DETERMINANTS OF CONSUMERS' PERSONAL HEALTH TECHNOLOGY USAGE INTENTIONS[1]

Semra ÇALIŞKAN[2]

Ayşegül TOKER[3]

V. Aslıhan NASIR[4, 5]

ABSTRACT

Healthcare industry experiences a tremendous transformation with the proliferation of technology and science. The possible effects of this transformation such as patient empowerment, self-health management, and health promotion make us curious about the underlying factors that influence intention to use healthcare innovations. This research investigates the determinants of consumer intention to use innovations for the post-adoption period, particularly Personal Health Technologies (PHTs), from the perspective of diffusion of innovation and technology acceptance and use literature. This research contributes to the understanding of important phenomena, namely intention to use innovations, in a consumer behavior context enriched with health-related constructs. 520 completed questionnaires were included in our empirical study. The primary method of analysis was Structural Equation Modeling (SEM) conducted through AMOS 24. We found perceived relative advantage as the strongest positive determinant of usage intention, whereas we delineated health information privacy concern as the strongest negative determinant of usage intention. The mediation effect of relative advantage and the moderation effects of personal innovativeness and health motivation on the relationships of research model were also analyzed.

Keywords: Technology acceptance and usage, post-adoption consumer behavior, personal innovativeness, health information privacy concern, personal health technologies

KİŞİSEL SAĞLIK TEKNOLOJİLERİNİ KULLANIM NİYETİNİ ETKİLEYEN FAKTÖRLER

ÖZ

Sağlık endüstrisi, teknoloji ve bilimdeki gelişmelerle önemli bir dönüşüm yaşamaktadır. Sağlık alanındaki bilgi teknolojileri yeniliklerinin; hastanın güçlenmesi, kişisel sağlık yönetimi ve sağlık motivasyonu gibi olası etkileri, Kişisel Sağlık Teknolojileri'ni kullanma niyetini etkileyen temel faktörler hakkında merak uyandırmaktadır. Bu çalışma, Yeniliklerin Yayılımı Teorisi ve Teknoloji Kabul Modeli ışığında, kabul sonrası dönem için tüketicinin yenilikleri kullanma niyetinin öncüllerini sağlık teknolojileri kapsamında incelemektedir. 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. AMOS 24 uygulaması üzerinden Yapısal Eşitlik Modellemesi analiz yöntemi ile 520 katılımcıdan toplanan anket verileri analiz edilmiştir. Analizlerin sonuçlarına göre, algılanan göreceli fayda kullanım niyetinin en güçlü pozitif belirleyicisi olarak tespit edilmiştir. Öte yandan sağlık bilgisi gizliliği kaygısı kullanım niyetinin en güçlü negatif öncülü olarak bulunmuştur. Araştırma modelindeki ilişkiler üzerindeki göreceli avantajın aracılık, bireysel yenilikçiliğin moderasyon ve sağlık motivasyonunun moderasyon etkileri bu çalışma kapsamında analiz edilmiş ve sonuçları irdelenmiştir.

Anahtar Kelimeler: Teknoloji kabulü ve kullanımı, kabul sonrası tüketici davranışı, bireysel yenilikçilik, sağlık bilgisi gizlilik endişesi, kişisel sağlık teknolojileri

1. Introduction

Healthcare industry experiences a tremendous transformation with the proliferation of technology and science. Technology becomes a resource for health information, a medium for interaction, and a tool for the delivery of healthcare. Therefore, new innovations and their successful applications are candidates to shift the balance of power in the healthcare industry and have great implications for self-health management and health promotion. Healthcare solutions built around smartphones, cloud computing, and big data have the potential to put power back in the hands of consumers. Health technology market starts to be driven by consumer preference for sophisticated gadgets, increasing demand for smartwatches and wristbands in the consumer market, increasing growth of integrated consumer wearable devices, increasing popularity of wearable medical devices, and growing popularity of Internet of Things. The possible effects of this transformation make us curious about the underlying factors that influence intention to use Personal Health Technologies (PHTs).

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 nutrition management apps, electronic health records apps, sleep cycle tracking apps, smart watches, electronic wristbands and so on. PHTs are connected devices or applications and one of the greatest applications of the Internet of Things (IoT).

