases from Wikipedia and so Wikipedia discover one month before official declaration. Secondly, he emphasized on health behavior change through digital channels.

Dr. Sertaç Doğanay mentioned one of their study about the usage of Internet for health purposes. They found that 80% of participants search and read on Internet about health issues. 41% of participants reported that they abandoned to take

prescribed medicine after reading about related medicine on Internet. These findings exhibited the importance of digital channels and sources for change in health behavior. He invited health professionals and health institutions to provide reliable information about health issues and diseases on Internet. Thirdly, he pointed out that huge technology companies are investing in health technologies. For example, venture company GV invested approximately 30-35 % of its fund to health-care technologies in 2016.

In terms of privacy, he stated, "According to my experience with health professionals and other people, I don't think that they are aware of privacy issues. While using smart phones and social media platforms, most of people do not know how to change privacy and security settings, they even do not know the existence of such settings". Also he stated that health status is important factor on the adoption of PHTs. Ease of use, relative advantage and price characteristics are emphasized as crucial innovation characteristics mentioned in the interview.

We discussed specifically mobile health applications with Bülent Bingül. Mr. Bingül and his team developed a personal health management system, namely Medibook, for both mobile (iOS and Android) and PC users. So, they knew current situation in personal healthcare management and analyzed the characteristics of their potential customers very deeply. He stated that we are already seeing amazing advancements in healthcare technology from robotic surgery to artificial intelligence programs. He mentioned that we would continue to witness cutting-edge technologies in health industry. He pointed out the importance of connected health system for increasing the effectiveness of treatments and decreasing the burden of health care costs. He stated, "Connected health can be achieved by connected software and devices. Electronic health records of patients should be shared across

multiple systems with the approval of patient". He stressed that the authorization of sharing health data is very sensitive issue and every system should conform to rules and regulations. While developing Medibook, they focused on six attributes of innovations. First of all, they provided relative advantage over current systems. For example, they utilized OCR technology, which provides upload of hard copy health documents and reads the health data from images. Therefore, users don't have to fill long forms for recording their test results. Secondly, they attached importance to user-friendly interfaces. Mr. Bingül mentioned that they designed handy menus, buttons and forms as well as simple and easy-to-find page formats. For example, users only need to press "plus" button on header in order to add new test result. Thirdly, they focused on the compatibility of the system with different screen sizes, screen resolutions, operating systems and browsers. For this purpose, they designed the system in a responsive manner. Fourthly, they offered free version of the system. So, before deciding on frequent usage, potential users can open accounts in the systems, download mobile application and try the features and functionalities of the system. Fifthly, in order to clarify the system's main functions, they share stories and cases about the usage. Lastly, they plan to offer different levels of price for different levels of service. For instance, storage is one of important parameter in price calculation.

Except for health and technology professionals, interviews were conducted with users and initial adopters of PHTs. 10 participants were asked about important characteristics of PHTs and their purposes of using PHTs. Three of participants have wearables, which are smart watches and fitness wristbands. Two of them use electronic health record system. One of them uses mobile applications for calorie calculation and water reminder. Four of participants use default mobile health

application in their smart phones. Easiness of tracking, system and device compatibility, free versions, simple interfaces, access to communities, long lasting batteries, easy access, personalized notifications, customized diet and fitness programs, reminder features, access to health information, calorie calculation, elegant design were frequent themes revealed by participants. In terms of usage purposes, three main categories were emerged. These are activity tracking, nutrition management and health data management. Activity tracking involves recording workouts, calculation of energy consumption, tracking walking and running distance and heart rate follow-up. Nutrition involves water consumption, calorie calculation, weight loss and balanced diet. Tracking and keeping health data involves having access to test results from smart phones, managing health status, and managing health problems.

These interviews provide insights on what may influence the attitude toward PHTs, and usage intention. We took advantage of valuable insights of participants in building the survey instrument. As a result of interviews, four categories of PHTs were determined and PHT example was validated. Secondly, the purpose of usage question were added into the questionnaire.

However, it was necessary to develop a preliminary quantitative study in order to validate the factors of items proposed in the relevant literature and enriched with interview results and test the relationships among the constructs in the research model.

CHAPTER 5

DEVELOPING AND TESTING THE PRELIMINARY RESEARCH MODEL

Personal Health Technologies are innovations and usage intentions of these technologies should be included in the innovation diffusion literature. The innovation diffusion literature provides a set of innovation characteristics that may affect an individual's opinion of the innovation before adoption and may affect the rate at which innovations are adopted. These attributes provide a theoretically based set of behavioral beliefs for the study. They include relative advantage, compatibility, ease of use (or complexity/simplicity), trialability, observability and image (Moore & Benbasat 1996; Rogers 1983).

5.1 Preliminary research model and hypotheses

A quantitative pilot study was designed in order to test the research model depicted in Figure 1. The following hypotheses were derived, relating the innovation characteristics of PHTs.

Hypothesis 1. Perceived relative advantage of using PHT has a positive effect on attitude toward usage (H1a) and usage intention (H1b) for users. The perceived relative advantage of using PHT has a positive effect on attitude toward usage (H1c) and usage intention (H1d) for potential users.

Hypothesis 2. Perceived compatibility of using PHT has a positive effect on attitude toward usage (H2a) and usage intention (H2b) for users. Perceived compatibility of using PHT has a positive effect on attitude toward usage (H2c) and usage intention (H2d) for potential users.

Hypothesis 3. Perceived ease of use of using PHT has a positive effect on attitude toward usage (H3a) and usage intention (H3b) for users. Perceived ease of use of using PHT has a positive effect on attitude toward usage (H3c) and usage intention (H3d) for potential users.

Hypothesis 4. Perceived result demonstrability of using PHT has a positive effect on attitude toward usage (H4a) and usage intention (H4b) for users. Perceived result demonstrability of using PHT has a positive effect on attitude toward usage (H4c) and usage intention (H4d) for potential users.

Hypothesis 5. Perceived trialability of using PHT has a positive effect on the attitude toward usage (H5a) and usage intention (H5b) for users. Perceived trialability of using PHT has a positive effect on attitude toward usage (H5c) and usage intention of (H5d) for potential users.

Hypothesis 6. Perceived image of using PHT has a positive effect on attitude toward usage (H6a), and usage intention (H6b) for users. Perceived image of using PHT has a positive effect on attitude toward usage (H6c) and usage intention (H6d) for potential users.

Hypothesis 7. Perceived price value of the PHT has a positive effect on the attitude toward usage (H7a) and usage intention (H7b) for users. Perceived price value of using PHT has a positive effect on attitude toward usage (H7c) and usage intention of PHTs (H7d) for potential adopters.

Hypothesis 8. Perceived enjoyment of using PHT has a positive effect on attitude toward usage (H8a) and usage intention (H8b) for users. Perceived enjoyment of using PHT has a positive effect on attitude toward usage (H8c) and usage intention (H8d) for potential users.

The following hypothesis was derived, relating contextual factors.

Hypothesis 9. Health information privacy concern has a negative effect on attitude toward usage (H9a) and usage intention (H9b) for users. Health information privacy concern has a negative effect on attitude toward usage (H9a) and usage intention (H9b) for potential users.

Hypothesis 10. Health information seeking behavior of users has a positive effect on usage intention (H10a). The health information seeking behavior of potential users has a positive effect on usage intention (H10b).

Hypothesis 11. Health motivation of users has a positive effect on usage intention (H11a). The health motivation of potential users has a positive effect on usage intention (H11b).

The following hypotheses were derived, relating the individual characteristics of the users or potential users of PHTs.

Hypothesis 12. Innovativeness of the users has a positive effect on usage intention (H12a). Innovativeness of potential users has a positive effect usage intention (H12b).

Hypothesis 13. Self-efficacy of users has a positive effect on usage intention to use PHTs (H13a). The self-efficacy of the potential adopters has a positive effect on and the purchase intention to use PHTs (H13b).

Hypothesis 14. The attitude toward using PHTs has positive effect on the future intention to use PHTs for the adopters (H14a). The attitude toward using PHTs has positive effect on the purchase intention of PHTs for the potential adopters (H14b).

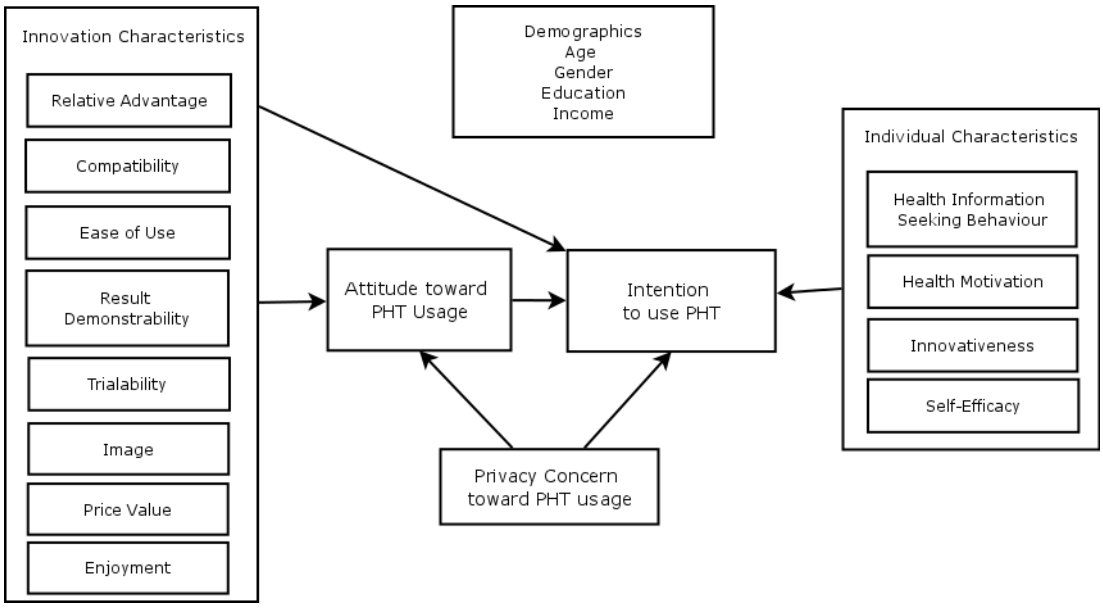


Figure 1. Preliminary research model

5.2 Measurement instrument and pretesting

In order to test the survey instrument before using it to collect data, pretesting was conducted. The aim of pretesting was to identify questions that don't make sense to participants, or problems with the questionnaire that might lead to biased answers. 10 people (testers) were selected on the basis of using at least one PHT. After finding the testers, appointments were arranged in order to get the insights more deeply and comfortably. While they are completing the survey, they were asked to think out loud. Each time they read and answered a question, they told us exactly what comes into their mind.

The pretesting notes were accumulated and analyzed for the revision of the survey. First of all, the survey items of the attitude scale, the enjoyment scale, and the ease of use scale were revised. Secondly, two questions about the usage frequency and the usage regularity were combined and the scale type was changed, since 9 out of 10 testers thought that there was no meaningful difference between two arguments and regularity may differ for the usage mode of PHTs. Thirdly, more

examples were added to the categories of Personal Health Technologies to provide better understanding of research context. New questions about the usage of Personal Health Technologies were included in order to eliminate the confusion about the selection of Personal Health Technologies for the questions of innovation characteristics.

In order to measure the 8 constructs related to the perceived characteristics of the PHTs in the proposed research model, 30 scale items based mostly on the items used in literature were adapted. The six perceived characteristics of the PHTs were measured using the items developed by Moore and Benbasat (1991), namely relative advantage, compatibility, ease of use, result demonstrability, trialability and image. As a result of interviews with the users, 4th item to compatibility scale was added regarding the technology compatibility, which differs from lifestyle compatibility. Survey items measuring the perceived price value and the perceived enjoyment of PHTs were derived using the scales developed by Dodds, Kent and Grewal (1991) and Davis et al (1992) respectively. Except from 8 innovation characteristics, health information privacy concern was measured with 3 items scale developed by Bansal and Gefen (2010).

In order to measure 4 constructs related to the individual characteristics of the users and potential users, 16 items were asked to participants. Health information seeking behavior was measured with 4 items scale developed by Hong (2009), self-efficacy with 3 items scale used by Agarwal, Ahuja, Carter and Gans (1998), health motivation with 4 items scale developed by Moorman (1990) and 1 item added to the scale from Kraft and Goodell (1993), innovativeness with 4 items scale developed by Agarwal and Prasad (1998a).

In addition to 4 constructs, the participants were asked to rate a list of the values that they look for or want out of their lives. Values were measured with the LOV scale developed by Kahle et al. (1986).

Attitude and intention are dependent variables of the research model in the pilot study. Attitude and intention constructs were measured for both users and potential users. The attitude scale was identical for both groups, whereas potential users were asked future use intention and users were asked to continue to use intention. Attitude scale was adapted from the studies of Karahanna et al. (1999), Taylor and Todd (1995), Tybout, Sternthal, Malaviya, Bakamitsos and Park (2005). Intention scale was adapted from Karahanna et al. (1999) and Davis (1989). The list of survey items by construct can be found in Appendix B.

An example of PHT was included for potential users. The participants were asked to consider their usage of PHT example and answer questions regarding their hypothetical usage. Example of PHT was added to Appendix C.

Except for LOV scale items, all items were measured by 7-point Likert scales (1 standing for "strongly disagree" and 7 for "strongly agree"). The original LOV scale was utilized with 9-point Likert scales 1 standing for "not important" and 9 for "very important".

The pilot survey also contained demographic questions regarding participants' age, gender, education level, and household average net monthly income level. In addition, health status and health problems were asked in order to understand whether they have mandatory situation regarding the usage of PHT or not.

5.3 Sampling and data collection procedure

The survey, consisted of 66 questions except for usage and demographics questions, was posted online to e-mail list of the department of management and the department of management information systems after receiving the consent of the program chairs. Since the return rate was very low, hard copies of the survey questions were delivered to students in 6 Management and Information Systems courses. The survey was conducted with the paper-and pencil administration method and the respondents replied the survey on a voluntary basis. In total 266 responses was received. By eliminating incomplete responses, 217 responses (82% of all responses) remained for the analysis.

5.4 Descriptive statistics of pilot study

Remaining 217 responses consisted of 95 (44%) responses from users and 122 (56%) responses from potential users. As shown in Table 2, 82% of users are the users of mobile wellness applications including Apple Health, Samsung Health, LG Health, Fit365, Nike + Run, Nike + Training, Seven, MyFitnessPal, Sony Lifelog, Diyetkolik, Clue, Runtastic, Freeletics, Fitwell, Polar Flow, Pillow, Sleep Cycle, Clue, Fat Secret. 36% of users are the users of medical applications including e-nabız, MHRS Mobil, Medibook, Acıbadem and WebMD. 22% of users are the users of wearable technologies including Apple Watch, Xiaomi Mi Band, Strava, Nike Fuel and unspecified wristbands. 12% of users are the users of medical devices including glucose meters, thermometers and blood pressure monitors.

Table 2. PHT Categories in the Pilot Study

	Number of Users	% of Users
Mobile Wellness Applications	78	82%
Mobile Medical Applications	36	38%
Wearable Technologies	21	22%
Medical Devices	11	12%

The reasons for the usage of their PHTs were asked to the users by offering seven options and one other option. As stated in Table 3, monitoring and analyzing fitness activities is the dominant reason for the usage with 77 %. Managing health status and managing eating habits are other most frequent reasons for the usage of PHTs.

Table 3. Reasons for Usage in the Pilot Study

Reasons for Usage	Number of Users	% of Users
Monitor and analyze fitness activities	73	77%
Manage health status	41	43%
Manage eating habits	36	38%
Prevent future health problems	15	16%
Manage health problems	12	13%
Share health information with health professionals	9	9%
Monitor health problems of family members	8	8%
Other (sleep quality tracking, period tracking)	8	8%
Total Users	95	100%

In order to analyze usage in detail, the respondents were asked to report their usage frequency of their PHTs. According to Table 4, the usage frequency of 72% of users is sometimes or usually. It can be concluded that the participants use their PHT at moderate levels with an average of 2.42 point (1=rarely, 2=sometimes, 3=usually, 4=always). The familiarity with PHTs were asked to the participants with 7 points Likert scale (1=Not familiar at all, 7=Very familiar). The mean of familiarity responses was calculated as 4.04, which means a moderate level of familiarity.

Table 4. Usage Frequencies in the Pilot Study

Usage Frequency	Number of Users	% of Users
Rarely	15	16%
Sometimes	37	39%
Usually	31	33%
Always	12	13%
Total Adopters	95	100%

Gender distribution of the sample was 52.5 % female and 47.5 % male. In terms of education, they were either undergraduate student or graduate student. Ages were in the range of 18-34. In terms of demographic information, a homogeneous sample was utilized in pilot study.

5.5 Results of pilot study

The main goal of the pilot study was to identify the relationships among the constructs in the research model as perceived in consumers' minds.

5.5.1 Reliability

In order to check reliability, Cronbach Alpha statistics were calculated for all scale items in the study. First of all, Cronbach Alpha was found as 0.952 for 66 items (except for 2 user only items, namely familiarity of PHTs, frequency of usage). In this reliability analysis, all responses were used since 66 items were asked both users and potential users. Then, remaining 2 items replied by only adopters were included. In this statistics, the responses from the adopters were used and Cronbach Alpha was calculated as 0.922. In addition, all construct scales were checked separately. Results demonstrability and trialability scales were found as below the cutoff level as 0.70 for both groups (Nunnally, 1978). Because of low reliability levels, result demonstrability and trialability constructs were omitted from the preliminary

research model. In order to improve the reliability statistics of innovativeness construct, 4th item of the scale was discarded, since this omission provided a 0.62 increase in Cronbach Alpha level. The details of reliability statistics for each construct were given in Appendix D.

After the examination of variables, the cases were observed for the detection of outliers. In order to examine outliers, standard residuals were observed. 10 cases that were outside -2.5 - +2.5 range were omitted. For the purpose of finding multivariate outliers, mahalanobis distance was calculated and none of remaining cases was eliminated.

5.5.2 Factor analysis

For the purpose of dimension reduction, exploratory factor analysis (EFA) was conducted in SPSS 24. The sample size was 207 and 25 items for innovation characteristics and 18 items for individual characteristics and contextual factors were obtained. Due to the sample size requirements of EFA and conceptual differences between individual and innovation characteristics, two separate factor analysis were performed for the innovation characteristics and the individual characteristics.

5.5.2.1 Factor analysis for innovation characteristics

Principal components extraction method were chosen, because primary concern is data reduction, focusing on the minimum number of factors needed to represent the maximum portion of total variance of the variables (Hair, Black, Babin, Anderson & Tatham, 2010). Since the scales developed by Moore and Benbasat (1991) were utilized for 4 innovation characteristics, principal components extraction method and varimax rotation were applied in EFA by referring their study. However, in same

study, they found significant correlation between relative advantage and compatibility constructs. Because of this known correlation, second EFA was run with principal components extraction method and direct oblimin rotation that does not assume the independency of the factors. Also, Davis et al. (1989) utilized varimax rotation with eigenvalue=1 cutoff criterion.

For the innovation characteristics, the sampling adequacy was examined with Kaiser-Meyer-Olkin (KMO) measure sampling adequacy and Bartlett's Test. KMO statistics was 0.879, which was higher than 0.50, lowest acceptable level. From the main diagonal of anti-image correlation matrix, the individual MSA values were checked and found as all above threshold value of 0.5 (Janssens, De Pelsmacker &Van Kenhove, 2008). In Bartlett's test, the null hypothesis, the variables are uncorrelated, was rejected. Therefore making a factor analysis is meaningful. Details of MSA statistics were indicated in Table 5.

Table 5. Sampling Adequacy Measures for Innovation Characteristics in the Pilot Study

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.879
Bartlett's Test of Sphericity	Approx. Chi-Square	4257.809
	df	300
	Sig.	0.000

EFA was run by setting principal component analysis as extraction method, varimax as rotation method and eigenvalue as 1. Coefficients lower than 0.40 were suppressed in order to identify significant factor loadings. According to Hair et al. (2010), minimum 0.40 factor loadings were needed for 200 sample size.

The communalities were examined in order to indicate which part of the variance of each variable is explained by 6 factors. All communalities were higher than 0.5. Lowest communality was found as 0.599 for 4th items for compatibility (Comp4). Details of communalities can be found in Appendix E. 6 factors

represented 78 percent of the variance of the 25 variables, deemed sufficient in terms of total variance explained. Details of total variance explained statistics could also be found in Appendix E.

While interpreting the results of rotated component matrix (Table 6) and pattern matrix (Table 7), the explanation of Knapp and Comrey (1973) about loadings was taken into consideration. Knapp and Comrey (1973) indicated that loadings in excess of 0.45 could be considered fair, greater than 0.55 good, 0.63 very good, and 0.71 excellent. Because of that, the loadings lower than .40 were suppressed.

Table 6. Rotated Matrix of Innovation Characteristics in the Pilot Study

Variable	Component					
	1	2	3	4	5	6
Rel_Adv1	0.703					
Rel_Adv2	0.718					
Rel_Adv3	0.576	0.483				
Rel_Adv4	0.874					
Rel_Adv5	0.836					
Rel_Adv6	0.822					
Rel_Adv7		0.528				
Comp1		0.825				
Comp2		0.77				
Comp3		0.836				
Comp4		0.583				
Ease1				0.897		
Ease2				0.841		
Ease3				0.773		
Ease4				0.845		
Image1						0.876
Image2						0.804
Image3						0.905
Price1			0.863			
Price2			0.799			
Price3			0.828			
Price4			0.908			
Enjoy1					0.845	
Enjoy2					0.891	
Enjoy3					0.86	

Notes: Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

As the rotated component analysis, most loadings on the target factors are in the excellent range (21 out of 25), with only one in the "fair" range (Rel_Adv7). Rel_Adv3 loaded significantly to factor 1 and factor 4. In order to attain clear distinction between constructs, Rel_Adv3 and Rel_Adv7 were omitted from the research model for the further analysis. Typically, convergent validity is considered to be satisfactory when items load high on their respective constructs (i.e. factors). As depicted in Appendix E, results showed that six factors were extracted with an eigenvalue >1.0 and that all items except for omitted ones loaded high on the expected constructs.

Table 7. Pattern Matrix of Innovation Characteristics in the Pilot Study

Variable	Component					
	1	2	3	4	5	6
Rel_Adv1	0.674					
Rel_Adv2	0.733					
Rel_Adv3	0.459					
Rel_Adv4	0.942					
Rel_Adv5	0.878					
Rel_Adv6	0.853					
Rel_Adv7						-0.437
Comp1						-0.877
Comp2						-0.766
Comp3						-0.885
Comp4						-0.561
Ease1		0.903				
Ease2		0.847				
Ease3		0.777				
Ease4		0.86				
Image1				0.882		
Image2				0.813		
Image3				0.927		
Price1			-0.926			
Price2			-0.794			
Price3			-0.826			
Price4			-0.94			
Enjoy1					-0.877	
Enjoy2					-0.942	
Enjoy3					-0.913	

Notes: Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

As the pattern analysis, most loadings on the target factors are in the excellent range (21 out of 25), with only one in the "fair" range (Rel-Adv3) and one out of acceptable ranges (Rel-Adv7). Discriminant validity was evaluated by examining whether each item loaded higher on the construct it measured than on any other. As summarized in Table 7, the overall results suggested that the measurement exhibited reasonable discriminant validity

5.5.2.2 Factor analysis for individual characteristics and contextual factors

Same procedures and methods were carried out for the EFA analysis of Individual characteristics and contextual factors. The sampling adequacy was examined with Kaiser-Meyer-Olkin (KMO) measure sampling adequacy and Bartlett's Test. KMO statistics was 0.816, which was higher than 0.50, lowest acceptable level. From the main diagonal of anti-image correlation matrix, the individual MSA values were checked and found as above threshold value of 0.5. (Janssens et al, 2008). In Bartlett's test, the null hypothesis, the variables are uncorrelated, was rejected. Therefore making a factor analysis is meaningful. MSA statistics were indicated in Table 8.

Table 8. KMO and Bartlett's Test for Individual Characteristics in the Pilot Study

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.809
Bartlett's Test of Sphericity	Approx. Chi-Square	2230.28
	df	153
	Sig.	0

EFA was conducted by setting principal component analysis as extraction method, varimax as rotation method, eigenvalue as 1. Coefficients lower than 0.40 were suppressed in order to identify significant factor loadings. According to Hair et al. (2010), minimum 0.40 factor loadings were needed for the sample size.

The communalities in order to indicate which part of the variance of each variable is explained by 5 factors. All communalities were higher than 0.5. Lowest communality was found as 0.587 for first item of health motivation (Heal_Ori1). 5 factors represent 74 percent of the variance of 18 variables, deemed sufficient in terms of total variance explained. Table A6 of total variance explained statistics was included in Appendix E. While interpreting rotated component matrix in Table 9, Heal_Ori9 and Self_Effi1 variables loaded significantly to two factors.

Table 9. Rotated Component Matrix of Individual Characteristics and Contextual Factors in the Pilot Study

Variable	Component				
	1	2	3	4	5
Heal_Ori1			0.686		
Heal_Ori2			0.638		
Heal_Ori3_R			0.815		
Heal_Ori4_R			0.824		
Heal_Ori5	0.842				
Heal_Ori6	0.833				
Heal_Ori7	0.867				
Heal_Ori8	0.791				
Heal_Ori9	0.645		0.46		
Inno_Ori1		0.842			
Inno_Ori2		0.812			
Inno_Ori3		0.818			
Self_Effi1		0.492			0.689
Self_Effi2					0.916
Self_Effi3					0.896
Privacy1_R				0.869	
Privacy2_R				0.915	
Privacy3_R				0.876	

Notes: Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 6 iterations.

In pattern matrix (Table 10), there is no cross factor loading, but the loading of Heal_Ori9 (0.572) had low loadings compared to other variables in the analysis. For that reason, Heal_Ori9 was excluded from the further analysis. Typically, convergent validity is considered as satisfactory when items load high on their respective constructs (i.e. factors).

Table 10. Pattern Matrix of Individual Characteristics and Contextual Factors in the Pilot Study

Variable	Component				
	1	2	3	4	5
Heal_Ori1				-0.684	
Heal_Ori2				-0.613	
Heal_Ori3_R				-0.861	
Heal_Ori4_R				-0.851	
Heal_Ori5	0.898				
Heal_Ori6	0.835				
Heal_Ori7	0.911				
Heal_Ori8	0.787				
Heal_Ori9	0.572				
Inno_Ori1					0.87
Inno_Ori2					0.808
Inno_Ori3					0.863
Self_Effi1		-0.636			
Self_Effi2		-0.959			
Self_Effi3		-0.938			
Privacy1_R			0.88		
Privacy2_R			0.922		
Privacy3_R			0.874		

Notes: Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

As depicted in Table 10, results showed that five factors were extracted with an eigenvalue >1.0 and that all items except for Heal_Ori9 loaded high on the expected constructs. Discriminant validity was evaluated by examining whether each item loaded higher on the construct it measured or on any other. As summarized in Table 10, the overall results suggested that the measurement exhibited reasonable discriminant validity. According to the results of EFA, summated scales of items loaded to same factor were calculated.

5.5.3 Linear regression

It was determined to conduct linear regression analysis in order to test proposed relationships among constructs. According to Hair et al. (2010), there are important underlying assumptions to be examined for linear regression analysis.

Linearity of phenomenon measured, constant variance of error terms, independence of error terms and normality of the error term distribution were checked. In addition, multicollinearity was examined and sample size requirement was checked.

In order to examine the linearity, residual plots and the partial regression plots were examined. Non-linear relationship was not detected. For examining homoscedasticity and independence of error term, the scatter plot was drawn for standardized residuals and standardized predictive value. No pattern existed in the graph. Also, ANOVA was conducted for males and females. The difference of the group means was statistically insignificant. Levene's Statistics was calculated as 0.587 and its p value was 0.445 that means the variances of error terms were equal. The homogeneity of variances of the error terms was assured. In order to examine outliers, standard residuals were observed. In addition, mahalanobis distance and leverage points were calculated. 10 cases that were outside -2.5 - +2.5 range were omitted.

One of the assumptions of linear regression is the normally distributed error term. Residuals were calculated and normality tests for them were conducted. As indicated in Table 11, both Kolmogorov-Smirnov and Shapiro-Wilk tests produced insignificant results. That means null hypothesis, which corresponds to a normal distribution of the residual, is accepted.

Table 11. Normality Tests for Pilot Study in the Pilot Study

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Standardized Residual	0.046	207	.200*	0.993	207	0.402

Notes: This is a lower bound of the true significance.
a Lilliefors Significance Correction

Also, the normality was observed with visual examination of histogram, and normal Q-Q plots. Residual distribution almost fit the normal probability curve and

points are very close to 45-degree line in Q-Q plot. These examinations guaranteed the normality assumption.

In addition, VIF, condition index and tolerance values were observed in order to assess multicollinearity. For current data, all of these statistics are in strict ranges; none of them exceeds cut-off values. The sample size was 207 and there were 11 independent variables. Since the number of observations should be 5 times larger than the number of independent variables, the sample size requirement was met.

5.5.3.1 Results of linear regression: Attitude as dependent variable

Three linear regression analyses were applied to total sample, only users and only potential users in order to predict the factors that affect attitude toward PHT usage. Linear regression analysis was run with stepwise method in SPSS. In line with the research model and the results of factor analysis, dependent variable was set as the attitude toward usage and independent variables were set as perceived relative advantage, perceived compatibility, perceived ease of use, perceived image, perceived price value, perceived enjoyment and health information privacy concern. For all observations, R square was found as 0.682 and significant coefficients were observed for 6 variables that are perceived compatibility, perceived relative advantage, perceived price value, health information privacy concern, perceived enjoyment and perceived image. Details of model summary can be found in Appendix F. According to standardized coefficients and t values in Table 12, perceived compatibility, perceived relative advantage and perceived price value were most significant constructs.

Table 12. Regression Coefficients for Total Sample in the Pilot Study

Constructs	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.865	0.26		7.165	0.000
Compatibility	0.236	0.039	0.341	5.991	0.000
Relative Advantage	0.251	0.046	0.278	5.504	0.000
Price	0.144	0.031	0.218	4.698	0.000
Privacy	-0.068	0.027	-0.107	-2.557	0.011
Enjoyment	0.089	0.033	0.136	2.672	0.008
Image	0.055	0.027	0.085	2.019	0.045

Note: Dependent Variable: Attitude

For users, R square was found as 0.535 and significant coefficients were observed for 5 independent variables that are perceived compatibility, perceived relative advantage, perceived price value, health information privacy concern and perceived image. Details of model summary can be found in Appendix F. According to standardized coefficients and t values in Table 13, perceived compatibility, perceived relative advantage and perceived price value were most significant constructs.

Table 13. Regression Coefficients for Users in the Pilot Study

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.269	0.489		4.639	0.000
Relative Advantage	0.261	0.072	0.320	3.616	0.001
Price	0.168	0.045	0.282	3.745	0.000
Compatibility	0.187	0.057	0.285	3.310	0.001
Image	0.118	0.042	0.208	2.800	0.006
Privacy	-0.09	0.043	-0.163	-2.124	0.037

Note: Dependent Variable: Attitude
Selecting only cases for which USAGE = Users

For potential users, R square was found as 0.697 and significant coefficients were observed for 4 independent variables that are perceived compatibility,

perceived relative advantage, perceived price value and health information privacy concern. Details of model summary can be found in Appendix F. According to standardized coefficients and t values in Table 14, perceived compatibility and perceived relative advantage were most significant constructs.

Table 14. Regression Coefficients for Potential Users in the Pilot Study

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.006	0.301		6.656	0
Compatibility	0.352	0.053	0.483	6.624	0
Relative Advantage	0.269	0.062	0.308	4.306	0
Privacy	-0.081	0.034	-0.129	-2.41	0.018
Price	0.128	0.056	0.141	2.285	0.024

Notes: Dependent Variable: Attitude
Selecting only cases for which Usage= Potential Users

5.5.3.2 Results of Linear Regression: Intention as dependent variable

Two linear regression analyses were conducted for only users and only potential users in order to predict the factors that affect usage intention. In line with the research model and the results of factor analysis, dependent variable was set as usage intention, independent variables were set as attitude toward usage, perceived relative advantage, perceived compatibility, perceived ease of use, perceived image, perceived price value, perceived enjoyment, health information privacy concern, health information seeking behavior, health motivation, innovativeness and domain specific self-efficacy. R Square was found as 0.508 and 4 independent variables were observed as significant. As indicated in Table 15, attitude toward usage and innovativeness were most significant variables in the regression equation for users.

Table 15. Regression Coefficients for Users in the Pilot Study

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.272	0.611		0.445	0.657
Attitude	0.601	0.095	0.509	6.339	0.000
Innovativeness	0.149	0.056	0.209	2.643	0.010
Health_Info_Seeking	0.148	0.054	0.21	2.753	0.007
Enjoyment	0.14	0.066	0.171	2.126	0.036

Notes: Dependent Variable: Intention
Selecting only cases for which Usage = Users

R Square was found as 0.505 and 3 independent variables were examined as significant. As seen from Table 16, attitude toward usage was the most significant variables in the regression equation for potential users.

Table 16. Regression Coefficients for Potential Users in the Pilot Study

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.742	0.489		-3.561	0.001
Attitude	0.603	0.133	0.418	4.537	0.000
Enjoyment	0.229	0.084	0.227	2.731	0.007
Price	0.269	0.104	0.205	2.597	0.011

Notes: Dependent Variable: Intention
Selecting only cases for which Usage = Potential Users

5.6 Summary of pilot study results

The results of 5 regression analyses were summarized in the following table. 46 hypotheses were proposed in pilot study. 16 of them were supported, 4 of them were not tested, and 26 of them were not supported.

Perceived relative advantage, perceived compatibility and perceived price value were significant antecedents of attitude toward usage for both users and potential users. On the other hand, perceived enjoyment and perceived ease of use had insignificant impact on attitude toward usage. As stated previously, result demonstrability and trialability were not included in the analysis phase, because of

low scale reliabilities. A significant difference was inspected between users and potential users in the relationship between perceived image and usage intention. Perceived image was statistically significant antecedents for users, whereas it was not for potential users.

Attitude toward usage and perceived enjoyment were found significant antecedents for both users and potential users. On the other hand, perceived relative advantage, perceived compatibility, perceived ease of use, perceived image, and health information privacy concern, health motivation and domain specific self-efficacy did not have significant impacts on usage intention. Health information seeking behavior and innovativeness were supported as significant antecedents of usage intention for only users, whereas perceived price value was supported as significant antecedent of usage intention for only potential users. All results were summarized in Table 17.

In conclusion, construct reliability and validity of the model were checked with this pilot study. In order to increase reliability, changes were composed in perceived trialability and perceived result demonstrability constructs. In addition, reversely written items of health motivation and innovativeness were updated. In terms of analysis of relationships, the student sample employed inhibited the generalizability of the results. So it was decided to use more representative sample in the final study for the sake of generalization.

Table 17. Hypothesis Testing Results of the Pilot Study

	Users		Potential Users	
Hypothesis	Code	Result	Code	Result
Relative Advantage -> Attitude	H1a	Supported	H1c	Supported
Compatibility -> Attitude	H2a	Supported	H2c	Supported
Ease of Use -> Attitude	H3a	Not supported	H3c	Not supported
Result Demonstrability -> Attitude	H4a	Not tested	H4c	Not tested
Trialability -> Attitude	H5a	Not tested	H5c	Not tested
Image -> Attitude	H6a	Supported	H6c	Not supported
Price Value -> Attitude	H7a	Supported	H7c	Supported
Enjoyment -> Attitude	H8a	Not supported	H8c	Not supported
Privacy -> Attitude	H9a	Supported	H9c	Supported
Relative Advantage -> Intention	H1b	Not supported	H1d	Not supported
Compatibility -> Intention	H2b	Not supported	H2d	Not supported
Ease of Use -> Intention	H3b	Not supported	H3d	Not supported
Result Demonstrability -> Intention	H4b	Not tested	H4d	Not tested
Trialability -> Intention	H5b	Not tested	H5d	Not tested
Image -> Intention	H6b	Not supported	H6d	Not supported
Price Value -> Intention	H7b	Not supported	H7d	Supported
Enjoyment -> Intention	H8b	Supported	H8d	Supported
Privacy -> Intention	H9b	Not supported	H9d	Not supported
Health Info. Seeking -> Intention	H10a	Supported	H10b	Not supported
Health Motivation -> Intention	H11a	Not supported	H11b	Not supported
Innovativeness -> Intention	H12a	Supported	H12b	Not supported
Self-efficacy -> Intention	H13a	Not supported	H13b	Not supported
Attitude -> Intention	H14a	Supported	H14b	Supported

CHAPTER 6

THE RESEARCH MODEL AND HYPOTHESES

The research model derives its theoretical foundations from prior research in the diffusion of innovations and technology acceptance models. . The relationships constituting the model also have support from prior theoretical and empirical work in technology acceptance. Specifically, the study focuses on individual acceptance behavior exhibited as current use of an innovation and intentions to use the innovation in the future. Current research examines the influence of the perceived characteristics of an innovation on these outcomes. The specific information technology innovation examined in this research is Personal Health Technologies ranged from mobile applications to smart devices.

Following from the theory and in the context of personal health technologies examined here, a priori expectation was that all of the innovation characteristics would be relevant to user acceptance. Except for health information privacy, the contextual factors, health motivation and health information seeking behavior, have positive impact on the intention to use PHTs. The impact of health information privacy on the intention to use PHTs is expected to be in negative direction.
The definitions of the constructs utilized in the final research model were summarized in Table 18.

6.1 Innovation attributes

As it is stated in previous sections, prior studies and relevant theories proposed that relative advantage, ease of use, compatibility, result demonstrability, trialability, image, enjoyment and price are beliefs regarding innovations and they have significant impacts on the attitude toward usage and usage intentions of innovations.

Table 18. Definitions of Constructs in the Final Study

Perceived Innovation Attributes	
Relative Advantage	The degree to which adopting/using the IT innovation is perceived as being better than using the practice it supersedes
Compatibility	The degree to which adopting/using the IT innovation is compatible with what people
Ease of Use	The degree to which adopting/using a particular system is free of effort
Result Demonstrability	The degree to which the results of adopting/using the IT innovation are observable and communicable to others
Trialability	The degree to which one can experiment with an innovation on a limited basis before making an adoption or rejection decision
Image	The degree to which adoption/usage of the innovation is perceived to enhance one's image or status in one's social system
Price Value	An indicator of the amount of sacrifice needed to purchase a product
Enjoyment	The extent to which activity of using the computer perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated
Individual Characteristics	
Innovativeness	The willingness of an individual to try out any new information technology
Self-efficacy	The judgments of how well one can execute courses of action required to deal with prospective situations
Values	Deeply held feelings about what is important in life
Contextual Factors	
Health Information Privacy Concern	Related how personal health information is used, disclosed, and protected, and the degree of control they have over the dissemination of this information
Health Motivation	Consumers' goal-directed arousal to engage in preventive health behaviors
Health Information Seeking Behavior	Individuals' reading, writing and numeracy skills in terms of accessing, processing, and utilizing health information, which contributes to healthier lifestyle, better stress coping, and a range of positive health outcomes
Behavioral Constructs	
Attitude	Complex mental state involving beliefs and feelings and values and dispositions to act in certain ways
Intention	Assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior.

In addition, it was postulated in literature that attitude toward usage has significant impacts on usage intentions. For instance, Taylor and Todd (1995) found that attitude is the primary determinant of behavioral intention in the decomposed model of TPB.

Hypothesis 1. Perceived relative advantage of PHT has a positive effect on attitude toward usage (H1a) and usage intention (H1b).

Hypothesis 2. Perceived compatibility of the PHT has a positive effect on the attitude toward usage (H2a) and usage intention (H2b) mediated by perceived relative advantage.

TAM2 posits that perceived ease of use and result demonstrability will have a positive direct influence on perceived usefulness (relative advantage). Therefore, it was proposed the mediation role of perceived relative advantage over the relationships of these two constructs with usage intention.

Hypothesis 3. Perceived ease of use of PHT has both a positive impact on attitude toward usage (H3a) and usage intention (H3b) mediated by perceived relative advantage. Perceived ease of use has a positive effect on perceived relative advantage (H3c).

Hypothesis 4. Perceived result demonstrability of the PHT has a positive effect on attitude toward usage (H4a) and usage intention (H4b) mediated by perceived relative advantage.

Hypothesis 5. Perceived trialability of the PHT has a positive effect on attitude toward usage (H5a) and usage intention (H5b) mediated by perceived ease of use. Perceived trialability has a positive effect on perceived ease of use (H5c).

Smart, branded, and well-designed wearables such as Apple Watch, FitBit, etc., are also considered as PHTs. People could prefer this kind of products to

formulate their personal image. So, image construct will be a significant innovation attribute in this model. In the study of Venkatesh and Bala (2008), image is indicated as one of the determinant of perceived usefulness (relative advantage). Therefore, the mediation role of perceived relative advantage for the relationship between perceived image and attitude toward usage/usage intention was proposed.

Hypothesis 6. The perceived image of the PHT has a positive effect on attitude toward usage (H6a), and usage intention (H6b) mediated by perceived relative advantage. The perceived image has a positive effect on perceived relative advantage (H6c).

Hypothesis 7. Perceived price value of the PHT has a positive effect on attitude toward usage (H7a) and usage intention (H7b) mediated by relative advantage. Perceived price value of the PHT has a positive effect on perceived relative advantage (H7c).

In the study of Venkatesh and Bala (2008), enjoyment is indicated as one of the determinant of perceived ease of use. Therefore, the mediation role of perceived ease of use for the relationship between perceived enjoyment and attitude toward usage/usage intention was proposed. In addition, having fun can be one of advantages of using innovations; it was suggested that relative advantage can also mediates this relationship.