PHTs are fascinating innovations and IS researchers should aim to investigate the antecedents as well as the consequences of the adoption of these innovations from consumer behavior perspective in a theoretical framework, specifically Technology Acceptance/Adoption Models and Diffusion of Innovation Theory. Understanding consumers' perceptions and innovation characteristics guides the innovators in building PHTs, the marketers in segmenting, targeting and positioning, the intermediaries in reaching a targeted audience, the rulers in enacting the regulations, the contributors in building strategies and the health professionals in promoting health and improving the patient-doctor relationship. Researchers can utilize relevant theories and models in information systems (IS) literature in building their research models in this context.

In the light of extant literature about post-adoption consumer behavior, there is limited knowledge related to beliefs and intentions of consumers in the health technology arena. The current research attempted to fill this gap. The main aim of this study is to investigate the determinants of the intention to use personal health technologies (PHTs) for adopters. The impacts of perceived innovation attributes and health information privacy concern on usage intention of adopters

were analyzed and the moderation effects of personal innovativeness, and health motivation on proposed relationships were observed in the context of PHTs. Our research questions were listed as follows.

- Do perceived attributes of information technology (IT) innovations positively affect consumer intention to use PHTs? (Innovation attributes: Relative Advantage, Ease of Use, Trialability, Image, and Enjoyment)

- Does privacy concern toward using PHT negatively affect consumer intention to use PHTs?

- Does perceived relative advantage mediates the relationship between perceived ease of use and usage intention? (Mediation)

- Does personal innovativeness have an impact on the relationships proposed in the research model? (Moderation)

- Does health motivation have an impact on the relationships proposed in the research model? (Moderation)

2. Literature Review and Theoretical Background

There is an extensive literature investigating the behavioral characteristics of technology adoption and usage. The theoretical model for our study includes the Innovation Diffusion Theory (Moore and Benbasat, 1991; Rogers, 1983), the Technology Acceptance Model (Davis, 1989), and the Unified Theory of Technology Acceptance and Usage (Venkatesh et al., 2003; Venkatesh et al. 2012). The details of relevant theories are presented in Table 1. The innovation diffusion and technology acceptance literature provides a set of innovation characteristics that may affect consumers' opinions of the innovation prior to adoption and may affect the rate at which innovations are adopted. Prior studies and relevant theories proposed that relative advantage, ease of use, trialability, image, and enjoyment are the factors that affect usage intentions. These attributes provide a theoretically based set of behavioral beliefs for our study.

Relative advantage is the degree to which adopting/using the IT innovation is perceived as being better than using the practice it supersedes (Moore and Benbasat, 1991). Ease of use is the degree to which an innovation is perceived as difficult to understand and use (Rogers, 1983). New technologies that are easy to understand and use are penetrated more rapidly than innovations that require the adopter to develop new skills. Trialability is the degree to which an innovation can be experimented with on a limited basis (Rogers, 1983). Perceived image is 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 and Benbasat, 1991). Lastly, enjoyment refers to the extent to which activity of using the innovation perceived to be enjoyable, apart from any performance consequences that may be anticipated (Davis et al., 1992). A distinction is made between perceptions of the innovation itself and perceptions of adopting/using the innovation (Moore and Benbasat, 1991; Karahanna et al., 1999). Consumers' perceptions about using

PHTs are analyzed in the current research. In addition, "continue to use intentions" of consumers are investigated in this study since participants already adopted PHTs

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.

In the current study, the mediation effect of perceived relative advantage on the relationship between perceived ease of use and usage intention. From a causal perspective, the results of Davis's (1989) study suggested that usefulness (=relative

advantage) mediated between ease of use and usage. He concluded from his analysis that "the easier a system is to interact with, the less effort needed to operate it" and suggested further research on this proposed mediation effect.

Determinants of consumers' usage intentions were investigated in the context of PHTs. In order to clarify our research context, the scope of PHTs is wearables or applications designed for use by a single individual, principally outside healthcare facilities. PHTs enable users to monitor physiological processes or body activities and they are frequently communication-enabled (Fox, 2017).

For health systems, the greatest challenge is providing protection of privacy and confidentiality of medical information that is being stored (Bansal and Gefen 2010). Health information privacy concern was included as a contextual factor in our research. A great deal of technology acceptance/adoption studies (Pavlou, 2003; Wu and Wang, 2005; Lee, 2009; Luo, Zhang and Shim, 2010) integrated trust, perceived risk or privacy constructs into their research models.