Hypothesis 8. Perceived enjoyment of the PHT has a positive effect on attitude toward usage (H8a) and usage intention mediated by perceived ease of use (H8b) perceived relative advantage (H8c). Perceived enjoyment has positive effects on perceived ease of use (H8d) and perceived relative advantage (H8e).

Hypothesis 9. The attitude toward usage has positive effect on usage intention (H9).

6.2 Contextual factors

Health information privacy, health motivation and health information seeking behavior were contextual factors in the model. It was proposed that these contextual factors had impacts on attitude toward usage, usage intention and relative advantage.

Hypothesis 10. The health information privacy concern has a negative effect on attitude toward usage (H10a) and usage intention (H10b), mediated by perceived relative advantage. The health information privacy concern has negative impact on perceived relative advantage (H10c).

Hypothesis 11. The health information seeking behavior moderates the relationship between the innovation attributes of PHTs and usage intention (H11).

Hypothesis 12. The health motivation moderates the relationship between perceived relative advantage and usage intention. Higher level of health motivation strengthens the relationship between relative advantage and usage intention (H12).

6.3 Individual characteristics

In innovation diffusion literature, innovators and early adopters are seen as having ability to cope with higher levels of risks. Agarwal and Prasad (1998a) argued that individuals with higher innovativeness are more prone to take risks and develop more positive intentions toward the use of an innovation, compared to less innovative individuals. Agarwal and Prasad (1998a) suggested that personal innovativeness could be included to models as moderators. Therefore, it was proposed that innovativeness moderates causal relationship between perceived relative advantage and intention to use PHTs and causal relationship between perceived ease of use and intention to use PHTs. As Bandura (1982) stated that self-efficacy derives its conceptual foundations from a rich literature related to social

learning theory. In the study of Agarwal et al. (1998), it was postulated that self-efficacy is higher for early adopters. Therefore, it was proposed that self-efficacy strengthens the effects of perceived relative advantage and perceived ease of use on usage intention. Venkatesh and Bala (2008) proposed that computer self-efficacy is the determinant of perceived ease of use.

Hypothesis 13. Innovativeness moderates the relationship between perceived relative advantage and usage intention. (H13a). Innovativeness moderates the relationship between perceived ease of use and usage intention. (H13b).

Hypothesis 14. Self-efficacy moderates the relationship between the perceived relative advantage and usage intention (H14a). Self-efficacy moderates the relationship between perceived ease of use and usage intention. (H14b).

People who place high importance on the external/social values are considered more likely to be interested in their physical appearance and are motivated to be healthy (Divine & Lepisto, 2005). People who place high importance on the internal/non hedonistic values (self-respect, self-fulfillment, sense of accomplishment and security) may adopt behaviors that will improve their long-term personal health, which should make them, feel better about themselves (Divine & Lepisto, 2005). People who placed a high level of importance on the more hedonistic values of fun, enjoyment and excitement will be less likely to adopt PHTs (Divine & Lepisto, 2005). Thus, it was hypothesized that: The importance of sense of belonging, well-respected, warm relationships with others, will have positive effects on usage intention (H15a). The importance of self-respect, self-fulfillment, sense of accomplishment and security will have positive effects on usage intention (H15b). The importance of fun and enjoyment, and excitement will have adverse effects on using PHTs (H15c).

6.4 Control variables

Analyzing the effects of control variables on the relationship in the research model will sharpen our understanding of the generalizability of research model. Karahanna et al. (1999) mentioned that there are differences between pre-adoption and post-adoption attitude, since pre-adoption attitudes are based on indirect experiences and post-adoption attitudes are based on direct attitudes. Also they stated that attitudes based on direct experience with an attitude object predict behavior better than attitudes formed based on indirect experience. Because of previous findings, usage and usage frequency were added as control variables in the model.

In order to be able to generalize the proposed model across different types of PHT technologies, PHT category was included as a control variable in the analysis. Age, gender, income and education are common control variables for group analysis. The final research model compromised these variables too. Health status is a crucial variable in health related context. It was proposed that usage intention and attitude toward usage change according to health status of individuals. If an individual has a health problem, s/he may be in mandatory situation. Voluntariness is important moderator for most of innovation adoption and use studies. Therefore, health status was included as a control variable in current study.

Hypothesis 16. Control variables have impact on the direct and indirect relationships in the research model. Control variables are age, gender, education, income, health status, SES groups, health status, usage, usage frequency and PHT categories.

All relationships and constructs included in the model were depicted in Figure 2.

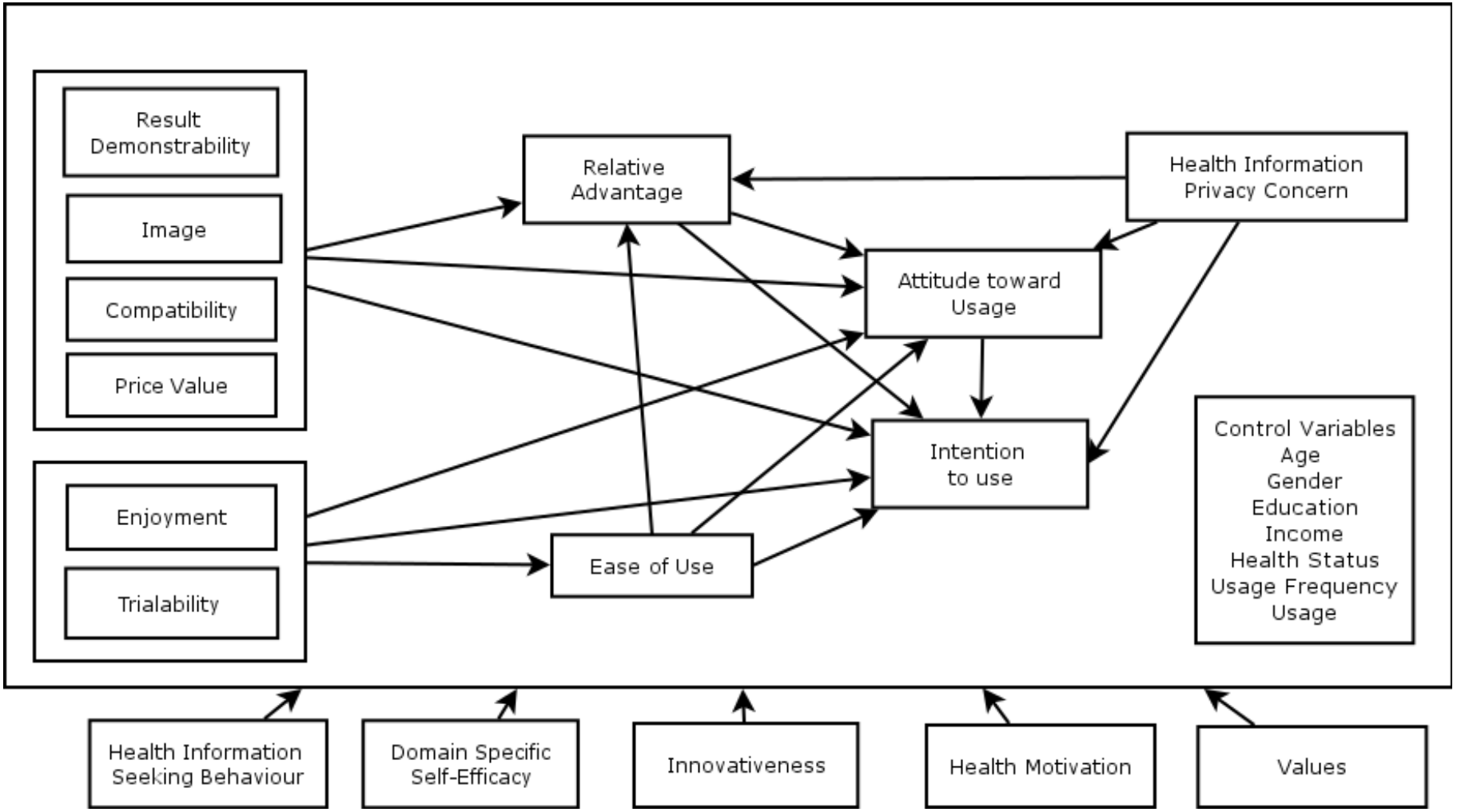


Figure 2. Proposed Research Model in Final Study

CHAPTER 7

TESTING AND VALIDATING THE FINAL MODEL

This chapter presents the testing and validation of the final research model depicted in Figure 2. After the launch smart phones and their app stores, specifically App Store and Google Play, mobile applications started to penetrate many industries. One of them is healthcare industry. On the other hand, with the proliferation of technology, smart health care devices are presented to individuals. Therefore, individuals can use these technologies personally outside the boundaries of health care system. In the light of my research motivation, revealed in previous sections, usage intentions of innovations were investigated in the context of PHTs.

By reviewing the literature, observing new technologies and interviewing users, PHTs were categorized into four main categories. These categories are mobile health applications, electronic health records, wearable technologies and medical devices. In survey, PHT categories were included with their explanations and examples.

7.1 Measurement instrument and questionnaire design

Similar to the process applied during the pilot study in the model development phase, scale items in final study were developed primarily based on items used in literature, with adaptations and minor additions to fit the specific characteristics of PHTs.

The perceived attributes of PHTs were measured using the factor structure and items validated in the pilot study, which had primarily been adapted from Moore and Benbasat's (1991) study. Contextual factors and individual characteristics in the

pilot study were also used in the final model testing and validation phase. The questionnaire used in final study can be found in Appendix G.

In addition to scale items, the survey included demographic questions as well as questions that enabled the identification of participants' usage and personal health technology details. This was done in order to allow for the analysis of control variables and their effects on the model. The questionnaire was organized so that it began with a set of screening questions, which would allow the administrator of the survey to identify who should be included as a participant in the study and who should not. Screening questions are related to socioeconomic status (SES), which are the combination of education, income and occupation.

7.2 Sampling and data collection

Sampling and data collection procedures were conducted using the services of an independent market research company. Stratified sampling was utilized in the final. The strata were identified as "PHT users vs. non-users" among the target population of PHTs. In order to enable analysis of group differences, approximately 2/3 of the sample consisted of PHT users and 1/3 consisted of non-users. The top 6 largest cities in Turkey, namely Istanbul, Ankara, Izmir, Bursa, Adana and Antalya were included in the sampling process of final study. Gender was evenly distributed among males and females for both users and non-users. The sample consisted of only A, B and C1 SES (socio-economic status) groups, since it was expected that education, income and occupation are indicators of potential users and users of PHTs.

Data was collected in the form of face-to-face survey interviews, where the survey administrator read the questions to the participants, and marked the answers

on the form. Data collection was conducted and completed during May and June 2017.

7.3 Descriptive statistics of final study

This section comprises the descriptive statistics of the final study. 902 completed questionnaires were included study after assuring data quality by eliminating the questionnaires that had same answers to all questions and inconsistent responses and omitting influential observations. The demographic characteristics of final study participants can be found in Table 19.

Consistent with gender distribution in Turkey, the sample consisted of an even distribution of males and females. The age distribution of the sample was allowed us to analyze the effect of age on the relationships in the model. 25-34 and 35-44 age groups had approximately even size. 45-55 age group had also large number of observations. Only 55-60 age group had small number of observation. The sample's distribution in cities of residence was consistent with the population ratios of the six largest cities in Turkey except for Ankara. Due to the elimination of some observations for the sake of data quality, Ankara had relatively low observations compared to İzmir. The education level and average monthly household net income distribution of the sample reflects the characteristics of the target population.

Table 19. Demographic Characteristics of the Final Study Participants

Gender		
	Frequency	Percent
Male	451	50.0
Female	451	50.0
Total	902	100.0
Age		
	Frequency	Percent
25-34	324	35.9
35-44	310	34.4
45-54	241	26.7
55-60	27	3.0
Total	902	100.0
City of residence		
	Frequency	Percent
İstanbul	376	41.7
İzmir	175	19.4
Ankara	154	17.1
Bursa	71	7.9
Adana	66	7.3
Antalya	60	6.7
Total	902	100.0
Education		
	Frequency	Percent
Secondary	73	8.1
High School	469	52.0
College or University Student	15	1.7
College or University Degree	319	35.4
Graduate Student	10	1.1
Graduate Degree	16	1.8
Total	902	100.0
Average Net Monthly Household Income		
	Frequency	Percent
Under 1300 TL	5	0.6
1300-5000 TL	399	44.2
5001-10000 TL	108	12.0
10001-20000 TL	38	4.2
20000 TL	67	7.4
No answer	285	31.6
Total	902	100.0

As indicated Table 20, the sample consisted of three SES group, namely A, B and C1. Half of participants belonged to C1 group and other half included A or B groups. 70.5 % of participants reported that they were healthy and had no serious health problem. On the other hand, 29.5 % of participants specified their health problems. Blood pressure problems, diabetics, allergies, orthopedics problems, lung diseases, eye problems and heart diseases were most frequent health problems. Obesity, addiction, neurological diseases and psychological problems had low frequency in the sample.

Table 20. Other Characteristics of the Final Study Participants

SES Group		
	Frequency	Percent
A	157	17.4
B	245	27.2
C1	500	55.4
Total	902	100.0
Health Status		
	Frequency	Percent
Having no health problem	636	70.5
Having at least one health problem	266	29.5
Total	902	100.0

As shown in the following Table 21, the sample consisted of 591 users of PHTs. Most of them used their PHTs at moderate level. 91 % of participants used actively their PHTs. 69.2 % of participants did not pay for their PHT and used free versions of the technologies. Four broad categories of PHTs were defined, namely mobile applications, electronic health records, wearable and medical devices. First, they were allowed for multiple selections, if they used more than one PHT. Then, they were forced to choose one category for the rest of questionnaire. Approximately half of them used electronic health records. Second most frequently used PHT was

wearable followed by mobile applications. The least used category was medical devices.

Table 21. Usage Characteristics of the Final Study Participants

Usage		
	Frequency	Percent
User	591	65.5
Non-user	311	34.5
Total	902	100.0
Usage Frequency		
	Frequency	Percent
Never	311	34.5
Rare	54	6.0
Sometimes	214	23.7
Usually	247	27.4
Always	76	8.4
Total	902	100.0
Active Usage		
	Frequency	Percent
Yes	538	91.0
No	53	9.0
Total	591	100.0
Cost of PHT		
	Frequency	Percent
Free	409	69.2
Paid	182	30.8
Total	591	100.0
PHT Category*		
	Frequency	Percent
Mobile Health Applications	167	28.3
Electronic Health Records	289	48.9
Wearable	192	32.5
Medical Devices	123	20.8
PHT Category**		
	Frequency	Percent
Mobile Health Applications	151	25.5
Electronic Health Records	224	37.9
Wearable	145	24.5
Medical Devices	71	12.0
Total	591	100.0

Notes: *Allowed for multiple selection **Participants selected the category of most frequent used PHT and answered the questions of innovation attributes accordingly.

Participants were asked to specify their PHT, which they used most frequently. The most frequently stated PHTs were listed in the following Table 22.

Table 22. The list of most frequently reported PHTs

	PHTs
Mobile Health Applications	Fitwell, Lose it, Diyetkolik, Myfitnesspal, Apple iHealth, Samsung Health, Calorie Counter, Nike Run Club, Lifelog, Seven, Freeyl, Fit365, Runkeeper, Formda Kal Türkiye,
Electronic Health Records	E-nabız, Acıbadem, MHRS, Medibook
Wearable	Apple watch, Samsung gear watch, LG watch, Fitbit wrist band, Samsung fight wrist band,
Medical Devices	Glucosemeter, pedometer, blood pressure monitor, thermometer

7.4 Selection of data analysis method: Structural equation modeling

Structural Equation Modeling (SEM) is powerful tool in testing theories that contain multiple equations involving dependence relationships. Since SEM can examine multiple equations involving dependence relationships in the model, SEM was selected as data analysis method in the final study.

Hair et al. (2010) suggest a sample size cutoff of 500 for models containing large numbers of observed and unobserved variables. Because of conducting multi-group analysis for control variables, it was decided to have larger sample size than cutoff level. In the final study, more than 1000 questionnaires were gathered and 902 of them were included in SEM analysis.

Data analysis through SEM was conducted using a measurement model and a structural model. The measurement model was identified through confirmatory factor analysis (CFA), and indicates the relationship between the observed and unobserved variables. CFA provides the assessment of convergent and discriminant validity, which shows construct validity. CFA enables the evaluation of reliability through composite reliability. After CFA, the structural model was built by path analysis.

7.5 Data analysis and results

In order to test the theoretical model depicted in Figure 2, a measurement model was set with 15 latent constructs, followed by a structural model to test the hypotheses.

7.5.1 Measurement model: Confirmatory factor analysis

The measurement model in final study was analyzed using AMOS 24 statistical software. The solution produced by the maximum likelihood method showed all items loading strongly on their corresponding factors and their factor loadings being higher than 0.50 (Hair et al., 2010). On the other hand, Cronbach's alpha values were calculated for all constructs via SPSS 24 and all of them higher than 0.70 (Nunnally and Bernstein, 1994).

After running CFA, composite reliabilities (CR), average variance explained (AVE), average shared variance (ASV), and maximum shared variance (MSV) were calculated from standardized regression weights and correlations outputs. At first calculation, composite reliabilities of 15 constructs were higher than 0.70 cut-off value. Convergent validity is sufficient with AVE > 0.5 and CR > AVE for all constructs. But the discriminant validity measures are not satisfactory with MSV < AVE and ASV < AVE for all factors, as well as the square root of AVE being greater than inter-construct correlations. As a result, it was decided to observe and solve discriminant validity issues in the model.

First, attitude construct had high inter-construct correlations with relative advantage (0.913), ease of use (0.874), compatibility (0.885) and result demonstrability (0.863). These high correlations led to relatively low square root of AVE. Moreover, because of the high correlation with relative advantage, MSV (0.834) value was greater than AVE (0.712). Therefore, it was decided to drop the

attitude construct from the final model because of discriminant validity problem by referring the most of IS acceptance and innovation diffusion studies in which attitude construct were not used.

Secondly, the square root of AVE for compatibility (0.834) was lower than the inter-construct correlation with relative advantage (0.910) and ease of use (0.843). Moore and Benbasat (1991) were reported the same problem. They stated that although relative advantage and compatibility constructs were conceptually different, they were loaded under same factor in exploratory factor analysis. As a result, compatibility was omitted from the measurement model.

Thirdly, result demonstrability had high correlations with ease of use (0.906), relative advantage (0.881) and compatibility (0.824). Due to the high correlation with ease of use, MSV value (0.821) was greater than both AVE and square root of AVE. Although, in TAM2, result demonstrability was included as the determinants of perceived usefulness (relative advantage), result demonstrability could not be included as a determinant of relative advantage because it was highly correlated with ease of use too. As a result, result demonstrability was dropped from the final model.

Fourthly, health information seeking behavior showed high correlation with health motivation (0.822). In order to overcome the discriminant validity problem, second order factor was considered as health orientation, which was the combination of health motivation and health information seeking behavior. However, in that solution, health orientation had high correlation with innovativeness construct. Therefore, health information seeking behavior was omitted from the measurement model.

Lastly, innovativeness and domain specific self-efficacy constructs indicated high inter-construct correlation (0.878). Since their items were conceptually similar

to each other, it was decided to create second order factor as IT competence, which was the combination of innovativeness and domain specific self-efficacy constructs.

In terms of observed variables, items were eliminated from innovativeness, health motivation, relative advantage and ease of use constructs in order to utilize the highest-loading items and omit cross-loading items from each of the respective scales. This approach is consistent with recommendations in the psychometric literature (e.g., Nunnally and Bernstein 1994).

Reliability and validity values were calculated once more. CR value was greater than 0.70 for all constructs. Convergent validity was sufficient with AVE > 0.5 for all factors. The discriminant validity measures were also satisfactory with MSV < AVE and ASV < AVE for all factors, as well as the square root of AVE being greater than inter-construct correlations. As a result, construct reliability and validity of the factors were confirmed in the final measurement model according to the suggested cut-offs provided by Hair et al. (2010). All reliability and validity indicators were found in Appendix H.

After omissions and modifications, model fit was assessed. In evaluating model fit, it is advisable to use multiple fit indices to decrease the risk of incorrectly assessing the model by using a single fit index (Hair et al., 2010). The model fit measures in the measurement model can be found in Table 23 below. According to cut-off values revealed by Hair et al. (2010) and Janssens et al. (2008), both the goodness of fit and badness of fit indices indicate strong fit for the model. Therefore, in terms of model fit, there is no reason to reject the measurement model. The final set of items obtained at the end of the CFA is shown in Appendix I.

Table 23. Goodness of Fit Indices in the Measurement Model

Measure	Cut-off	Value
CMIN/df	<3	2.851
GFI	>0.90	0.917
AGFI	>0.80	0.893
NFI	>0.90	0.948
IFI	>0.90	0.965
TLI	>0.90	0.958
CFI	>0.90	0.965
RMSEA	<0.05	0.045
PCLOSE	>0.05	0.994
SRMR	<0.09	0.026

Before specifying the structural model, multivariate assumptions of linearity, multicollinearity and common method bias were checked. In order to test linearity, curve estimation analysis were conducted for all relationships in the model, and it was concluded that all relationships were linear. Multicollinearity was tested through conducting linear regression analysis with collinearity diagnostics. For every construct, regression analysis was run by putting one construct as a dependent variable and remaining ones set as independent variables. After conducting ten linear regression analysis, it was concluded that all variance inflation factors (VIF) were below 4 which was a strict cut-off value stated by Hair et al. (2010). In addition, tolerance values were over 0.3, which means that there was no significant multicollinearity problem. In order to test common method bias, Harman's single factor test was utilized. Exploratory factor analysis was conducted by setting number of factors to 1 without rotation. It was found that one factor explained 45% of the total variance, which was the under cut-off value 50 %. As a result, no significant common method bias was found in current data (Podsakoff et al., 2003).

7.5.2 Structural model: Path analysis and mediation analysis

The structural model was built with 10 latent variables and 32 observed variables identified in the CFA. Intention, relative advantage and ease of use were endogenous constructs, whereas image, enjoyment, trialability, price value, health information privacy concern were exogenous constructs. Health motivation and IT competence were moderators in the model. Age, gender, income level, education level, SES groups, health status, usage, usage frequency and categories of PHTs were control variables in the model. Structural model estimates were indicated in the following Table 24 and Figure 3.

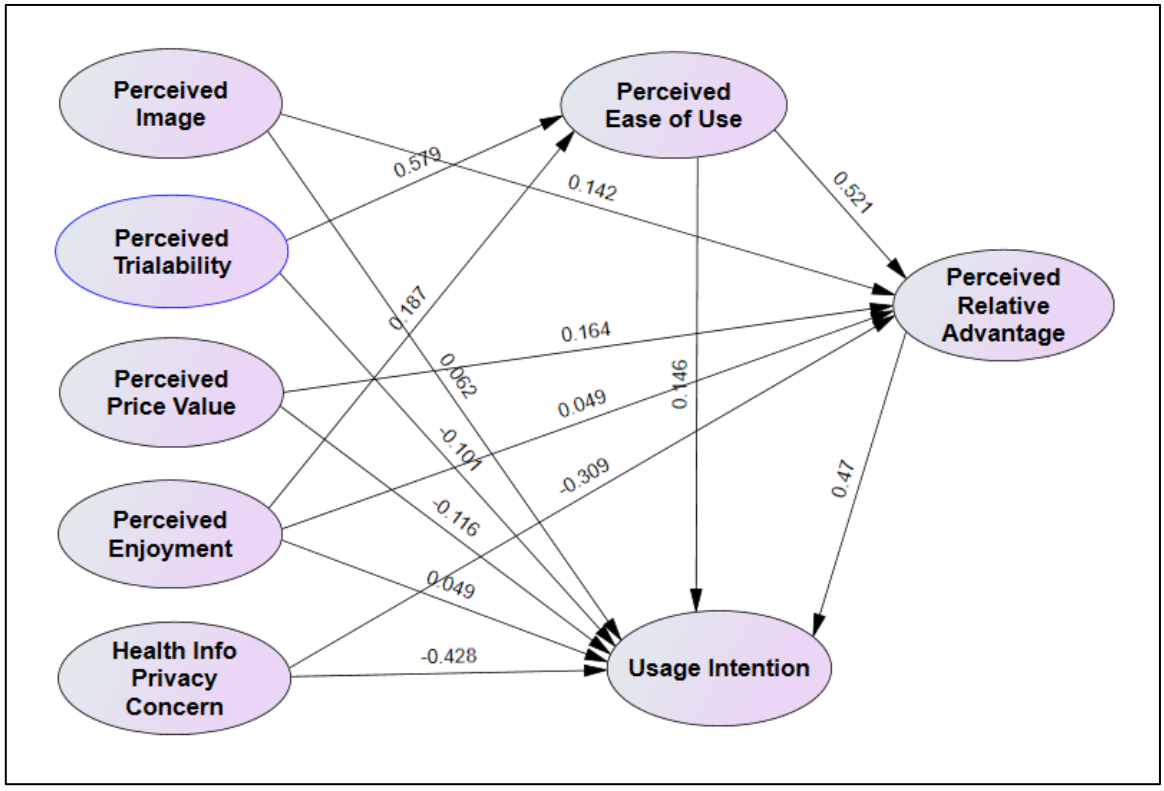


Figure 3. Structural Model with Standardized Estimates

According to the results of path analysis, 11 of 14 proposed relationships were supported in the structural model. Because of elimination of attitude, compatibility and result demonstrability in CFA phase due to the lack of discriminant validity, the hypotheses consisted of these constructs could not be tested.

The results confirmed that perceived relative advantage of PHT had a positive effect on usage intention (H1b). The standard estimate of the relationship was 0.470 and found statistically significant (p-value < 0.050). If the regression weights were observed, perceived relative advantage was the first determinant of usage intention in the model.

Table 24. Structural Model Estimates

Hypothesis	Relationship			Std. Estimate	p-value	Result
H1	IN	<---	RA	0.470	***	H1b-Supported
H3	IN	<---	EU	0.146	0.015	H3b-Supported
	RA	<---	EU	0.521	***	H3c-Supported
H5	IN	<---	TR	-0.101	0.094	H5b-Mediation
	EU	<---	TR	0.579	***	H5c-Supported
H6	IN	<---	IM	0.062	0.057	H6b-Mediation
	RA	<---	IM	0.142	***	H6c-Supported
H7	IN	<---	PR	-0.116	0.006	H7b-Rejected
	RA	<---	PR	0.164	***	H7c-Supported
H8	IN	<---	EN	0.049	0.356	H8b, H8c-Rejected
	EU	<---	EN	0.187	***	H8d-Supported
	RA	<---	EN	-0.033	0.455	H8e-Rejected
H10	IN	<---	PRV	-0.428	***	H10b-Supported
	RA	<---	PRV	-0.309	***	H10c-Supported

Notes: IM: Perceived Image, EN: Perceived Enjoyment, RA: Perceived Relative Advantage, IN: Usage Intention, EU: Perceived Ease of Use, TR: Perceived Trialability, PR: Perceived Price Value, PRV: Health Information Privacy Concern

The results also indicated that perceived ease of use has a positive direct effect on usage intention. The standard estimate of the relationship was 0.146 and found statistically significant (p-value < 0.050). In H3b, it was also proposed indirect effect of perceived ease of use on usage intention with the mediation of perceived relative advantage. As suggested in Hair et al. (2010), in order to test mediation, 2 steps process was utilized and applied in SEM. First, observed the correlation table and identified whether the relationships were significant or not. In second step, full structural model was run and standardized estimate and p value were observed for

direct effect with mediator. Furthermore, indirect effect and its significance were calculated with bootstrapping method available in SEM. The mediation results were reported in Table 25. Mediation results showed that perceived ease of use had indirect effect on usage intention over perceived relative advantage. H3b was confirmed with partial mediation. In H3c, positive impact of perceived ease of use on perceived relative advantage was proposed. H3c was confirmed with 0.521 as standardized regression coefficient and 0.000 as p-value.

It was found that perceived trialability did not have direct significant impact on usage intention (p-value=0.094>0.050). Mediated effect of trialability on usage intention was checked over perceived ease of use. Full mediation was confirmed with p value was greater than 0.050. Therefore, H5b was supported with full mediation.

It was proposed that perceived image has a positive effect on usage intention (H6b). The direct effect with mediator was not confirmed, since p-value (0.057) was slightly greater than the cut-off level (0.050). But, mediation analysis indicated that the indirect effect of perceived image on usage intention over perceived relative advantage was significant (p-value < 0.050). As a result, H6b was supported with full mediation.

On the other hand, perceived price value had significant effect on usage intention, since p-value (0.006) was greater than threshold. However, a negative impact was found, whereas a positive impact was proposed. As a result, H7b could not be accepted. In addition, indirect of perceived price value on usage intention was tested over perceived relative advantage and significant positive indirect effect was found.

As the final innovation attribute hypothesis, perceived enjoyment was predicted as one of antecedents of usage intention (H8b). However, proposed direct positive relationship between perceived enjoyment and usage intention was not confirmed. Indirect effect of enjoyment, perceived ease of use and perceived relative advantage as mediators, was not significant. As a result, H8b was rejected. H9 could not be tested, since attitude was omitted due to discriminant validity issues.

10b and 10c hypotheses related to health information privacy concern were confirmed. In H10b, negative effect of privacy concern on usage intention was proposed with the mediation of perceived relative advantage. The standard estimate of the relationship was 0.428 and found statistically significant (p-value < 0.050). Partial mediation was confirmed with significant indirect effect. In H10c, negative effect of privacy concern on relative advantage was proposed and confirmed with significant coefficient.

Table 25. Results of Mediation Analysis for All Data

Mediation*	Direct effect (Correlations)		Direct effect with mediator		Indirect effect (Bootstrapping)		Result
	Corr.	p	Estimate	p	Estimate	p	
H3b: EU->RA->IN	0.721	***	0.146	0.015	0.245	0.001	Partial
H5b: TR->EU->IN	0.587	***	-0.101	0.094	0.226	0.003	Full
H6b: IM->RA->IN	0.488	***	0.062	0.057	0.067	0.000	Full
H7b: PR->RA->IN	0.547	***	-0.116	0.006	0.077	0.002	Partial
H8b: EN->RA->IN	0.522	***	0.049	0.355	0.058	0.358	No
H8c: EN->EU->IN	0.522	***	0.049	0.355	0.058	0.358	No
H9b: PRV->RA->IN	-0.787	***	-0.428	***	-0.145	0.001	Partial

*IM: Perceived Image, EN: Perceived Enjoyment, RA: Perceived Relative Advantage, IN: Usage Intention, EU: Perceived Ease of Use, TR: Perceived Trialability, PR: Perceived Price Value, PRV: Health Information Privacy Concern

***p-value=0.000

7.5.3 Multi-group structural equation modeling: Moderation analysis

As it was suggested in Agarwal and Prasad (1998a), innovativeness was included as a moderator in the structural model. According to results of CFA, domain specific self-efficacy and innovativeness constructs were combined and built new construct, named it as IT competence, since it was found that they were highly correlated with each other and they were conceptually similar. In order to test moderator effect with multi group structural equation modeling (MSEM) analysis, interval scaled IT competence construct was converted into categorical moderator. For this purpose, K-means clustering analysis was conducted for the items of IT competence with 2, 3 and 4 cluster solutions. It was identified that 3-cluster solution was most appropriate one in terms of the number of observations in each cluster and the significant difference between centers of means for each item. The cluster numbers were assigned to each observation. The cluster analysis ended up with 3 groups, namely high IT competence (n=500), moderate IT competence (n=300) and low IT competence (n=102). In a similar manner, health motivation construct was turned into categorical moderator. K-means clustering analysis was conducted for 2, 3 and 4 cluster solutions. By taking into consideration of the significant difference between clusters and the number of observations in each cluster, it was decided on two clusters solution consisted of high health motivation (n=765) and low health motivation (n=137). The number of clusters was assigned to each observation. The group differences were confirmed with ANOVA and the results were indicated that both groups in IT competence and health motivation were significantly different from each other.

MSEM analysis was proposed in Hair et al. (2010) for testing moderation effect. Building sub-groups in MSEM was chosen instead of calculating interaction

variables. First of all, in order to conduct moderation analysis across sub-groups in structural model, invariance was tested in the measurement model. Technically, the model with equality constraints was compared with the model that allows the parameters to vary. As stated in Hair et al. (2010), invariance test was initially applied by creating constrained model and calculating chi-squares for each group. Chi-square difference test was applied, that indicates if the model fit significantly changed, when the estimates were constrained to be equal. If the difference was statistically significant, it was concluded that the moderation was supported.

Hair et al. (2010) suggested that since full invariance becomes more difficult to achieve, as models are more complex, partial invariance is accepted to continue with structural model comparisons for multiple sub-groups. According to results of invariance tests (chi-square difference test) of the measurement model, partial or full invariance was applied for the groups of gender, education, IT competence, usage frequency, and SES groups. Therefore, group comparisons can be made without concern that the differences are due to differing measurement properties. On the other hand, full or partial measurement invariance was not achieved for the groups of usage, health motivation, income, age, health status and PHT categories. Therefore, it was continued to analyze group differences with independent samples t-tests for the usage intention construct for the groups of usage, health motivation, income, age, health status and PHT categories.

First of all, chi-square difference test was conducted to the structural model for women and men. It was found that the model was not invariant for these groups. In order to understand details of the difference, the standard estimates and their significance were observed for all proposed paths in the model. Moderation results of gender are indicated in Table 26. Differences were found in 3 paths. The path

between perceived enjoyment and perceived ease of use was insignificant for women, whereas it was significant for men. The direct effect of perceived image on usage intention was significant for women, while it was not significant for men. Perceived price value had positive impact on perceived relative advantage for women, however this effect was not significant for men.

Table 26. Moderation Results for Gender

Standardized Regression Weights: Gender						
			Women		Men	
Sample Size			451		451	
Invariance Test			Chi-square: df=28, CMIN=72.994, p=0.000			
Path*			Estimate	P value	Estimate	P value
EU	<---	TR	0.575	***	0.611	***
EU	<---	EN	0.085	0.267	0.289	***
RA	<---	EU	0.491	***	0.573	***
RA	<---	EN	-0.073	0.171	0.061	0.493
RA	<---	IM	0.153	***	0.138	***
RA	<---	PRV	-0.337	***	-0.271	***
RA	<---	PR	0.224	***	0.02	0.769
IN	<---	RA	0.605	***	0.315	0.009
IN	<---	PRV	-0.39	***	-0.466	***
IN	<---	IM	0.146	***	-0.019	0.694
IN	<---	PR	-0.128	0.013	-0.159	0.041
IN	<---	EN	-0.042	0.492	0.168	0.102
IN	<---	TR	-0.084	0.249	-0.029	0.795
IN	<---	EU	0.098	0.129	0.15	0.255

Notes: *IM: Perceived Image, EN: Perceived Enjoyment, RA: Perceived Relative Advantage, IN: Usage Intention, EU: Perceived Ease of Use, TR: Perceived Trialability, PR: Perceived Price Value, PRV: Health Information Privacy Concern
**The results of structural weights invariance test
*** p value=0.000

The steps of mediation analysis were applied for women and men separately. The results of moderated mediation analysis for gender were indicated in Appendix J. Perceived relative advantage partially mediated 4 relationships (privacy, image, price value and ease of use) for women, whereas it didn't mediate any relationship for men. Perceived ease of use mediated fully the relationship between perceived

trialability and usage intention for both men and women. In addition, the relationship between perceived enjoyment and usage intention was not mediated by perceived ease of use and perceived relative advantage for both men and women.

Secondly, chi-square difference test was conducted to the structural model for moderate education and high education levels. It was found that the structural model was not invariant for these groups. In order to understand details of the difference the standard estimates and their significance were observed for all proposed paths in the model. Moderation results of education levels were indicated in Table 27. Differences were found in 3 paths. These paths were from ease of use to usage intention, from price value to relative advantage and from image to usage intention. The results of moderated mediation analysis were indicated in Appendix K.

Table 27. Moderation Results for Education

Standardized Regression Weights: Education						
			Moderate		High	
Sample Size			542		360	
Invariance Test			Chi-square: df=28, CMIN=88.112, p=0.000			
Path*			Estimate	P value	Estimate	P value
EU	<---	TR	1.391	***	0.423	***
EU	<---	EN	-0.603	***	0.277	***
RA	<---	EU	0.618	***	0.415	***
RA	<---	EN	0.016	0.753	0.019	0.781
RA	<---	IM	0.082	0.024	0.162	***
RA	<---	PRV	-0.149	***	-0.468	***
RA	<---	PR	0.178	***	0.073	0.267
IN	<---	RA	0.348	0.001	0.646	***
IN	<---	PRV	-0.545	***	-0.288	***
IN	<---	IM	0.084	0.046	0.038	0.473
IN	<---	PR	-0.067	0.258	-0.127	0.069
IN	<---	EN	0.403	0.055	-0.053	0.486
IN	<---	TR	-0.686	0.065	0.003	0.968
IN	<---	EU	0.393	0.025	0.093	0.226

Notes: *IM: Perceived Image, EN: Perceived Enjoyment, RA: Perceived Relative Advantage, IN: Usage Intention, EU: Perceived Ease of Use, TR: Perceived Trialability, PR: Perceived Price Value, PRV: Health Information Privacy Concern **The results of structural weights invariance test, *** p value=0.000

Thirdly, chi-square difference was run test to the structural model for high, moderate and low IT competence levels. It was found that the structural model was not invariant for these groups. In order to observe details of the difference, the standard estimates and their significance were observed for all proposed paths in the model. Moderation results of IT competence were indicated in Table 28. Differences were found in 5 paths. These paths were from enjoyment to ease of use, from image to relative advantage, from price to relative advantage, from privacy to relative advantage, and from ease of use to usage intention. The results of moderated mediation analysis for IT competence were summarized in Appendix L.

Table 28. Moderation Results for IT Competence

Standardized Regression Weights: IT Competence								
			High		Moderate		Low	
Sample Size			500		300		102	
Invariance Test			Chi-square: df=56, CMIN=153.825, p=0.000					
Path*			Estimate	P value	Estimate	P value	Estimate	P value
EU	<--	TR	0.385	***	0.514	***	0.635	***
EU	<--	EN	0.128	0.177	0.227	0.008	-0.036	0.783
RA	<--	EU	0.412	***	0.564	***	0.666	***
RA	<--	EN	0.098	0.138	-0.022	0.796	-0.104	0.31
RA	<--	IM	0.19	***	0.154	0.004	0.103	0.215
RA	<--	PRV	-0.469	***	-0.276	***	-0.116	0.195
RA	<--	PR	0.015	0.806	0.183	0.003	0.361	0.002
IN	<--	RA	0.714	***	0.418	***	0.537	0.043
IN	<--	PRV	-0.231	0.013	-0.358	***	-0.305	0.022
IN	<--	IM	0.019	0.729	-0.047	0.439	0.026	0.829
IN	<--	PR	-0.081	0.186	-0.139	0.049	-0.029	0.869
IN	<--	EN	0.104	0.206	0.027	0.791	-0.169	0.266
IN	<--	TR	-0.024	0.782	-0.132	0.163	-0.204	0.279
IN	<--	EU	-0.041	0.646	0.297	0.005	0.164	0.465

Notes: *IM: Perceived Image, EN: Perceived Enjoyment, RA: Perceived Relative Advantage, IN: Usage Intention, EU: Perceived Ease of Use, TR: Perceived Trialability, PR: Perceived Price Value, PRV: Health Information Privacy Concern
**The results of structural weights invariance test
*** p value=0.000

Since a composite construct was created from innovativeness and self-efficacy, H13 and H14 hypotheses were tested together. It was proposed that

innovativeness and self-efficacy moderates the relationship between perceived relative advantage and usage intention. (H13a, H14a). It was hypothesized that innovativeness and self-efficacy moderates the relationship between perceived ease of use and usage intention. (H13b, H14b). H13a, H13b, H14a, H14b were not confirmed, because the relationship between relative and usage intention were significant for all levels of IT competence. The standardized estimates changed, however but the change was not linear. On the other hand, the direct relationship between ease of use and usage intention was only significant for moderate level IT competence.

Fourthly, chi-square difference test was applied to the structural model for high and low usage frequency levels. It was found that the model was not invariant for these groups. Moderation results of usage frequency were shown in Table 29.

Table 29. Moderation Results for Usage Frequency

Standardized Regression Weights: Usage Frequency						
			Low		High	
Sample Size			268		323	
Invariance Test**			Chi-square: df=28, CMIN=134.776, p=0.000			
Path*			Estimate	P value	Estimate	P value
EU	<---	TR	0.246	0.043	0.273	0.007
EU	<---	EN	0.296	0.015	0.132	0.184
RA	<---	EU	0.414	***	0.49	***
RA	<---	EN	0.15	0.061	-0.001	0.995
RA	<---	IM	-0.058	0.333	0.071	0.321
RA	<---	PRV	-0.232	***	-0.359	***
RA	<---	PR	0.426	***	-0.01	0.912
IN	<---	RA	0.321	0.06	0.783	***
IN	<---	PRV	-0.321	***	-0.19	0.035
IN	<---	IM	0.007	0.913	-0.118	0.081
IN	<---	PR	0.263	0.029	0.078	0.351
IN	<---	EN	0.02	0.866	0.237	0.016
IN	<---	TR	-0.01	0.923	-0.044	0.625
IN	<---	EU	0.046	0.634	-0.131	0.208

Notes: *IM: Perceived Image, EN: Perceived Enjoyment, RA: Perceived Relative Advantage, IN: Usage Intention, EU: Perceived Ease of Use, TR: Perceived Trialability, PR: Perceived Price Value, PRV: Health Information Privacy

In order to observe in detail, the standard estimates and their significance were examined for all proposed paths in the model. Differences were found in 4 paths. These paths were from enjoyment to ease of use, from enjoyment to usage intention from price value to relative advantage and from price value to usage intention. Moderated mediation analysis were summarized in Appendix M.