The notion that individual differences can play a crucial role in the implementation of any technological innovation recurs in a wide variety of research streams. Numerous individual difference variables have been studied including gender, age, income, social status, education, experience, personality, and motivation. With the individual characteristics, specifically personal innovativeness and health motivation, we planned to measure the effects of instinct motivation of individuals to adopt innovations. First of all, Rogers (1983) defined innovativeness as the degree to which an individual or other units of adoption is relatively earlier in adopting new ideas than the other members of a system. Agarwal and Prasad (1998) 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 (1998) proposed that PIIT serves as a key moderator for the antecedents as well as the consequences of perceptions. Therefore, we assumed that people, who are willing to try new products and technologies, tend to be potential users of PHTs. Innovativeness was included in this study to measure individual innovativeness and technology literacy of individuals. Secondly, health motivation refers to consumers' goal-directed arousal to engage in preventive health behaviors (Moorman and 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 affect preventive health behaviors. In multiple 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 that 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.

Although relevant literature covers the acceptance of health technologies by health professionals, few studies attempt to investigate the adoption of health technologies in the consumer context. Gao et al. (2015) focused on only wearable technologies and examined the underlying factors of adoption from technology, health, and privacy perspectives. The characteristics of personal health records were examined by Tang et al. (2006) and Kahn et al. (2009), whereas the adoption of personal health records was studied by Yamin et al. (2011) and Liu et al. (2011). Arning and Ziefle (2009) identified main utilization motives of eHealth technology and technology-specific acceptance patterns. The current research endeavors to fill the gap by examining consumer perceptions about using PHTs.

3. Research Design and Methodology

3.1. Research Model and Survey Instrument

We designed a survey primarily based on items used in literature, with adaptations and minor additions. Perceived attributes of PHTs were measured using the factor structure and items validated in a pilot study with a sample of 207 participants. Relative advantage, ease of use, trialability, and image were adapted from Moore and Benbasat's (1991) study. Enjoyment scale was borrowed from Davis et al. (1992), whereas privacy concern scale was adapted from the study of Bansal and Gefen (2010). We measured innovativeness with the scale developed by Agarwal and Prasad (1998) and health motivation with the scale developed by Moorman (1990). Usage intention scale was adapted from the research of Venkatesh et al. (2012). All items were measured with 7-point Likert scales and Cronbach's alpha values of the scales are indicated in Table 2. Our proposed research model is depicted in Figure 1.
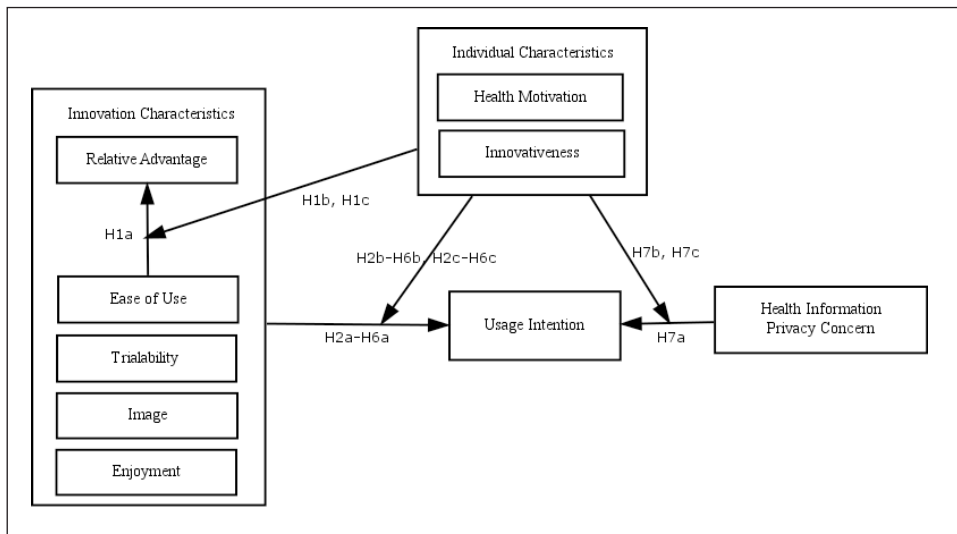