Lastly, moderation analysis for SES groups was conducted as seen from Table 30. Significant differences were observed in 8 paths, from enjoyment to ease of use, from enjoyment to relative advantage, from image to relative advantage, from price value to relative advantage, from privacy to usage intention, from enjoyment to usage intention, from trialability to usage intention and from ease of use to usage intention.

Table 30. Moderation Results for SES Group

Standardized Regression Weights: SES Group								
			A		B		C1	
Sample Size			157		245		500	
Invariance Test			Chi-square: df=56, CMIN=118.255, p=0.000					
Path*			Estimate	P value	Estimate	P value	Estimate	P value
EU	<---	TR	0.292	0.003	0.547	***	0.892	***
EU	<---	EN	0.592	***	0.159	0.178	-0.111	0.18
RA	<---	EU	0.212	0.036	0.478	***	0.612	***
RA	<---	EN	0.411	0.018	0.021	0.809	-0.06	0.217
RA	<---	IM	0.07	0.389	0.117	0.042	0.122	***
RA	<---	PRV	-0.62	***	-0.322	***	-0.198	***
RA	<---	PR	-0.256	0.094	0.16	0.037	0.224	***
IN	<---	RA	0.824	***	0.586	***	0.395	0.006
IN	<---	PRV	-0.116	0.492	-0.408	***	-0.534	***
IN	<---	IM	-0.024	0.783	0.102	0.071	0.088	0.063
IN	<---	PR	-0.013	0.944	-0.141	0.067	-0.108	0.086
IN	<---	EN	-0.217	0.321	-0.094	0.371	0.21	0.01
IN	<---	TR	0.103	0.275	-0.038	0.705	-0.382	0.018
IN	<---	EU	0.124	0.334	0.139	0.113	0.223	0.08

*IM: Perceived Image, EN: Perceived Enjoyment, RA: Perceived Relative Advantage, IN: Usage Intention, EU: Perceived Ease of Use, TR: Perceived Trialability, PR: Perceived Price Value, PRV: Health Information Privacy Concern
**The results of structural weights invariance test
*** p value=0.000

Unlikely to other groups, enjoyment was significant determinant of relative advantage and ease of use for SES group A. Privacy concern was not significant determinant of usage intention for group A. Enjoyment, trialability and ease of use were significant determinants of usage intentions for Group C1. The results of moderated mediation analysis were summarized in Appendix N.

7.5.4 Analyzing effects of values on usage intention

The impact of values on usage intention was examined by conducting independent sample t-test. First, K-means cluster analysis was run in order to create groups having high or low values. As stated in hypothesis development section, 9 values were assigned to 3 categories. In first category, sense of belonging, well-respected, and warm relationship with others were included. First category was called as external/social. Results of cluster analysis for external/social values were indicated in Table 31 and Table 32.

Table 31. Final Cluster Centers for Social/external Values

	Cluster	
	Low	High
Sense_of_Belongingness	3.88	8.22
Warm_Relations	6.01	8.17
Well_Respected	6.39	8.30
N	116	785

Table 32. Mean of Intention across Social/external Values

Variable	Cluster Number of Case	N	Mean
Usage Intention	Low	116.00	4.36
	High	785.00	5.52

The result of t-test was significant for social/external values and positive relationship was demonstrated as indicated in Table 33. Positive relationship

between usage intention and social/external values was proposed. Therefore, H15a was confirmed.

Table 33. Independent Sample T-test for Social/External Values

	F	t	df	Sig.	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Diff.	
							Lower	Upper
Usage Intention	11.18	-7.66	140.84	0.0	-1.16	0.15	-1.46	-0.86

In second category, self-respect, self-fulfillment, sense of accomplishment and security were included. Second category was called as internal/non-hedonistic. Results of cluster analysis for internal/non-hedonistic values were indicated in Table 34 and Table 35.

Table 34. Final Cluster Centers for Internal/Non-Hedonistic Values

	Cluster	
	High	Low
Self-fulfillment	8.17	5.54
Security	8.46	5.78
Sense_of_Accomplishment	8.33	5.46
Self_Esteem	8.37	5.39
N	826	76

Table 35. Mean of Intention across Internal/Non-Hedonistic Values

Variable	Cluster Number of Case	N	Mean
Usage Intention	High	826.00	5.51
	Low	76.00	3.91

The result of t-test was significant for internal/non-hedonistic values and positive relationship was demonstrated as indicated in Table 36. Positive relationship between usage intention and internal/non-hedonistic values was proposed. Therefore, H15b was confirmed.

Table 36. Independent Sample T-test for Internal/Non-Hedonistic Values

	F	t	df	Sig.	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Diff.	
							Lower	Upper
Usage Intention	4.18	9.23	86.77	0.0	1.60	0.17	1.25	1.94

In third category, fun/enjoyment and excitement were included. Third category was called as hedonistic values. Results of cluster analysis for hedonistic values were indicated in Table 37 and Table 38.

Table 37. Final Cluster Centers for Hedonistic Values

	Cluster	
	High	Low
Fun	8.31	6.67
Excitement	8.09	4.06
N	732	170

The result of t-test was significant for hedonistic values and positive relationship was observed from Table 39. It was proposed that hedonistic values are negatively correlated with usage intention. However, mean values demonstrated positive relationship. Therefore, H15c was rejected.

Table 38. Mean of Intention across Hedonistic Values

Variable	Cluster	N	Mean
Usage Intention	High Hedonism	732	5.59
	Low Hedonism	170	4.44

Table 39. Independent Sample T-test for Hedonistic Values

	F	t	df	Sig.	Mean Diff.	Std. Err. Diff.	95% Confidence Interval of the Diff.	
							Lower	Upper
Usage Intention	71.23	7.98	206.78	0.00	1.14	0.14	0.86	1.42

7.5.5 Comparing users with potential users

Since groups' differences for users and potential users could not be examined by MSEM, mean differences were analyzed for each construct. As seen from Table 40, except for enjoyment, the mean differences were significant with respect to all other constructs. Users were prone to rate positively than potential users. Furthermore, in terms of privacy concern, users were more sensitive than potential users.

Table 40. Independent Samples T-test for Users and Potential Users

	F	t	df	Sig.	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Diff.	
							Lower	Upper
Intention	248.4	10.0	402.1	0.00	1.09	0.11	0.88	1.31
Attitude	209.5	7.8	395.1	0.00	0.68	0.09	0.51	0.85
Relative Advantage	125.4	8.4	422.6	0.00	0.75	0.09	0.58	0.93
Ease of Use	95.0	8.6	449.1	0.00	0.71	0.08	0.55	0.87
Price Value	31.1	2.2	491.0	0.03	0.16	0.07	0.01	0.30
Image	11.3	2.7	590.6	0.01	0.32	0.12	0.08	0.55
Enjoyment	16.0	1.7	552.4	0.09	0.14	0.08	-0.02	0.30
Trialability	39.9	3.9	500.4	0.00	0.37	0.10	0.18	0.56
Result Demonstrability	118.6	6.4	416.4	0.00	0.51	0.08	0.36	0.67
Compatibility	172.0	8.2	407.1	0.00	0.73	0.09	0.56	0.91
IT Competence	67.3	6.5	467.7	0.00	0.53	0.08	0.37	0.70
Privacy Concern	127.7	-8.2	437.4	0.00	-0.77	0.09	-0.95	-0.58
Health Motivation	41.9	3.9	470.1	0.00	0.29	0.07	0.14	0.43
Health Info Seeking	48.4	5.1	501.4	0.00	0.41	0.08	0.25	0.57

The results of all hypotheses were summarized in Appendix O.

7.5.6 Testing effects of health motivation on other constructs

According to the results of mean comparison by t-tests, there were significant differences in means between high and low health motivation levels. High health motivated individuals have higher mean levels for all constructs. High health motivation level was an indicator of high usage intention levels. Therefore, the moderation effect of health motivation on relationships could not be tested s (H12), but the differences in means were observed. The results were demonstrated in Table 41. Health information seeking behavior was omitted from the final model, H11 was not examined.

Table 41. Independent Samples T-test for Health Motivation

	F	t	df	Sig	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Diff.	
							Lower	Upper
Intention	17.21	9.86	170	0	1.38	0.14	1.10	1.66
Attitude	65.58	9.39	160	0	1.12	0.12	0.89	1.36
Relative Advantage	73.71	9.79	158	0	1.28	0.13	1.02	1.54
Ease of Use	52.39	8.99	160	0	1.09	0.12	0.85	1.33
Price Value	107.41	8.65	153	0	0.99	0.11	0.77	1.22
Image	1.07	9.30	900	0	1.36	0.15	1.07	1.65
Enjoyment	66.45	9.32	156	0	1.19	0.13	0.94	1.45
Trialability	47.33	9.67	163	0	1.31	0.14	1.04	1.58
Result Demonstrability	74.74	8.24	156	0	0.97	0.12	0.74	1.21
Compatibility	30.05	10.00	168	0	1.15	0.12	0.92	1.38
IT Competence	58.15	11.61	158	0	1.36	0.12	1.13	1.59
Privacy Concern	26.27	-9.75	169	0	-1.20	0.12	-1.44	-0.96
Health Motivation	136.22	26.07	152	0	2.06	0.08	1.90	2.21
Health Info Seeking	89.20	14.32	155	0	1.65	0.12	1.42	1.88

7.5.7 Testing effects of health status on other constructs

According to the results of mean comparison by t-tests reported in Table 42, there were no significant differences in mean between participants who have health problems and who have not any health problem except for usage intention. The usage intention was low for healthy people compared to people who have at least one health problem.

Table 42. Independent Samples T-test for Health Status

	F	t	df	Sig	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference	
							Lower	Upper
Intention	6.146	-2.828	580	0.01	-0.27	0.10	-0.46	-0.08
Attitude	0.413	-0.677	900	0.50	-0.05	0.08	-0.21	0.10
Relative Advantage	0.725	-0.738	900	0.46	-0.06	0.08	-0.23	0.10
Ease of Use	4.35	-0.668	561	0.50	-0.05	0.08	-0.20	0.10
Price Value	0.485	0.51	900	0.61	0.03	0.07	-0.10	0.17
Image	3.398	-1.326	900	0.19	-0.16	0.12	-0.40	0.08
Enjoyment	3.079	1.347	448	0.18	0.11	0.08	-0.05	0.28
Trialability	1.689	1.078	900	0.28	0.10	0.09	-0.08	0.28
Result Demonstrability	2.048	-1.321	897	0.19	-0.10	0.07	-0.24	0.05
Compatibility	1.518	0.281	897	0.78	0.02	0.08	-0.14	0.19
IT Competence	8.403	0.647	456	0.52	0.05	0.08	-0.11	0.21
Privacy Concern	0.059	0.241	900	0.81	0.02	0.09	-0.15	0.20
Health Motivation	1.12	-1.637	900	0.10	-0.11	0.07	-0.25	0.02
Health Info Seeking	0.656	0.499	897	0.62	0.04	0.08	-0.12	0.19

7.5.8 Testing effects of household income levels on other constructs

The means of variables were examined according to household monthly income of participants. As mentioned previously, approximately one third of participants did not disclose their income levels. T-tests were conducted in order to examine differences between less than 5000 TL and more than 5000 TL income levels. Significant differences were found in enjoyment, trialability, IT competence and health information seeking behavior as seen from Table 43. The mean levels of these four constructs are higher for more than 5000 TL income level. However, significant differences were not detected in main variables in the final model.

Table 43. Independent Samples T-test for Household Income

	F	t	df	Sig	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Diff.	
							Lower	Upper
Intention	2.87	-1.63	615	0.10	-0.20	0.12	-0.43	0.04
Attitude	2.25	-0.79	615	0.43	-0.08	0.10	-0.27	0.11
Relative Advantage	2.80	-0.83	615	0.41	-0.08	0.10	-0.29	0.12
Ease of Use	8.28	-0.41	514	0.68	-0.04	0.09	-0.22	0.14
Price Value	0.80	1.30	615	0.19	0.11	0.08	-0.05	0.26
Image	2.68	-1.35	615	0.18	-0.20	0.14	-0.48	0.09
Enjoyment	4.77	-2.02	482	0.04	-0.19	0.09	-0.37	-0.01
Trialability	10.6	-2.11	502	0.04	-0.23	0.11	-0.44	-0.02
Result Demonstrability	2.59	-0.55	612	0.58	-0.05	0.09	-0.23	0.13
Compatibility	1.61	-0.36	612	0.72	-0.04	0.10	-0.23	0.16
IT Competence	1.36	-1.71	615	0.09	-0.16	0.09	-0.35	0.02
Privacy Concern	0.50	-0.06	615	0.95	-0.01	0.10	-0.21	0.20
Health Motivation	1.28	-0.87	615	0.39	-0.07	0.08	-0.23	0.09
Health Info Seeking	7.75	-2.31	453	0.02	-0.22	0.10	-0.41	-0.03

7.5.9 Testing effect of age levels on other constructs

Since age intervals were more than 2, one-way ANOVA was conducted with post hoc tests. In Table 44, significant differences were reported. Most significant differences were observed in ease of use, result demonstrability, trialability, compatibility and IT competence. Young individuals rated these constructs higher than older ones. However, in terms usage intention, significant difference was not observed.

Table 44. ANOVA Results for Age Level Comparisons

Variable	Age Groups*		Mean Difference	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Attitude	3	2	-0.19	0.09	0.039	-0.36	-0.01
Relative Advantage	1	3	0.19	0.09	0.047	0.00	0.38
Ease of Use	1	3	0.31	0.09	0.001	0.13	0.48
	2	3	0.33	0.09	0.000	0.15	0.50
Enjoyment	2	3	0.20	0.09	0.029	0.02	0.38
Trialability	1	3	0.22	0.10	0.032	0.02	0.43
	2	3	0.23	0.11	0.030	0.02	0.44
Result Demonstrability	1	3	0.21	0.08	0.011	0.05	0.37
	2	3	0.18	0.08	0.028	0.02	0.35
Compatibility	1	3	0.25	0.09	0.007	0.07	0.43
	2	1	0.29	0.09	0.002	0.11	0.48
IT Competence	3	1	-0.29	0.09	0.001	-0.47	-0.12
Privacy Concern	3	1	0.23	0.10	0.021	0.04	0.43
Health Motivation	1	2	-0.14	0.07	0.070	-0.28	0.01

Notes: The mean difference is significant at the 0.05 level.

*Age group 1=25-34, Age group 2=35-44, Age group 3=45-60

CHAPTER 8

DISCUSSION OF THE RESULTS

It was found that perceived relative advantage was the most determinant of usage intention among all innovation attributes. The impact was validated for the different groups in terms of gender, education, socio-economic status, usage frequency and IT competence. Almost all technology adoption and usage studies included perceived relative advantage (usefulness) in their studies and found significant impacts on usage or adoption intentions/behaviors. Therefore, the important impact of perceived relative advantage was proven once more.

Although it was found that perceived ease of use had both direct and indirect effects on usage intention for whole sample, discrepancies were discovered among different groups. It had only indirect effect for women, and no indirect or direct effect for men. For the individuals who have moderate education level, perceived ease of use had both direct and indirect effect on usage intention, but for the individuals who have high education, it had only indirect effects over perceived relative advantage. What it means that increase in education level drops the impact of perceived ease of use on usage intention. The effect of perceived ease of use changed according to IT competence levels. On the other hand, for low frequent users, perceived ease of use had no impact on usage intention and for high frequent users, it had only indirect effects on usage intention. This result supported that increase in experience with innovations strengthens the beliefs about innovation. In terms of socio-economic status, for the individuals who have high level of status (SES-A), perceived ease of use has no effects. However, for B and C1 levels, perceived ease of use has indirect effect on usage intention over perceived relative advantage. The

significant effect of perceived ease of use on perceived relative advantage was consistent for all different groups. Davis et al. (1992) postulated that these were distinct but related constructs and since increase in perceived ease of use enables individuals to accomplish more work with same effort or time, the usage performance was improved.

Perceived trialability has indirect effect on usage intention except for moderate IT competence group, low usage frequency group and SES A group. Moore and Benbasat (1991) stated that trialability seemed to be weak predictor of adoption for their particular study. Because it had only indirect effects, it was concluded that perceived trialability was one of weak antecedents of usage intention in the study. Across all groups, the relationship between perceived ease of use and perceived trialability was significant.

The relationship between perceived image and usage intention was fully mediated by perceived relative advantage for whole sample. Nevertheless, it showed differences among groups. Being women and having moderate education level were indicators of both direct and indirect effects, whereas being men and having low competence level indicated that there was no effect. High education levels and high and moderate IT competence levels showed indirect effect. The path between perceived relative advantage and perceived image was not significant for low IT competence group, both low and high usage frequency groups and SES A group. Moore and Benbasat (1991) also found that perceived image seem to be weak predictor of adoption for their study.

Venkatesh et al (2012) proposed price value has a positive impact on intention to use. The positive relationship between usage intention and price value was not supported. On the other hand, the positive significant path between relative

advantage and price value demonstrated that great price value was ascribed as one of advantage. This result should be evaluated with free/paid ratio of PHTs in the sample. 69.2 % of users did not pay for their PHTs. These PHTs consisted of mobile health applications and electronic health records, which had free versions. Because of zero cost of PHTs, it was difficult to make meaningful inferences.

The impact of perceived enjoyment on usage was not significant directly or indirectly for whole sample. It had only direct effects on usage intention for the individuals who use PHTs in high frequency or belong to SES C1 group. Since using PHTs includes mostly utilitarian motivation, the impact of hedonic motivation could not be supported for most groups in the study. The paths from enjoyment to ease of use and relative advantage were also analyzed. Except for SES A group, the path to relative advantage was found as insignificant. The path to ease of use was significant for the individuals who belong to SES A, have low usage frequency level, have moderate IT competence level or are men. Furthermore, this relationship was significant for all education groups.

Angst and Agarwal (2009) observed that a direct relationship between privacy concern and behavioral intention was substantially supported by empirical studies. Bansal and Gefen (2010) postulated that higher privacy concern is negatively related to intention to disclose health information. Current study supported that high privacy concern is negatively related to usage intention directly. As it was expected, people are not willing to provide their sensitive health information while they have concerns regarding violation of confidentiality and abuse of trust. By contrast, as concern for privacy declines, individuals disclose information with little elaboration on the consequences. In current study, negative direct impact of health information

privacy concern was strongly supported across different groups. Only for SES A group, impact of privacy was indirect over relative advantage.

Important differences between women and men were investigated. Perceived ease of use did not affect usage intention directly or indirectly for men. On the other hand, perceived ease of use affected usage intention indirectly over perceived relative advantage. Perceived image did not have a significant impact on usage intention directly or indirectly for men, however, it has both direct and indirect impact on usage intention for women. Perceived price value and health information privacy concern have negative significant effects on usage intention directly and indirectly for women, whereas they have only direct effects for men.

The individuals with different education levels were compared. In the scope of current study, perceived ease of use and perceived image positively affect usage intention for moderately educated individuals, whereas they did not have significant direct influence for highly educated individuals. Ease of use and image had indirect effects over relative advantage on usage intention for highly educated people.

In terms of paths to usage intention, the most salient difference was observed in ease of use path for the levels of IT competence. For moderate and high IT competence levels direct or indirect effects of ease of use were found. However, ease of use had no effect for low IT competence individuals.

Users and potential users were compared to each other. The findings demonstrated that users had high ratings for innovation attributes than potential users. In terms of privacy concern, users were more sensitive than potential users. In addition, users were compared with each other by evaluating their usage frequency. Usage frequency moderated negatively the relationship between ease of use and enjoyment. For high level of usage frequency, the strength of link between ease of

use and enjoyment becomes insignificant. On the other hand, usage frequency moderated positively the relationship between usage intention and enjoyment. This finding suggested that if individuals use PHTs intensively, hedonic features provide them to continue to use their PHTs. If individuals use PHTS rarely, hedonic features enable them easiness to use PHTs.

The moderation effects of SES categorization were examined on proposed paths. High level of SES (group A) strengthened the paths from enjoyment to ease of use and relative advantage. It negatively moderated the direct relationship between ease of use and usage intention and the direct relationship between enjoyment and usage intention.

It was found that internal/non-hedonistic values had positive relation with usage intention. Similarly, the findings demonstrated that individuals who had high external/social values were prone to have high usage intentions. On the other hand, surprisingly, hedonistic values were also positively related to usage intention. However, a negative correlation was expected, since people, who are in the pursuit of fun, enjoyment and excitement, does not indicate preventive and cautious behaviors.

CHAPTER 9

IMPLICATIONS AND CONCLUSIONS

9.1 Summary and conclusions

Based on extant literature, there is limited knowledge related to beliefs, attitudes and intentions of consumers in the health technology arena. This research attempted to fill this gap. Thus, current study can serve as a foundation for future research regarding health technology acceptance and use of consumers.

This dissertation aimed to answer following questions: Do the perceived attributes of information technology (IT) innovations positively affect attitude toward the usage and usage intentions of IT innovations in the context of PHTs? If so, do individual characteristics positively moderate these relationships? Do contextual factors -health motivation; privacy concerns and health status- have impacts on the relationships? Are intentions to use IT innovations explained by values of individuals? Do the relationships in the research model vary in terms of the age, gender, education, income and socio-economic status? Do the usage differences in terms of frequency have impact on the relationships proposed in the research model?

The research model was built on diffusion of innovation theory and technology acceptance models in order to investigate the research questions. After constructing the model, the survey items were adapted from relevant literature in the light of the exploratory study and context dynamics. The survey tool was examined with a pilot study consisted of a student sample. By conducting face-to-face interviews, 902 observations were obtained and observations reflected the target population in the final study. The final research model was validated through confirmatory factor analysis (CFA) and revised accordingly. The revised final model

was tested with structural equation modeling (SEM). Mediation analysis was conducted through SEM with two mediators, namely relative advantage and ease of use. Multi-group structural equation modeling was utilized for moderation analysis.

Perceived relative advantage was found as the strongest positive determinant of usage intention, whereas privacy concern was delineated as the strongest negative determinant of usage intention. Powerful positive relationship between perceived ease of use and perceived relative advantage was proved, which was validated by multi-group analysis. In addition, positive impact of perceived ease of use on usage intention was demonstrated. Multi-group analysis indicated that the path of this impact changed with respect to individual and usage characteristics. For the majority of the groups, perceived ease of use had indirect effects on usage intention.

In the case of high frequency usage, perceived enjoyment became one of determinant of continue to use intention. Otherwise, it had only a positive relation with perceived ease of use. Perceived image was found as weak determinant of usage intention. It had only indirect effect for most groups. Exceptionally, perceived image affected usage intention through both direct path and indirect path for women. Another finding is related to perceived trialability. With few exceptions, perceived trialability affected usage intention indirectly and it was highly correlated with perceived ease of use. It was found that internal/non-hedonistic values had positive relation with usage intention. Similarly, the findings demonstrated that individuals who had high external/social values were prone to have high usage intentions.

9.2 Contribution to theory and implications for researchers

One of theoretical contributions of this study is investigating technology/innovation acceptance and use in end-user context. Most of technology/innovation acceptance

and use studies investigated behavioral intentions in organizational contexts. Price value, enjoyment and image constructs were included, which become important antecedents in consumer behavior studies.

The mediation effects of relative advantage and ease of use were delineated deeply. The power of relative advantage as a mediator was confirmed. Furthermore, it was demonstrated that how various individual characteristics influence the relationships in technology/innovation acceptance and use models. Gender, age, income, education and socio-economic status were demographic characteristics investigated in current study. Moderated mediation analysis was conducted for different levels of moderators. As of one finding of that analysis, image had direct effect on usage intention for women, however it had not direct or indirect effect for men.

Another theoretical contribution is that the impacts of contextual factors were observed, not studied in prior research. Health motivation, health status and privacy concern were investigated in this study. It was found that privacy concern was very strong antecedent of usage intention.

Low frequency users were compared with high frequency users. In addition, group differences between users and potential users were investigated.

IT competence construct was introduced within this study. Although, some studies conceptualized IT competence in business context formerly, it was defined in a different way with the combination of personal innovativeness and domain-specific (IT) self-efficacy.

Limited by our knowledge of relevant literature, this study is unique with respect to investigation of impacts of values on the dependent variable of technology acceptance and use models.

9.3 Implications for practitioners

Our findings have substantial implications for practitioners, particularly those in health-care industry. Primarily, developing new technologies requires deep evaluation of innovation attributes, individual characteristics of target customer base and usage contexts. Although relative advantage is very strong innovation attribute, other attributes should be taken into consideration for specific customer segments.

In addition, innovators should be aware of difference between initial usage intentions and continue to usage intentions. The importance of innovation attributes decrease or increase after adoption. Promoting both intentions in one innovation may be possible with improving usage experience while enhancing the perceptions of innovation attributes.

For PHT context, functionality and performance of the systems in the most critical issue. However, in order to enable at least moderate level of user experience (UX), developers should pay attention to user interface design and navigation.

Lastly, for health technology developments, providing the privacy of health information is a vital mission. Building secure systems and explicitly demonstrating rules and regulation about health data may enable to decrease concerns about privacy.

9.4 Limitations and suggestions for future research

In order to provide holistic view, a complex model was built and tested with mediators and moderators. However, because of discriminant validity issues, compatibility and result demonstrability constructs were dropped. Future studies may focus on including compatibility and result demonstrability by avoiding discriminant validity issues. Moreover, current scales of these two constructs can be redefined and

validated in various contexts. Including different dimensions to compatibility construct other than life style compatibility was suggested. For result demonstrability, current scale can be adopted through more concrete wording in accordance with the context. In addition, attitude toward usage could not be included in the final model due to high correlations with other constructs. Different scales may be utilized or new attitude scales can be developed for the context of information technology acceptance and use.

Being aware of the limitations regarding cross-sectional analysis, an exploratory study was conducted and both contextual factors and control variables were included in the model. Nevertheless, future studies should focus on collecting data at multiple time points.

Since the adoption or usage levels of personal health technology is very low, an experimental study can be designed and therefore, adoption and usage patterns/levels can be controlled in a more rigorous way.

APPENDIX A

DETAILED INFORMATION ON THE INTERVIEWEES

Dr. Sertaç Doğanay, graduated from Istanbul University, Faculty of Medicine, is one of the prominent opinion leaders on digital marketing and social media fields. He writes, talks, trains and works in the field of social media and digital marketing since 2010, after 10 years of marketing and sales management career in the pharmaceutical industry. He gives lectures in undergraduate and graduate programs of Galatasaray University, Istanbul University, Marmara University, Yıldız University, Yeni Yüzyıl University and Yakın Doğu University under the titles of marketing communication, digital marketing and social media. Since 2010, he has written articles on digital marketing, social media and digital health in industry publications such as Digital Age, Pharmaceutical Business Review, Farmagazine, Farmascope, Literature Actual, Health and Human, Hospital Manager, Reflex. Between 2012 and 2014, he has been the editor of the health and pharmaceutical sector of Turkey's leading social media site, socialmedia.co. He is the founder and author of "Tek Doz Dijital", the first and only in the field in Turkey and the number one thematic blog in the global arena. Since November 2012, he and his team offer regular updates on the use of digital technology and social media in the health and pharmaceutical industry. He is the founder of Social Touch, the agency that provides digital marketing and social media communications services for the drug and healthcare sector. He is a founding partner of LeadNeuro, Turkey's leading and full-fledged neuromarketing agency.

Bülent Bingül, graduated from Middle East Technical University as an electrical and electronics engineer, is an enterpreneur and avant-garde executive in the field of health-care technologies. He is the general manager of Medibook which is a start-up company operating and creating solutions for healthcare, medical device,

POC (Poinf of Care), digital marketing and software industries. From 2013, he is responsible for managing sales and marketing, R&D, commercialization and product development for integrated personalized healthcare, remote monitoring (POC), patient engagement and digital marketing solutions as a director in Invenoa which is a software company develops solutions, renders services and gives support to diverse industries including banking, leading, telecommunication, sports betting, healthcare. Between 1995 and 2012, he worked for Abbott, an American worldwide health care company operating in more than 150 countries. He was responsible from sales and marketing activity in more than 25 countries with P&L responsibility and budget, strategic management and implementation of tactical execution with countries, in Europe at director level.

APPENDIX B

SURVEY ITEMS FOR THE PILOT STUDY

Table A1. List of items in the Pilot Study

Innovation Attributes	Please rate your level of agreement for the following arguments about your personal health technology product on a scale from 1 (strongly disagree) to 7 (strongly agree).
Relative Advantage Moore & Benbasat (1991)	I find my personal health technology useful in my health management.
	Using personal health technology helps me manage my health more quickly.
	Using personal health technology improves the quality of my life.
	Using personal health technology gives me greater control over my health.
	Using personal health technology enhances my effectiveness in the management of my health.
	Using personal health technology makes it easier to manage my health.
	I find using personal health technology to be advantageous in my life.
Compatibility Moore Benbasat (1991)	Using personal health technology is compatible with all aspects of my life.
	Using personal health technology fits into my lifestyle.
	Using personal health technology is completely compatible with my current situation.
New Item	My personal health technology is compatible with other technologies I use.
Ease of Use Moore Benbasat (1991)	I believe it is easy to get my personal health technology to do what I want it to do.
	It is easy for me to become skillful at using personal health technology.
	Learning to use personal health technology is easy for me.
	I believe my personal health technology is easy to use.
Result Demonstrability Moore Benbasat (1991)	I have no difficulty telling others about the results of using the personal health technology.

	The results of using the personal health technology are apparent to me.
	I have difficulty explaining why using the personal health technology may or may not be beneficial. (R)
Trialability Moore Benbasat (1991)	I am permitted to use the personal health technology on a trial basis long enough to see what it could do.
	Before deciding to use the personal health technology, I am able to properly try it out.
Image Moore Benbasat (1991)	People who use the personal health technology have more prestige than those who do not.
	People who use the personal health technology have a high profile.
	Using the personal health technology is a status symbol.
Price Dodds et al (1991)	My personal health technology is reasonably priced.
	My personal health technology offers value for the money.
	My personal health technology is good product for the price.
	My personal health technology is economical.
Enjoyment Davis et al (1992)	I find using personal health technology to be enjoyable.
	The actual process of using personal health technology is pleasant.
	I have fun using personal health technology.
Health Information Privacy Concern Bansal et al. (2010)	Please rate your level of agreement for the following arguments on a scale from 1 (strongly disagree) to 7 (strongly agree).
	I believe that submitting health information on the personal health technology is highly advisable.
	Health information on the personal health technology, once submitted will not be abused at all.
	Health information on the personal health technology, once submitted will not be shared or sold to others.
Health Motivation Moorman (1990), Kraft & Goodell (1993)	Please rate your level of agreement for the following arguments on a scale from 1 (strongly disagree) to 7 (strongly agree).
	I try to prevent common health problems before I feel any symptoms

	I am concerned about common health hazards and try to take action to prevent them.
	I don't worry about the common health hazards until they come a problem for me or someone close to me (R)
	I don't take any action against common health hazards I hear about until I know I have a problem. (R)
	I am concerned about my health all the time.
Health Information Seeking Hong et al. (2009)	I often read and listen about health in various media.
	I often search health information on the Internet.
	I often talk about health with my friends, family or relatives
	I often ask health care providers about health information.
Innovativeness Agarwal & Prasad (1998b)	Please rate your level of agreement for the following statements on a scale from 1 (strongly disagree) to 7 (strongly agree).
	If I heard about a new information technology, I would look for ways to experiment with it.
	In general, I am hesitant to try out new information technologies. (R)
	Among my peers, I am usually the first to try out new information technologies.
	I like to experiment with new information technologies.
Self-efficacy Agarwal et al. (1998)	Please rate your level of agreement for the following statements about your usage of technological products/services on a scale from 1 (strongly disagree) to 7 (strongly agree).
	I would feel comfortable using technological products/services on my own.
	I could use technological products/services even if there was no one around to help.
	If I wanted to, I could easily use technological products/services on my own.
Values - LOV Kahle et al. (1986)	The following is a list of things that some people look for or want out of life. Please study the list carefully and then rate each thing on how important it is in your daily life, where 1 = very unimportant and 9 = very important.
	Sense of belonging

	Excitement
	Warm relationships with others
	Self-fulfillment
	Being well respected
	Fun and enjoyment of life
	Security
	Self-respect
	A sense of accomplishment
Attitude Karahanna et al. (1999), Taylor & Todd (1995), Tybout et al. (2005)	Please rate your level of agreement for the following statements on a scale from 1 (strongly disagree) to 7 (strongly agree).
	Using a personal health technology is a good idea.
	It is right to use a personal health technology.
	Using a personal health technology is necessary.
	Using a personal health technology is important.
	It is beneficial to use a personal health technology.
	It is reliable to use a personal health technology.
	My opinion to use a personal health technology is positive.
Intention Karahanna et al (1999), Davis (1989)	Please rate your level of agreement for the following statements on a scale from 1 (strongly disagree) to 7 (strongly agree).
	I intend to continue using my personal health technology in the future.
	I plan to continue to use my personal health technology regularly.

APPENDIX C

PERSONAL HEALTH TECHNOLOGY EXAMPLE

IN THE SURVEY FOR POTENTIAL ADOPTERS

HealthTuner wristband (a personal health technology) is a clinically accurate blood pressure monitor that provides real-time blood pressure readings. Its purpose is to help you, with/out chronic illness, in recording and managing your health data. The wristband also collects data like your steps, your calories burned, and your sleep quality, to give you a better picture of your health. HealthTuner also showed its monitor for the upper arm, which measures heartbeat and hypertension. You can get on-the-go blood pressure data without dealing with tubes and wires. The wristband and armband will project your data to its mobile app (iOS or Android). The mobile app warns you in case of unusual blood pressure and also sends health data to your authorized health care providers automatically. The wristband is comfortable, easy to wear and water-resistant. Its charge time is about one hour and it has battery life up to 5 days. It is recommended that charge your device every few days to ensure you are always tracking. With HealthTuner, you will manage your health better.

APPENDIX D

SCALE RELIABILITIES IN THE PILOT STUDY

Table A2. Cronbach's Alpha Statistics in the Pilot Study

	Users		Non-users	
	Cronbach's Alpha	N of Items	Cronbach's Alpha	N of Items
Attitude Toward Usage	0.834	7	0.920	7
Usage Intention	0.904	2	0.800	2
Perceived Relative Advantage	0.886	7	0.917	7
Perceived Compatibility	0.877	4	0.904	4
Perceived Ease of Use	0.758	4	0.928	4
Perceived Result Demonstrability	0.399	3	0.678	3
Perceived Trialability	0.601	2	0.508	2
Perceived Image	0.834	3	0.863	3
Perceived Price	0.889	4	0.860	4
Perceived Enjoyment	0.922	3	0.931	3

	Both groups	
	Cronbach's Alpha	N of Items
Health Information Privacy Concern	0.872	3
Health Motivation	0.813	5
Health Information Seeking	0.885	4
Innovativeness	0.787	4
Self-efficacy	0.879	3

APPENDIX E

DETAILS OF FACTOR ANALYSIS IN THE PILOT STUDY

Table A3. Communalities for Innovation Characteristics

Variables	Initial	Extraction
Rel_Adv1	1	0.648
Rel_Adv2	1	0.610
Rel_Adv3	1	0.680
Rel_Adv4	1	0.821
Rel_Adv5	1	0.795
Rel_Adv6	1	0.775
Rel_Adv7	1	0.657
Comp1	1	0.839
Comp2	1	0.858
Comp3	1	0.858
Comp4	1	0.599
Ease1	1	0.849
Ease2	1	0.768
Ease3	1	0.663
Ease4	1	0.745
Image1	1	0.820
Image2	1	0.696
Image3	1	0.840
Price1	1	0.772
Price2	1	0.811
Price3	1	0.841
Price4	1	0.890
Enjoy1	1	0.901
Enjoy2	1	0.928
Enjoy3	1	0.859
Note: Extraction Method: Principal Component Analysis.		

Table A4. Total variance explained statistics of Innovation Characteristics

	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	9.5	38.1	38.1	9.5	38.1	38.1	4.2	16.8	16.8
2	2.8	11.0	49.2	2.8	11.0	49.2	3.5	13.9	30.7
3	2.5	9.9	59.0	2.5	9.9	59.0	3.4	13.4	44.1
4	2.0	7.9	66.9	2.0	7.9	66.9	3.2	12.6	56.7
5	1.6	6.5	73.4	1.6	6.5	73.4	2.9	11.5	68.2
6	1.2	4.7	78.1	1.2	4.7	78.1	2.5	9.9	78.1
Notes: Extraction Method: Principal Component Analysis.									

Table A5. Communalities of Individual Characteristics and Contextual Factors

	Initial	Extraction
Heal_Ori1	1	0.587
Heal_Ori2	1	0.611
Heal_Ori3_R	1	0.707
Heal_Ori4_R	1	0.728
Heal_Ori5	1	0.731
Heal_Ori6	1	0.776
Heal_Ori7	1	0.777
Heal_Ori8	1	0.703
Heal_Ori9	1	0.648
Inno_Ori1	1	0.800
Inno_Ori2	1	0.784
Inno_Ori3	1	0.718
Self_Effi1	1	0.750
Self_Effi2	1	0.900
Self_Effi3	1	0.865
Privacy1_R	1	0.760
Privacy2_R	1	0.845
Privacy3_R	1	0.787
Note: Extraction Method: Principal Component Analysis.		

Table A6. Total variance explained statistics of Individual Characteristics and Contextual Factors

	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	5.58	30.98	30.98	5.58	30.98	30.98	3.51	19.52	19.52
2	2.98	16.56	47.54	2.98	16.56	47.54	2.59	14.41	33.93
3	2.47	13.72	61.26	2.47	13.72	61.26	2.57	14.28	48.21
4	1.44	7.98	69.24	1.44	7.98	69.24	2.45	13.59	61.80
5	1.01	5.63	74.88	1.01	5.63	74.88	2.35	13.08	74.88
Extraction Method: Principal Component Analysis.									

APPENDIX F

DETAILS OF LINEAR REGRESSION ANALYSIS IN THE PILOT STUDY

Table A7. Regression Model Summary for Attitude

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721[a]	0.520	0.518	0.67834
2	.769[b]	0.591	0.587	0.62791
3	.803[c]	0.645	0.640	0.58596
4	.815[d]	0.664	0.657	0.57196
5	.822[e]	0.676	0.668	0.56308
6	.826[f]	0.682	0.673	0.55882

Notes:
[a] Predictors: (Constant), Compatibility
[b] Predictors: (Constant), Compatibility, Relative_Advantage
[c] Predictors: (Constant), Compatibility, Relative_Advantage, Price
[d] Predictors: (Constant), Compatibility, Relative_Advantage, Price, Privacy_R
[e] Predictors: (Constant), Compatibility, Relative_Advantage, Price, Privacy_R, Enjoyment
[f] Predictors: (Constant), Compatibility, Relative_Advantage, Price, Privacy_R, Enjoyment, Image
[g] Dependent Variable: Attitude

Table A8. Regression Model Summary for Attitude of Users

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	USAGE = 1 (Selected)			
1	.556[a]	0.309	0.302	0.66201
2	.624[b]	0.390	0.376	0.62576
3	.678[c]	0.459	0.441	0.59243
4	.714[d]	0.510	0.488	0.56682
5	.731[e]	0.535	0.508	0.55571

Notes:
[a] Predictors: (Constant), Relative_Advantage
[b] Predictors: (Constant), Relative_Advantage, Price
[c] Predictors: (Constant), Relative_Advantage, Price, Compatibility
[d] Predictors: (Constant), Relative_Advantage, Price, Compatibility, Image
[e] Predictors: (Constant), Relative_Advantage, Price, Compatibility, Image, Privacy_R

Table A9. Regression Model Summary for Attitude of Potential Users

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	USAGE = 2 (Selected)			
1	.775[a]	0.600	0.596	0.64142
2	.815[b]	0.664	0.658	0.59046
3	.827[c]	0.683	0.675	0.57592
4	.835[d]	0.697	0.686	0.56527

Notes:
[a] Predictors: (Constant), Compatibility
[b] Predictors: (Constant), Compatibility, Relative_Advantage
[c] Predictors: (Constant), Compatibility, Relative_Advantage, Privacy_R
[d] Predictors: (Constant), Compatibility, Relative_Advantage, Privacy_R, Price

Table A10. Regression Model Summary for Intention of Users

Model	R		R Square	Adjusted R Square	Std. Error of the Estimate
	USAGE = 1 (Selected)	USAGE ~= 1 (Unselected)			
1	.615[a]		0.378	0.371	0.74274
2	.667[b]		0.445	0.432	0.70577
3	.694[c]		0.482	0.464	0.68547
4	.712[d]	0.681	0.508	0.485	0.67216

Notes:
[a] Predictors: (Constant), Attitude
[b] Predictors: (Constant), Attitude, Innovativeness
[c] Predictors: (Constant), Attitude, Innovativeness, Health_Info_Seeking
[d] Predictors: (Constant), Attitude, Innovativeness, Health_Info_Seeking, Enjoyment
[e] Unless noted otherwise, statistics are based only on cases for which USAGE = 1.
[f] Dependent Variable: Intention

Table A11. Regression Model Summary for Intention of Potential Users

Model	R		R Square	Adjusted R Square	Std. Error of the Estimate
	USAGE = 2 (Selected)	USAGE ~= 2 (Unselected)			
1	.663[a]		0.439	0.434	1.09463
2	.689[b]		0.475	0.465	1.06386
3	.711[c]	0.639	0.505	0.492	1.03759

Notes:
[a] Predictors: (Constant), Attitude
[b] Predictors: (Constant), Attitude, Enjoyment
[c] Predictors: (Constant), Attitude, Enjoyment, Price
[d] Unless noted otherwise, statistics are based only on cases for which USAGE = 2.
[e] Dependent Variable: Intention

APPENDIX G

SURVEY USED IN THE FINAL STUDY

Kişisel sağlık teknolojileri, sağlık kuruluşlarının dışında kullanılmak üzere tasarlanmış insan vücudu ile entegre çalışabilen bireysel olarak kullanılabilen cihazlar veya uygulamalardır. Kullanıcılara fizyolojik süreçlerini veya vücut aktivitelerini izlemelerini sağlar. İzleme sonucunda oluşan verileri kaydeder, kullanıcının bilgisine sunar. Yetki ve izinler dahilinde sağlık profesyonellerine kişilerin sağlık bilgilerini gönderebilir. Hastalara sağlık durumlarını ve sorunlarını yönetmekte yardımcı olur.