Figure 1. Proposed Research Model

Table 2. Sources and Reliabilities of Scales

Scale	Source	Cronbach's Alpha
Relative Advantage		.817
Ease of Use		.777
Trialability	Moore and Benbasat (1991)	.807
Image		.933
Enjoyment	Davis et al. (1992)	.842
Privacy	Bansal and Gefen (2010)	.845
Usage Intention	Venkatesh et al. (2012)	.725
Health Motivation	Moorman (1990)	.732
Personal Innovativeness	Agarwal and Prasad (1998)	.829

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. 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 usage of PHTs and socioeconomic status (SES), which is the combination of education, income, and occupation.

3.2. Sampling and Data Collection

Sampling and data collection procedures were conducted using the services of an independent market research company. The top 6 largest cities in Turkey, namely Istanbul, Ankara, Izmir, Bursa, Adana, and Antalya were included. Gender was evenly distributed among males and females. The sample consisted of A, B, and C1 socio-economic status groups. Data was collected in the form of face-to-face survey interviews. 520 completed questionnaires were included to the study after data examination. By screening questions about usage, we selected the participants who use one of following PHTs: Mobile applications (n=151), electronic health records (n=224), or wearables (n=145). Demographic characteristics of our sample presented in Table 3. 25-34 and 35-44 age groups had approximately even size. 45-55 age group had also a large number of observations. Only 55-60 age group had a small number of observation.

Table 3. Demographic Characteristics of the Participants

Gender		
	Frequency	Percent
Male	250	48.1
Female	270	51.9
Total	520	100.0
Age		
	Frequency	Percent
25-34	199	38.3
35-44	203	39.0
45-54	110	21.2
55-60	8	1.5
Total	520	100.0
City of residence		
	Frequency	Percent
İstanbul	249	47.9
İzmir	87	16.7
Ankara	69	13.3
Bursa	40	7.7
Adana	40	7.7
Antalya	35	6.7
Total	520	100.0
Education		
	Frequency	Percent
Secondary	30	5.8
High School	261	50.2
College or University Student	7	1.3
College or University Degree	206	39.6
Graduate Student	5	1.0
Graduate Degree	11	2.1
Total	520	100.0
Average Net Monthly Household Income		
	Frequency	Percent
Under 1300 TL	1	0.2
1301-5000 TL	215	41.3
5001-10000 TL	75	14.4
10001-20000 TL	24	4.6
>20000 TL	29	5.6
No answer	176	33.8
Total	520	100.0

As summarized in Table 4, the sample consisted of three SES group, namely A, B, and C1. Approximately, half of the participants (51.3%) belonged to C1 group and other half included A or B groups. 69.4% of participants reported that they were healthy and had no serious health problem. On the other hand, 30.6% of participants specified their health problems. Blood pressure problems, diabetics, allergies, orthopedic problems, eye problems and heart diseases were most frequent health problems. Obesity, addiction, neurological diseases and psychological problems had a low frequency in the sample.

Table 4. Other Characteristics of the Participants

SES Group		
	Frequency	Percent
A	114	21.9
B	139	26.7
C1	267	51.3
Total	520	100.0
Health Status		
	Frequency	Percent
Having no health problem	361	69.4
Having at least one health problem	159	30.6
Total	520	100.0

As indicated in Table 5, most of the participants used their PHTs at a moderate level. 91% of participants used actively their PHTs. 71.3% of participants did not pay for their PHT and used free versions of the technologies.

Table 5. Usage Characteristics of the Participants

Usage Frequency		
	Frequency	Percent
Rare	42	8.1
Sometimes	197	37.9
Usually	217	41.7
Always	64	12.3
Total	520	100.0
Active Usage		
	Frequency	Percent
Yes	473	91.0
No	47	9.0
Total	520	100.0
Cost of PHT		
	Frequency	Percent
Free	371	71.3
Paid	149	28.7
Total	520	100.0

We conducted SEM in AMOS 24 using a measurement model and a structural model. The measurement model was identified through confirmatory factor analysis (CFA). CFA provides the assessment of convergent and discriminant validity as well as composite reliability. After ensuring reliability and construct validity by CFA, the structural model was built by path analysis.

4. Findings and Discussion

A measurement model was set with 9 latent constructs, followed by a structural model to test the hypotheses. With CFA, the model fit was evaluated and all fit indices were found as acceptable according to thresholds stated by Hair et al. (2010) [GFI=.928>.90, AGFI=.895>.80, CMIN/D=2.393>3, IFI=.961>.95, RMSEA=.052<.08]. Before specifying our structural model, we checked multivariate assumptions of linearity, multicollinearity, and common method bias. The results of curve estimation analysis confirmed linearity. VIF values were below 4, the cut-off value stated by Hair et al. (2010). We conducted Harman's Single Factor Test and found that total variance explained by one factor was 37%, under the cut-off value of 50% (Podsakoff et al., 2003).

After ensuring model fit and checking multivariate assumptions, we conducted path analysis with our structural model in order to test proposed relationships in this research. Usage intention and relative advantage were endogenous, whereas ease of use, image, enjoyment, trialability, and privacy concern were exogenous constructs in our structural model. Since we chose multi-group SEM as the analysis method for the moderation effects of innovativeness and health motivation, we included them to the structural model as moderators not as exogenous constructs. For the structural model, model fit indicies are GFI=.931, AGFI=.896, CMIN/D=3.275, IFI=.956, and RMSEA=.066.

By the results of path analysis indicated in Table 6, 4 of 7 proposed main relationships (H1a-H7a) were supported. Our results confirmed that perceived relative advantage was the first determinant of usage intention (H3a). Our findings also indicated that perceived ease of use has a positive direct effect on relative advantage (H1a). We confirmed the indirect effect of perceived ease of use (H2a) on usage intention with the mediation of perceived relative advantage. Both perceived image (H4a) and perceived trialability (H5a) did not have a significant impact on usage intention. The proposed relationship from perceived enjoyment to usage intention (H6a) was confirmed. Perceived privacy concern had a significant negative effect on usage intention (H7a).

Table 6. Structural Model Estimates

Proposed Relationships			Std. Estimate	P-value
H1a	Relative Advantage	Ease of Use	.856	.000
H2a	Usage Intention	Ease of Use	-.104	.428
H3a	Usage Intention	Relative Advantage	.741	.000
H4a	Usage Intention	Image	.048	.274
H5a	Usage Intention	Trialability	-.086	.224
H6a	Usage Intention	Enjoyment	.185	.011
H7a	Usage Intention	Privacy	-.270	.000

In order to investigate the moderator effect of health motivation, we conducted multi-group SEM analysis. Prior to multi-group analysis, we obtained 2 clusters as high and low motivation with K-means clustering analysis. According to the results indicated in Table 7, we examined differences in the effects privacy concern and enjoyment on usage intention. Firstly, our findings revealed that privacy issues are important for consumers who have high health motivation, whereas consumers who have low health motivation do not give importance to privacy issues (H7b). Secondly, the effect of enjoyment changes according to the level of consumers' health motivation (H6b). For other relationships, we rejected the differences proposed in H1b, H2b, H3b, H4b, and H5b.

Table 7. Structural Model Estimates: Moderator=Health Motivation

			High Motivation		Low Motivation	
Proposed Relationships			Std. Estimate	P-value	Std. Estimate	P-value
H1b	Relative Advantage	Ease of Use	.756	.000	.837	.000
H2b	Usage Intention	Ease of Use	-.268	.094	.179	.271
H3b	Usage Intention	Relative Advantage	.760	.000	.695	.000
H4b	Usage Intention	Image	.073	.209	-.078	.308
H5b	Usage Intention	Trialability	-.105	.234	-.019	.878
H6b	Usage Intention	Enjoyment	.310	.000	.064	.608
H7b	Usage Intention	Privacy	-.335	.000	-.087	.303

In order to examine the moderator effect of personal innovativeness, we run multi-group SEM analysis. Before multi-group analysis, we obtained 2 clusters as high and low innovativeness with K-means clustering analysis. According to the results indicated in Table 8, we observed a significant difference in the effect of privacy concerns on usage intention (H7c). Highly innovative consumers are sensitive to the privacy of their health information. For other relationships, we rejected the differences proposed in H1c, H2c, H3c, H4c, H5c, and H6c. The results of hypotheses were summarized in Appendix.