Kişisel Sağlık Teknolojileri Örnekleri:

- Spor aktivitelerini izlemek, sağlıklı beslenmek, kilo vermek veya almak gibi amaçlarla cep telefonlarına yüklenen Mobil Sağlık Uygulamaları - Örnekler; FitWell, Nike+ Run Club, Carrot Fit, 7 Dakikalık Egzersizler, Fooducate, Lose It!, Calorie Counter- Myfitnesspal, Formda Kal Türkiye, Fit365, Diyetkolik
- Elektronik sağlık kayıtlarınızı içeren sağlık durumunuzu ve/ya sorunlarınızı yönettiğiniz Dijital Tıbbi Uygulamalar - Örnekler: Medibook, E-nabız, Acıbadem, MHRS Mobil
- Nabız, kalori yakımı gibi vücut aktivitelerinizi izlemek, yağ kitlesi ve su seviyesi gibi değerlerinizi takip etmek, uykunuzu analiz etmek, spor aktivitelerinizi kaydetmek gibi amaçlar için kullandığınız Giyilebilir Teknolojiler - Örnekler: Fitbit Bilek Bandı, Jawbone Akıllı Bileklik, Apple Akıllı Saat, Samsung Akıllı Saat
- Sağlık durumunuzu analiz etmek ve/ya sağlık sorunlarınızı yönetmek amacıyla kan, ter,idrar, nabız ya da nefes gibi aktivitelerinizi/değerlerinizi ölçen ya da sağlık sorununuzu tedavi eden ve ilgili sonuçları akıllı telefonlarınızın sağlık uygulamalarına aktarabilen Sağlık Cihazları - Örnekler: Sensörlü Akıllı Haplar, Akıllı Ateşölçer, Akıllı Şekerölçer, Akıllı Nabız Monitörleri, Akıllı Solunum Monitörleri

1. Kişisel Sağlık Teknolojisi kullanıyor musunuz?

2. Lütfen kullandığınız Kişisel Sağlık Teknolojisi (leri)'nin kategorisini (lerini) seçin.

- Mobil Sağlık Uygulamaları
- Dijital Tıbbi Uygulamalar
- Giyilebilir Teknolojiler
- Sağlık Cihazları

3. Kişisel Sağlık Teknolojsi kullanmaktaki birincil amaçlarınız nelerdir?

- Sağlık durumumu yönetmek için
- Sağlık sorunlarımı yönetmek için
- Sağlık bilgilerimi sağlık uzmanları ile paylaşmak için
- Aile üyelerimin sağlıklarını izlemek için
- Gelecekteki sağlık sorunlarını önlemek için
- Yeme alışkanlıklarımı yönetmek (dengeli beslenme, kilo verme vb.).

- Spor aktivitelerimi izlemek ve analiz etmek için
- Diğer (Lütfen belirtiniz.)

4. Kişisel Sağlık Teknolojilerine ne kadar aşinasınız? 1 hiç aşina değilim 7 çok aşinayım olacak şekilde cevaplayınız.

5. Bu aşamada en sık ve düzenli kullandığınız Kişisel Sağlık Teknolojisini seçmeniz ve size yöneltilen soruları bu seçtiğiniz teknolojiyi düşünerek cevaplamanız gerekmektedir.

6. Lütfen en sık ve düzenli kullandığınız ve bir önceki soruda seçtiğiniz Kişisel Sağlık Teknolojisi ile ilgili mobil uygulama adı, marka/model gibi kısa bilgi giriniz. (Örnek: Fitbit Akıllı Bileklik, e-nabız uygulaması, fitwell sağlıklı beslenme uygulaması, omron şekerölçer gibi.)

7. Seçtiğiniz Kişisel Sağlık Teknolojisini ne sıklıkta kullanıyorsunuz ya da kullandınız? (Nadiren, Bazen, Sık sık, Her zaman)

8. Seçtiğiniz Kişisel Sağlık Teknolojisini şu an kullanıyor musunuz?

9. Kullandığınız Kişisel Sağlık Teknolojisi ücretsiz midir?

10. Lütfen önceki aşamada seçtiğiniz Kişisel Sağlık Teknolojisi ilgili aşağıdaki ifadelere katılım
seviyenizi 1'den (kesinlikle katılmıyorum) 7'ye kadar (kesinlikle katılıyorum) olan ölçekte değerlendirin.

- Sağlık yönetimimde yararlıdır.
- Sağlığımı yönetmem daha az zaman alıyor.
- Hayatımın kalitesini arttırıyor.
- Sağlığım üzerinde bana daha fazla kontrol sağlıyor.
- Sağlığımın yönetiminde etkinliğimi arttırıyor.
- Sağlığımı yönetmemi kolaylaştırıyor.
- Bu teknolojiyi kullanmayı avantajlı buluyorum.
- Hayatımın tüm yönleriyle uyumludur.
- Yaşam biçimime uyuyor.
- İçinde bulunduğum şimdiki durumumla tamamen uyumludur.
- Kullandığım diğer teknolojilerle uyumludur.
- Yapmasını istediğim şeyi yaptırmak kolaydır.
- Kullanmada ustalık kazanmak benim için kolay oldu.
- Kullanmayı öğrenmek benim için kolay oldu.
- Bu teknolojinin kullanımının kolay olduğuna inanıyorum.
- Verdiği sonuçlar ve bilgiler benim için anlaşılırdır.
- Verdiği sonuçları ve bilgileri başkalarına anlatmakta zorlanmıyorum.
- Neden yararlı olduğunu veya olmadığını açıklamakta güçlük çekmiyorum.
- Neler yapabileceğini görmek için yeterince uzun süre deneme fırsatım oldu.
- Kullanmaya karar vermeden önce bunu düzgün bir şekilde deneyebildim.
- Bu teknolojiyi kullananların daha fazla prestij sahibi olduğunu düşünüyorum.
- Bu teknolojiyi kullanan kişilerin gelir ve eğitim seviyelerinin yüksek olduğuna inanıyorum.
- Bu teknolojiyi kullanmanın bir statü sembolü olduğunu düşünüyorum.

- Kullandığım kişisel sağlık teknolojisi makul fiyatlıdır.
- Kullandığım kişisel sağlık teknolojisi ödediğim para için iyi bir değer sunar.
- Kullandığım kişisel sağlık teknolojisi fiyatına göre iyi bir üründür.
- Kullandığım kişisel sağlık teknolojisi ekonomiktir.
- Kişisel sağlık teknolojisi kullanmayı keyifli buluyorum.
- Kişisel sağlık teknolojisi kullanma süreci zevklidir.
- Kişisel sağlık teknolojisini kullanırken eğleniyorum.

11. Lütfen aşağıdaki ifadelere katılım seviyenizi 1'den (kesinlikle katılmıyorum) 7'ye (kesinlikle katılıyorum) olan bir ölçekte değerlendirin.

- Kişisel sağlık teknolojisi kullanmak iyi bir fikirdir.
- Kişisel sağlık teknolojisi kullanmak doğru bir seçimdir.
- Kişisel sağlık teknolojisi kullanmak gereklidir.
- Kişisel sağlık teknolojisi kullanmak önemlidir.
- Kişisel sağlık teknolojisi kullanmak faydalıdır.
- Kişisel sağlık teknolojisi kullanmak güvenlidir.
- Kişisel sağlık teknolojisi kullanmakla ilgili fikrim olumludur.

12. Lütfen aşağıdaki ifadelere katılım seviyenizi 1'den (kesinlikle katılmıyorum) 7'ye (kesinlikle katılıyorum) olan bir ölçekte değerlendirin.

- Gelecekte kişisel sağlık teknolojilerini kullanmaya devam etme niyetindeyim.
- Gelecekte kişisel sağlık teknolojilerini düzenli olarak kullanmayı planlıyorum.

13. Kişisel Sağlık Teknolojileri sağlık bilgilerinizi kaydeder ve saklar. Lütfen sağlık bilgilerinin gizliliği ile ilgili aşağıdaki ifadelere katılım seviyenizi 1'den (kesinlikle katılmıyorum) 7'ye (kesinlikle katılıyorum) olan bir ölçekte değerlendirin.

- Kişisel sağlık teknolojilerine sağlık bilgisini vermenin sakıncalı olmadığına inanıyorum.
- Kişisel sağlık teknolojilerine yüklenen sağlık bilgilerinin kötüye kullanılmayacağını düşünüyorum.
- Kişisel sağlık teknolojilerine yüklenen sağlık bilgilerinin izinsiz paylaşılmayacağını ve satılmayacağını düşünüyorum.

14. Lütfen aşağıdaki ifadelere katılım seviyenizi 1'den (kesinlikle katılmıyorum) 7'ye (kesinlikle katılıyorum) olan bir ölçekte değerlendirin.

- Herhangi bir semptom hissetmeden sağlık sorunlarını önlemeye çalışırım.
- Sağlık sorunlarından endişe duyarım ve bunları önlemek için elimden geleni yaparım.
- Kendimde ya da yakınlarımda bir sorun olmasa da sağlık sorunları beni endişelendirir.
- Bir sorunum olmasa da hastalıklara karşı tedbir alırım.
- Sağlığımla her zaman ilgilenmeye çalışırım.
- Çeşitli medyada sağlık hakkında okur ve dinlerim.
- İnternet'te sağlıkla ilgili arama yaparım.

- Arkadaşlarımla, ailemle veya akrabalarımla sağlık hakkında konuşurum.
- Sağlık uzmanlarından sağlıkla ilgili bilgiler edinirim.

15. Lütfen aşağıdaki Bilgi Teknolojileri ile ilgili ifadelere katılım seviyenizi 1'den (kesinlikle katılmıyorum) 7'ye (kesinlikle katılıyorum) olan bir ölçekte değerlendirin.

- Yeni bir bilgi teknolojisi hakkında bilgi aldıysam, onu deneme yollarını araştırırım.
- Yeni bilgi teknolojilerini test etmeyi severim.
- Akranlarım arasında genellikle yeni bilgi teknolojilerini deneyen ilk kişi ben olurum.
- Yeni bilgi teknolojilerini denemekten çekinmem.
- Bilgi teknolojilerini kendi başıma kullanırken rahat hissederim.
- Yardım edecek kimse olmasa bile bilgi teknolojilerini kullanabilirim.
- İstersem bilgi teknolojilerini kendi başıma kolayca kullanabilirim.

16. Aşağıdaki maddeler insanların hayattan istedikleri ve elde etmek için çabaladıkları şeylerin bir listesidir. Lütfen listeyi dikkatli bir şekilde inceleyin ve sonra günlük hayatınızda her maddenin sizin için ne kadar önemli olduğunu 1 = çok önemsiz ve 9 = çok önemli olacak şekilde değerlendirin.

- Aidiyet duygusu
- Heyecan
- Başkalarıyla iyi ilişkiler
- Kendini gerçekleştirme
- Saygın olma
- Hayattan keyif ve zevk alma
- Güvenlik
- Öz saygı
- Başarılı olma hissi

17. Herhangi bir sağlık sağlık sorununuz var mı? Varsa, lütfen sağlık sorununuzu belirtiniz.

- Hayır, herhangi bir sağlık sorunum yok.
- Diyabet
- Kalp ve damar hastalıkları
- Akciğer ve kronik solunum yolu hastalıkları
- Obezite
- Nörolojik hastalıklar
- Psikolojik hastalıklar
- Cilt hastalıkları
- Kanser
- Alerjiler
- Bağımlılık
- Eklem ve iskelet sistemi hastalıkları
- Göz hastalıkları
- Düşük ya da Yüksek Tansiyon
- Diğer (Lütfen belirtiniz.)

18. Lütfen cinsiyetinizi belirtiniz. (Erkek, Kadın)

19. Lütfen yaş aralığınızı seçiniz.

- 25 - 34 yaş arası
- 35 - 44 yaş arası
- 45 - 54 yaş arası
- 55 - 60 yaş arası

20. Lütfen eğitim seviyenizi seçiniz.

- İlköğretim Mezunu/Lise Öğrencisi
- Lise Mezunu
- Üniversite / Yüksekokul Öğrencisi
- Üniversite / Yüksekokul Mezunu
- Lisansüstü Öğrencisi
- Lisansüstü Mezunu

28. Son 1 yılda ortalama aylık hane halkı geliriniz nedir?

- 1,300 TL altı
- 1,300 TL - 5000 TL arası
- 5,001 TL -10,000 TL arası
- 10,001 TL - 20,000 TL arası
- 20,000 TL üstü

APPENDIX H

CONSTRUCT RELIABILITY AND VALIDITY FIGURES OF THE FINAL STUDY

Table A12. Construct Reliability and Validity Figures of the Final Study

	CR	AVE	MSV	ASV	EN	IM	PRV	HM	IN	PR	RA	EU	ITC	TR
EN	0.88	0.70	0.57	0.39	0.84									
IM	0.93	0.83	0.33	0.24	0.57	0.91								
PRV	0.91	0.77	0.62	0.41	-0.51	-0.46	0.87							
HM	0.83	0.54	0.52	0.36	0.66	0.47	-0.58	0.74						
IN	0.88	0.79	0.66	0.42	0.52	0.49	-0.79	0.56	0.89					
PR	0.85	0.60	0.53	0.38	0.68	0.42	-0.57	0.61	0.55	0.77				
RA	0.88	0.72	0.71	0.48	0.62	0.54	-0.75	0.59	0.82	0.70	0.85			
EOU	0.84	0.72	0.71	0.44	0.60	0.41	-0.69	0.58	0.72	0.73	0.84	0.85		
ITC	0.92	0.85	0.52	0.41	0.66	0.48	-0.70	0.72	0.70	0.64	0.61	0.67	0.92	
TR	0.86	0.76	0.57	0.39	0.76	0.57	-0.62	0.59	0.59	0.57	0.68	0.68	0.59	0.87

CR : Composite reliability
AVE : Average variance explained
MSV : Maximum shared variance
ASV : Average shared variance

EN : Enjoyment
IM : Image
PRV : Privacy
HM : Health motivation
IN : Intention

PR : Price
RA : Relative advantage
EOU : Ease of use
ITC : IT competence
TR : Trialability

APPENDIX I

ITEMS AND STANDARDIZED FACTOR LOADINGS IN THE FINAL STUDY

Table A13. Standardized Factor Loadings in the Final Study

Item Code	Item Description	Standardized Loadings
Perceived Relative Advantage		
RA1	Kullandığım kişisel sağlık teknolojisi sağlık yönetimimde yararlıdır.	0.846
RA6	Kullandığım kişisel sağlık teknolojisi sağlığımı yönetmemi kolaylaştırıyor.	0.840
RA7	Bu teknolojiyi kullanmayı avantajlı buluyorum.	0.843
Perceived Ease of Use		
EOU2	Kullanmada ustalık kazanmak benim için kolay oldu.	0.879
EOU3	Yapmasını istediğim şeyi yaptırmak kolaydır.	0.821
Perceived Trialability		
TR1	Neler yapabileceğini görmek için yeterince uzun süre deneme fırsatım oldu.	0.871
TR2	Kullanmaya karar vermeden önce bunu düzgün bir şekilde deneyebildim.	0.863
Perceived Image		
IM1	Bu teknolojiyi kullananların daha fazla prestij sahibi olduğunu düşünüyorum.	0.915
IM2	Bu teknolojiyi kullanan kişilerin gelir ve eğitim seviyelerinin yüksek olduğuna inanıyorum.	0.897
IM3	Bu teknolojiyi kullanmanın bir statü sembolü olduğunu düşünüyorum.	0.915
Perceived Price Value		
PR1	Kullandığım kişisel sağlık teknolojisi makul fiyatlıdır.	0.769
PR2	Kullandığım kişisel sağlık teknolojisi ödediğim para için iyi bir değer sunar.	0.790
PR3	Kullandığım kişisel sağlık teknolojisi fiyatına göre iyi bir üründür.	0.773
PR4	Kullandığım kişisel sağlık teknolojisi ekonomiktir.	0.763
Perceived Enjoyment		
EN1	Kişisel sağlık teknolojisi kullanmayı keyifli buluyorum.	0.820
EN2	Kişisel sağlık teknolojisi kullanma süreci zevklidir.	0.871
EN3	Kişisel sağlık teknolojisini kullanırken eğleniyorum.	0.819
Intention		
IN1	Gelecekte kişisel sağlık teknolojilerini kullanmaya devam etme niyetindeyim.	0.908
IN2	Gelecekte kişisel sağlık teknolojilerini düzenli olarak kullanmayı planlıyorum.	0.870

Health Information Privacy Concern		
PRV1	Kişisel sağlık teknolojilerine sağlık bilgisini vermenin sakıncalı olduğuna inanıyorum.	0.855
PRV2	Kişisel sağlık teknolojilerine yüklenen sağlık bilgilerinin kötüye kullanılacağını düşünüyorum.	0.869
PRV3	Kişisel sağlık teknolojilerine yüklenen sağlık bilgilerinin izinsiz paylaşılacağını ve satılacağını düşünüyorum.	0.900
Health Motivation		
HM2	Sağlık sorunlarından endişe duyarım ve bunları önlemek için elimden geleni yaparım.	0.802
HM3	Kendimde ya da yakınlarımda bir sorun olmasa da sağlık sorunları beni endişelendirir.	0.718
HM4	Bir sorunum olmasa da hastalıklara karşı tedbir alırım.	0.658
HM5	Sağlığımla her zaman ilgilenmeye çalışırım.	0.762
IT Competence		
ITC1 (INV2)	Yeni bilgi teknolojilerini test etmeyi severim.	0.885
ITC2 (INV3)	Akranlarım arasında genellikle yeni bilgi teknolojilerini deneyen ilk kişi ben olurum.	0.828
ITC3 (INV4)	Yeni bilgi teknolojilerini denemekten çekinmem.	0.832
ITC4 (SE1)	Bilgi teknolojilerini kendi başıma kullanırken rahat hissederim.	0.837
ITC5 (SE2)	Yardım edecek kimse olmasa bile bilgi teknolojilerini kullanabilirim.	0.820
ITC6 (SE3)	İstersem bilgi teknolojilerini kendi başıma kolayca kullanabilirim.	0.793

APPENDIX J

MODERATED MEDIATION RESULTS IN THE FINAL STUDY: GENDER

Table A14. Moderated Mediation Results in the Final Study: Gender

	Mediation*	Direct effect (Correlations)		Direct effect with mediator		Indirect effect Bootstrapping	Result **
		Corr.	p	Estimate	p	p	
All Groups	PRV->RA->IN	-0.787	***	-0.428	***	0.001	Partial
	IM->RA->IN	0.488	***	0.062	0.057	0.000	Full
	PR->RA->IN	0.547	***	-0.116	0.006	0.002	Partial
	EN->RA->IN	0.522	***	0.049	0.355	0.358	No
	TR->EU->IN	0.587	***	-0.101	0.094	0.003	Full
	EU->RA->IN	0.721	***	0.146	0.015	0.001	Partial
	EN->EU->IN	0.522	***	0.049	0.355	0.358	No
Women	PRV->RA->IN	-0.816	***	-0.390	***	***	Partial
	IM->RA->IN	0.499	***	0.146	***	0.001	Partial
	PR->RA->IN	0.589	***	-0.128	0.013	0.003	Partial
	EN->RA->IN	0.472	***	-0.042	0.492	0.912	No
	TR->EU->IN	0.471	***	-0.084	0.249	0.018	Full
	EU->RA->IN	0.768	***	0.098	0.129	0.001	Full
	EN->EU->IN	0.472	***	-0.042	0.492	0.912	No
Men	PRV->RA->IN	-0.760	***	-0.466	***	0.068	No
	IM->RA->IN	0.481	***	-0.019	0.694	0.054	No
	PR->RA->IN	0.518	***	-0.159	0.041	0.703	No
	EN->RA->IN	0.600	***	0.168	0.102	0.105	No
	TR->EU->IN	0.643	***	-0.029	0.795	0.022	Full
	EU->RA->IN	0.680	***	0.150	0.255	0.059	No
	EN->EU->IN	0.600	***	0.168	0.102	0.105	No

Notes: *IM: Perceived Image, EN: Perceived Enjoyment, RA: Perceived Relative Advantage, IN: Usage Intention, EU: Perceived Ease of Use, TR: Perceived Trialability, PR: Perceived Price Value, PRV: Health Information Privacy Concern