Table 8. Structural Model Estimates: Moderator=Innovativeness

Proposed Relationships			High Innovativeness		Low Innovativeness	
			Std. Estimate	P-value	Std. Estimate	P-value
H1c	Relative Advantage	Ease of Use	.713	.000	.845	.000
H2c	Usage Intention	Ease of Use	-.202	.220	.054	.750
H3c	Usage Intention	Relative Advantage	.656	.000	.727	.000
H4c	Usage Intention	Image	.103	.148	-.101	.178
H5c	Usage Intention	Trialability	-.057	.604	-.094	.432
H6c	Usage Intention	Enjoyment	.108	.315	.218	.067
H7c	Usage Intention	Privacy	-.419	.000	-.099	.190

5. Conclusion

In the light of extant literature about post-adoption consumer behavior, there is limited knowledge related to beliefs and intentions of consumers in the health technology arena. The current research attempted to fill this gap. Our study can serve as a foundation for future research regarding health technology acceptance and use of consumers. We found perceived relative advantage as the strongest positive determinant of usage intention, whereas we delineated privacy concern as the strongest negative determinant of usage intention. We proved the powerful positive relationship between ease of use and relative advantage. We confirmed the effect of personal innovativeness on the relationship between privacy concerns and usage intention.

One of our theoretical contributions 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. We included innovativeness, privacy concern, and health motivation constructs, which become important factors in consumer behavior studies, specifically in the domain of health technologies. Our study revealed the mediation effect of relative advantage on the relationship between ease of use and usage intention and confirmed its mediating power.

Our findings have substantial implications for practitioners, particularly for innovators and product/system designers. Primarily, developing new technologies requires a deep evaluation of innovation attributes and individual characteristics of target customer base. Although relative advantage is a very strong innovation attribute, other attributes should be taken into consideration for specific customer segments. Health technology developers should put emphasis on guaranteeing the privacy of health information and building secure systems in order to decrease concerns about privacy.

Because of the limitations regarding cross-sectional analysis, future studies should focus on collecting data at multiple time points in order to validate the results. Further research may focus on the differences between adopters and potential adopters by evaluating beliefs related to innovation attributes and usage intentions.

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Appendix

Table 5. Summary of Results

#	Hypotheses	Result
H1	(a) Perceived ease of use has a positive effect on perceived relative advantage	Supported
	(b) The relationship between perceived relative advantage and perceived ease of use moderated by health motivation	Not Supported
	(c) The relationship between perceived relative advantage and perceived ease of use moderated by personal innovativeness	Not Supported
H2	(a) Perceived ease of use of PHT has a positive impact on usage intention.	Not Supported
	(b) The relationship between usage intention and perceived ease of use moderated by health motivation	Not Supported
	(c) The relationship between usage intention and perceived ease of use moderated by personal innovativeness	Not Supported
H3	(a) Perceived relative advantage of PHT has a positive impact on usage intention.	Supported
	(b) The relationship between usage intention and perceived relative advantage moderated by health motivation	Not Supported
	(c) The relationship between usage intention and perceived relative advantage moderated by personal innovativeness	Not Supported
H4	(a) Perceived image of PHT has a positive impact on usage intention.	Not Supported
	(b) The relationship between usage intention and perceived ease of image moderated by health motivation	Not Supported
	(c) The relationship between usage intention and perceived ease of image moderated by personal innovativeness	Not Supported
H5	(a) Perceived trialability of PHT has a positive impact on usage intention.	Not Supported
	(b) The relationship between usage intention and perceived trialability moderated by health motivation	Not Supported
	(c) The relationship between usage intention and perceived trialability moderated by personal innovativeness	Not Supported
H6	(a) Perceived enjoyment of PHT has a positive impact on usage intention.	Supported
	(b) The relationship between usage intention and perceived enjoyment moderated by health motivation	Supported
	(c) The relationship between usage intention and perceived enjoyment moderated by personal innovativeness	Not Supported
H7	(a) Health information privacy concern has a negative impact on usage intention.	Supported
	(b) The relationship between usage intention and heath information privacy concern moderated by health motivation	Supported
	(c) The relationship between usage intention and health information privacy concern moderated by personal innovativeness	Supported