**Partial= Partial Mediation, Full=Full Mediation, No=No Mediation, NS= No Significance, ***p value=0.000

APPENDIX K

MODERATED MEDIATION RESULTS IN THE FINAL STUDY: EDUCATION

Table A15. Moderated Mediation Results in the Final Study: Education

	Mediation*	Direct effect (Correlations)		Direct effect with mediator		Indirect effect Bootstrapping	Result **
		Corr.	p	Estimate	p	p	
All Groups	PRV->RA->IN	-0.787	***	-0.428	***	0.001	Partial
	IM->RA->IN	0.488	***	0.062	0.057	0.000	Full
	PR->RA->IN	0.547	***	-0.116	0.006	0.002	Partial
	EN->RA->IN	0.522	***	0.049	0.355	0.358	No
	TR->EU->IN	0.587	***	-0.101	0.094	0.003	Full
	EU->RA->IN	0.721	***	0.146	0.015	0.001	Partial
	EN->EU->IN	0.522	***	0.049	0.355	0.358	No
Education: Moderate	PRV->RA->IN	-0.800	***	-0.545	***	0.037	Partial
	IM->RA->IN	0.519	***	0.084	0.046	0.035	Partial
	PR->RA->IN	0.575	***	-0.067	0.258	0.014	Full
	EN->RA->IN	0.609	***	0.403	0.055	0.214	No
	TR->EU->IN	0.651	***	-0.686	0.065	0.006	Full
	EU->RA->IN	0.759	***	0.393	0.025	0.019	Partial
	EN->EU->IN	0.609	***	0.403	0.055	0.214	No
Education: High	PRV->RA->IN	-0.766	***	-0.288	***	0.001	Partial
	IM->RA->IN	0.445	***	0.038	0.473	0.003	Full
	PR->RA->IN	0.487	***	-0.127	0.069	0.454	No
	EN->RA->IN	0.391	***	-0.053	0.486	0.178	No
	TR->EU->IN	0.506	***	0.003	0.968	0.001	Full
	EU->RA->IN	0.660	***	0.093	0.226	0.001	Full
	EN->EU->IN	0.391	***	-0.053	0.486	0.178	No

Notes: *IM: Perceived Image, EN: Perceived Enjoyment, RA: Perceived Relative Advantage, IN: Usage Intention, EU: Perceived Ease of Use, TR: Perceived Trialability, PR: Perceived Price Value, PRV: Health Information Privacy Concern

**Partial= Partial Mediation, Full=Full Mediation, No=No Mediation, NS= No Significance

***p value=0.000

APPENDIX L

MODERATED MEDIATION RESULTS IN THE FINAL STUDY: IT COMPETENCE

Table A16. Moderated Mediation Results in the Final Study: IT Competence

	Mediation*	Direct effect (Correlations)		Direct effect with mediator		Indirect effect Bootstrapping	Result **
		Corr.	p	Estimate	p	p	
High IT Competence	PRV->RA->IN	-0.639	***	-0.231	0.013	0.006	Partial
	IM->RA->IN	0.365	***	0.019	0.729	0.006	Full
	PR->RA->IN	0.419	***	-0.081	0.186	0.786	No
	EN->RA->IN	0.273	***	0.104	0.206	0.220	No
	TR->EU->IN	0.447	***	-0.024	0.782	0.024	Full
	EU->RA->IN	0.533	***	-0.041	0.646	0.004	Full
	EN->EU->IN	0.273	***	0.104	0.206	0.220	No
Moderate IT Competence	PRV->RA->IN	-0.642	***	-0.358	***	0.008	Partial
	IM->RA->IN	0.249	***	-0.047	0.439	0.003	Full
	PR->RA->IN	0.249	***	-0.139	0.049	0.025	Partial
	EN->RA->IN	0.323	***	0.027	0.791	0.244	No
	TR->EU->IN	0.366	***	-0.132	0.163	0.074	No
	EU->RA->IN	0.632	***	0.297	0.005	0.007	Partial
	EN->EU->IN	0.323	***	0.027	0.791	0.244	No
Low IT Competence	PRV->RA->IN	-0.639	***	-0.305	0.022	0.230	No
	IM->RA->IN	0.365	***	0.026	0.829	0.264	No
	PR->RA->IN	0.419	***	-0.029	0.869	0.100	No
	EN->RA->IN	0.273	***	-0.169	0.266	0.460	No
	TR->EU->IN	0.447	***	-0.204	0.279	0.007	Full
	EU->RA->IN	0.533	***	0.164	0.465	0.114	No
	EN->EU->IN	0.273	***	-0.169	0.266	0.460	No

Notes: *IM: Perceived Image, EN: Perceived Enjoyment, RA: Perceived Relative Advantage, IN: Usage Intention, EU: Perceived Ease of Use, TR: Perceived Trialability, PR: Perceived Price Value, PRV: Health Information Privacy Concern

**Partial= Partial Mediation, Full=Full Mediation, No=No Mediation, NS= No Significance ***p value=0.000

APPENDIX M

MODERATED MEDIATION RESULTS IN THE FINAL STUDY:

USAGE FREQUENCY

Table A17. Moderated Mediation Results in the Final Study: Usage Frequency

	Mediation*	Direct effect (Correlations)		Direct effect with mediator		Indirect effect Bootstrapping	Result **
		Corr.	p	Estimate	p	p	
All Groups	PRV->RA->IN	-0.787	***	-0.428	***	0.001	Partial
	IM->RA->IN	0.488	***	0.062	0.057	0.000	Full
	PR->RA->IN	0.547	***	-0.116	0.006	0.002	Partial
	EN->RA->IN	0.522	***	0.049	0.355	0.358	No
	TR->EU->IN	0.587	***	-0.101	0.094	0.003	Full
	EU->RA->IN	0.721	***	0.146	0.015	0.001	Partial
	EN->EU->IN	0.522	***	0.049	0.355	0.358	No
Usage Frequency: Low	PRV->RA->IN	-0.746	***	-0.321	***	0.148	No
	IM->RA->IN	0.397	***	0.007	0.913	0.297	No
	PR->RA->IN	0.785	***	0.263	0.029	0.177	No
	EN->RA->IN	0.506	***	0.020	0.866	0.350	No
	TR->EU->IN	0.474	***	-0.010	0.923	0.400	No
	EU->RA->IN	0.680	***	0.046	0.634	0.163	No
	EN->EU->IN	0.506	***	0.020	0.866	0.530	No
Usage Frequency: High	PRV->RA->IN	-0.618	***	-0.190	0.035	0.001	Partial
	IM->RA->IN	0.066	***	-0.118	0.081	0.261	No
	PR->RA->IN	0.478	***	0.078	0.351	0.918	No
	EN->RA->IN	0.421	***	0.237	0.016	0.688	No
	TR->EU->IN	0.341	***	-0.044	0.625	0.049	Full
	EU->RA->IN	0.496	***	-0.131	0.208	***	Full
	EN->EU->IN	0.421	***	0.237	0.016	0.688	No

Notes: *IM: Perceived Image, EN: Perceived Enjoyment, RA: Perceived Relative Advantage, IN: Usage Intention, EU: Perceived Ease of Use, TR: Perceived Trialability, PR: Perceived Price Value, PRV: Health Information Privacy Concern

**Partial= Partial Mediation, Full=Full Mediation, No=No Mediation, NS= No Significance
***p value=0.000

APPENDIX N

MODERATED MEDIATION RESULTS IN THE FINAL STUDY: SES GROUPS

Table A18. Moderated Mediation Results in Final Study: SES Groups

	Mediation*	Direct effect (Correlations)		Direct effect with mediator		Indirect effect Bootstrapping	Result **
		Corr.	p	Estimate	p	p	
SES: A	PRV->RA->IN	-0.784	***	-0.116	0.492	0.017	
	IM->RA->IN	0.476	***	-0.024	0.783	0.460	No
	PR->RA->IN	0.547	***	-0.013	0.944	0.145	No
	EN->RA->IN	0.517	***	-0.217	0.321	0.102	No
	TR->EU->IN	0.592	***	0.103	0.275	0.094	No
	EU->RA->IN	0.721	***	0.124	0.334	0.198	No
	EN->EU->IN	0.517	***	-0.217	0.321	0.102	No
SES: B	PRV->RA->IN	-0.782	***	-0.408	***	0.001	Partial
	IM->RA->IN	0.469	***	0.102	0.071	0.032	Full
	PR->RA->IN	0.504	***	-0.141	0.067	0.130	No
	EN->RA->IN	0.561	***	-0.094	0.371	0.402	No
	TR->EU->IN	0.616	***	-0.038	0.705	0.015	Full
	EU->RA->IN	0.710	***	0.139	0.113	0.001	Full
	EN->EU->IN	0.561	***	-0.094	0.371	0.402	No
SES: C1	PRV->RA->IN	-0.784	***	-0.534	***	0.035	Partial
	IM->RA->IN	0.476	***	0.088	0.063	0.035	Full
	PR->RA->IN	0.547	***	-0.108	0.086	0.026	Full
	EN->RA->IN	0.517	***	0.210	0.010	0.516	No
	TR->EU->IN	0.592	***	-0.382	0.018	0.006	Partial
	EU->RA->IN	0.517	***	0.223	0.080	0.046	Full
	EN->EU->IN	0.517	***	0.210	0.010	0.516	No

Notes: *IM: Perceived Image, EN: Perceived Enjoyment, RA: Perceived Relative Advantage, IN: Usage Intention, EU: Perceived Ease of Use, TR: Perceived Trialability, PR: Perceived Price Value, PRV: Health Information Privacy Concern

**Partial= Partial Mediation, Full=Full Mediation, No=No Mediation, NS= No Significance

***p value=0.000

APPENDIX O

SUMMARY OF THE HYPOTHESES IN THE FINAL STUDY

Table A19. Summary of the Hypotheses in the Final Study

No	Hypothesis	Result
H1	Perceived relative advantage of PHT has a positive effect on attitude toward usage (H1a) and usage intention (H1b).	H1a: Not tested H1b: Supported
H2	Perceived compatibility of the PHT has a positive effect on the attitude toward usage (H2a) and usage intention (H2b) mediated by perceived relative advantage.	H2a: Not tested H2b: Not tested
H3	Perceived ease of use of PHT has both a positive impact on attitude toward usage (H3a) and usage intention (H3b) mediated by perceived relative advantage. Perceived ease of use has a positive effect on perceived relative advantage (H3c).	H3a: Not tested H3b: Supported H3c: Supported
H4	Perceived result demonstrability of the PHT has a positive effect on attitude toward usage (H4a) and usage intention (H4b) mediated by perceived relative advantage.	H4a: Not tested H4b: Not tested
H5	Perceived trialability of the PHT has a positive effect on attitude toward usage (H5a) and usage intention (H5b) mediated by perceived ease of use. Perceived trialability has a positive effect on perceived ease of use (H5c).	H5a: Not tested H5b: Supported H5c: Supported
H6	The perceived image of the PHT has a positive effect on attitude toward usage (H6a), and usage intention (H6b) mediated by perceived relative advantage. The perceived image has a positive effect on perceived relative advantage (H6c).	H6a: Not tested H6b: Supported H6c: Supported
H7	Perceived price value of the PHT has a positive effect on attitude toward usage (H7a) and usage intention (H7b) mediated by relative advantage. Perceived price value of the PHT has a positive effect on perceived relative advantage (H7c).	H7a: Not tested H7b: Rejected H7c: Supported
H8	Perceived enjoyment of the PHT has a positive effect on attitude toward usage (H8a) and usage intention mediated by perceived ease of use (H8b) perceived relative advantage (H8c). Perceived enjoyment has positive effects on perceived ease of use (H8d) and perceived relative advantage (H8e).	H8a: Not tested H8b: Rejected H8c: Rejected H8d: Supported H8e: Rejected
H9	Attitude toward usage has a positive effect on usage intention.	H9: Not tested

H10	Health information privacy concern has a negative effect on attitude toward usage (H10a) and usage intention (H10b), mediated by perceived relative advantage. Health information privacy concern has negative impact on perceived relative advantage (H10c).	H10a: Not tested H10b: Supported H10c: Supported
H11	Health information seeking behavior moderates the relationship between the innovation attributes of PHTs and usage intention.	Not tested
H12	Health motivation moderates the relationship between perceived relative advantage and usage intention. Higher level of health motivation strengthens the relationship between relative advantage and usage intention.	Not tested
H13 & H14	Innovativeness moderates the relationship between perceived relative advantage and usage intention. (H13a). Innovativeness moderates the relationship between perceived ease of use and usage intention. (H13b). Self-efficacy moderates the relationship between the perceived relative advantage and usage intention (H14a). Self-efficacy moderates the relationship between perceived ease of use and usage intention. (H14b).	H13a: Rejected H13b: Rejected H14a: Rejected H14b: Rejected
H15	The importance of sense of belonging, well-respected, warm relationships with others, will have positive effects on usage intention (H15a). The importance of self-respect, self-fulfillment, sense of accomplishment and security will have positive effects on usage intention (H15b). The importance of fun and enjoyment, and excitement will have adverse effects on using PHTs (H15c).	H15a: Supported H15b: Supported H15c: Rejected
H16	Control variables have impact on the direct and indirect relationships in the research model. Control variables are age, gender, education, income, health status, SES groups, health status, usage, usage frequency and PHT categories.	Partially Supported

REFERENCES

Adler-Milstein, J. (2009). Health Care Requires Big Changes to Complement New IT. *Harvard Business Review, 87*(4), 20.

Agarwal, R., & Prasad, J. (1998a). A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research, 9*(2), 204-215.

Agarwal, R., & Prasad, J. (1998b). The antecedents and consequents of user perceptions in information technology adoption. *Decision Support Systems, 22*(1), 15-29.

Agarwal, R., Ahuja, M., Carter, P. E., & Gans, M. (1998). Early and late adopters of IT innovations: Extensions to innovation diffusion theory. In *Proceedings of the DIGIT Conference* (pp. 1-18).

Agarwal, R., & Prasad, J. (1999). Are individual differences germane to the acceptance of new information technologies? *Decision Sciences, 30*(2), 361-391.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In Julius Kuhl and Jürgen Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 11-39). Berlin: Springer-Verlag.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Angst, C. M., & Agarwal, R. (2009). Adoption of electronic health records in the presence of privacy concerns: The elaboration likelihood model and individual persuasion. *MIS Quarterly, 33*(2), 339-370.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*(2), 122-147.

Bansal, G., & Gefen, D. (2010). The impact of personal dispositions on information sensitivity, privacy concern and trust in disclosing health information online. *Decision Support Systems, 49*(2), 138-150.

Bashshur, R. L. (1995). On the definition and evaluation of telemedicine. *Telemedicine Journal, 1*(1), 19-30.

Berkman, N. D., Davis, T. C., & McCormack, L. (2010). Health literacy: what is it? *Journal of Health Communication, 15*(S2), 9-19.

Byers, B. (n.d.). *Life science and health*. Retrieved from https://www.gv.com/portfolio

Chen, W., & Lee, K. H. (2014). More than search? Informational and participatory eHealth behaviors. *Computers in Human Behavior*, *30*, 103-109.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*, *22*(14), 1111-1132.

Dishman, Eric (2012). *EY Report Progressions 2012 - the third place: health care everywhere.* Retrieved from http://www.ey.com/gl/en/industries/life-sciences/the-personal-health-technology-revolution

Divine, R. L., & Lepisto, L. (2005). Analysis of the healthy lifestyle consumer. *Journal of Consumer Marketing*, *22*(5), 275-283.

Dodds, W. B., Monroe, K. B., & Grewal, D. (1991). Effects of price, brand, and store information on buyers' product evaluations. *Journal of Marketing Research*, *28*(3), 307-319.

Fox, N. J. (2017). Personal health technologies, micropolitics and resistance: a new materialist analysis. *Health*, *21*(2), 136-153.

Fox, S., & Duggan, M. (2013). *Health Online 2013*. Retrieved from http://bibliobase.sermais.pt:8008/BiblioNET/Upload/PDF5/003820.pdf

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to research and theory*. Reading, PA: Addison-Wesley.

.

Goldsmith, R. E. (2001). Using the domain specific innovativeness scale to identify innovative internet consumers. *Internet Research, 11*(2), 149-158.

Goldsmith, R. E., Freiden, J., & Henderson, K. V. (1995). The impact of social values on food-related attitudes. *The Journal of Product and Brand Management, 4*(4), 6.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R.L. (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Holbrook, M. B., & Hirschman, E. C. (1982). The experiential aspects of consumption: Consumer fantasies, feelings, and fun. *Journal of Consumer Research*, *9*(2), 132-140.

Hong, H. (2009, March). Scale development for measuring health consciousness: Re-conceptualization. In *12th Annual International Public Relations Research Conference, Holiday Inn University of Miami Coral Gables, Florida*.

Ipsos (2016). *Connected Health: Coming ready or not.* Retrieved from http://www.pchalliance.org/sites/pchalliance/files/Ipsos%20International%20Survey%20on%20Connected%20Health_Infographic_%2012052016.pdf

Ipsos & Personal Connected Health Alliance (2017). *The future of connected health.* Retrieved from http://www.pchalliance.org/sites/pchalliance/files/PCHA%20Infographic_final_0.jpg

Ipsos Public Affairs (2017). *A healthy understanding? Global attitudes to health*. Retrieved from http://www.pchalliance.org/sites/pchalliance/files/understanding-society-global-attitudes-to-health-january-2017.pdf

Janssens, W., De Pelsmacker, P., & Van Kenhove, P. (2008). *Marketing research with* SPSS (1st ed.). Upper Saddle River, NJ: Prentice Hall.

Jayanti, R. K., & Burns, A. C. (1998). The antecedents of preventive health care behavior: An empirical study. *Journal of the Academy of Marketing Science*, *26*(1), 6.

Kahle, L. R., Beatty, S. E., & Homer, P. (1986). Alternative measurement approaches to consumer values: the list of values (LOV) and values and life style (VALS). *Journal of Consumer Research*, *13*(3), 405-409.

Karahanna, E., Straub, D. W., & Chervany, N. L. (1999). Information technology adoption across time: a cross-sectional comparison of pre-adoption and post-adoption beliefs. *MIS Quarterly*, 183-213.

Knapp, R. R., & Comrey, A. L. (1973). Further construct validation of a measure of self-actualization. *Educational and Psychological Measurement*, *33*(2), 419-425.

Kraft, F. B., & Goodell, P. W. (1993). Identifying the health conscious consumer. *Marketing Health Services*, *13*(3), 18.

Kerr, D., Butler-Henderson, K., & Sahama, T. (2016). Security, Privacy, and Ownership Issues with the Use of Wearable Health Technologies. In A. Marrington, D. Kerr, & J. Gammack (Eds), *Managing Security Issues and the Hidden Dangers of Wearable Technologies* (pp.161-203). Hershey, PA: IGI Global.

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research*, *2*(3), 192-222.

Moorman, C. (1990). The effect of stimulus and consumer characteristics on the utilization of nutrition information. *Journal of Consumer Research, 17*(3), 362-374.

Moorman, C., & Matulich, E. (1993). A model of consumers' preventive health behaviors: The role of health motivation and health ability. *Journal of Consumer Research, 20*(2), 208-228.

Newman, P. (2017). *The Internet of Things Report.* Retrieved from http://www.businessinsider.com/the-internet-of-things-2017-report-2017-1

Nunnally, J. C. (1978). *Psychometric theory*. New York, NY: MacGraw-Hill.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York, NY: MacGraw-Hill.

Personal Connected Health Alliance (2017). *What is personal connected health? An Ecosystem's Perspective Defining Personal Connected Health.* Retrieved from http://www.pchalliance.org/sites/pchalliance/files/PCHA_Defining_ Personal_Connected_Health.pdf

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879.

Rosenstock, I. M. (1974). The health belief model and preventive health behavior. *Health Education Monographs, 2*(4), 354-386.

Rogers, E. M. (1983). *Diffusion of innovation* (3rd ed.). New York, NY: Free Press.

Rokeach, M. (1968). A theory of organization and change within value-attitude systems. *Journal of Social Issues, 24*(1), 13-33.

Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research, 6*(2), 144-176.

Thackeray, R., Crookston, B. T., & West, J. H. (2013). Correlates of health-related social media use among adults. *Journal of Medical Internet Research*, *15*(1):e21. doi:10.2196/jmir.2297

Tornatzky, L. G., & Klein, K. J. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management*, (1), 28-45.

Turkey Ministry of Health (2016). *Health Statistics 2015*. Ankara: Author.

Tybout, A. M., Sternthal, B., Malaviya, P., Bakamitsos, G. A., & Park, S. B. (2005). Information accessibility as a moderator of judgments: The role of content versus retrieval ease. *Journal of Consumer Research, 32*(1), 76-85.

U.S. Department of Health & Human Services (2010). *Compilation of Patient Protection and Affordable Act*. Washington, DC: Author.

Van der Heijeden, H. (2004). User acceptance of hedonic information systems. *MIS Quarterly*, *28*(4), 695-704.

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information Systems Research*, *11*(4), 342-365.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, *46*(2), 186-204.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*(3), 425-478.

Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, *39*(2), 273-315.

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Quarterly*, *36*(1), 157-178.

Webster, J., & Martocchio, J. J. (1992). Microcomputer playfulness: Development of a measure with workplace implications. *MIS Quarterly*, *16*(2), 201-226.

Yeshwant, K. (n.d.). *Life science*. Retrieved from https://www.gv.com/team