IJCEAS

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume: XI, Issue: 2, Year: 2021, pp. 354-373

WILL YOU CARRY THAT WATCH? INVESTIGATING FACTORS AFFECTING CONTINUANCE INTENTION OF SMARTWATCHES

Ebru ENGİNKAYA ERKENT[1]
Şirin Gizem KÖSE[2]
Ece ÖZER ÇİZER[3]

Received: 10.07.2021, Accepted: 27.12.2021
DOI Number: 10.5281/zenodo.5831643

Abstract

The interest in wearable technologies, especially smartwatches rise day by day parallel with technological developments and an increasing need to monitor health. In line with those developments, this study aims to investigate the role of perceived ease of use, perceived usefulness, user satisfaction, healthology in explaining smartwatch continuance intention. In addition, this study investigates the relationships between perceived ease of use, perceived usefulness, healthology and user satisfaction. Questionnaire method was used to gather data from actual smartwatch consumers in Turkey and the data analyzed by utilizing structural equation modeling. Findings demonstrate that the most powerful variable to explain smartwatch continuance intention is perceived usefulness, whereas perceived ease of use contributes to user satisfaction the most. Also, healthology is positively related to both user satisfaction and continuance intention. The results also highlight the importance of continuance intention to increase intention to recommend smartwatches to other people.

Key words: Smart Watches, User Satisfaction, Healthology, Continuance Intention

JEL Code: M30, M31, M39

1. Introduction

As technology proliferation continues, wearable technologies are frequently used in various areas. Wearable technologies refer to the integration of smart technologies into objects such as watches, wristbands, necklaces, and shoes. Liu &

[1] Assoc. Prof., Yıldız Technical University, Turkey, ebruenginkaya@gmail.com, https://orcid.org/0000-0003-1137-3470
[2] Res. Asst., PhD, Yıldız Technical University, Turkey, siringizemkose@gmail.com, https://orcid.org/0000-0003-4075-7166
[3] Res. Asst., PhD Student, Yıldız Technical University, Turkey, ece.ozer@icloud.com, https://orcid.org/0000-0002-8597-2073

Guo (2017) define wearable tools as "computers which have access to a mobile internet connection, provide information, and are put on like clothes or accessories". People can use wearable devices in several applications. Watch-type wearable devices can replace the functions of smartphones, wristbands, or wearable devices on necks can be used to gain information on health status, whereas head-mount display-type wearable devices are mostly preferred because of their virtual reality functions. Yang et al., 2016). As a type of wearable device, smartwatches help to save, report, and share information such as heart rate, blood pressure, diabetes, calories spent, times spent on physical activities, and therefore provide health benefits for users. The information and reports saved by smartwatches can be accessed from smartphones and can be shared with other users and physicians. Communication and fitness tools are the two main usages of smartwatches. They are worn on the body and provide ubiquitous computing and accessibility (Ogbanufe & Gerhartb, 2018).

As smartphones and smartwatches are used simultaneously, smartwatches increased their popularity with the mobility and increased use of smartphones. Smartwatch shipments are increasing worldwide and the shipments are expected to reach 113 million units by 2022 (Statista, 2021). The increasing sales of watches, along with the digitalization movement and the high-speed pace of technological developments reflect the importance of this market for the future. Moreover, smartwatches are often accepted as complementary accessories and not deemed as a necessity (Cho, Lee & Yang, 2019), and even though initial market exposure is important, the long-term survival of the smartwatch sector relies on continued usage (Bölen, 2020). This calls for additional research on continuance intention.

As an emerging market, 25,5% of the internet users have smartwatches in Turkey as of January 2021 (Wearesocial, 2021). Although the Turkish market on smartwatches has potential, the market is still young and there are only a few studies focused on the subject in Turkey (Marangoz & Aydın, 2018; Şahin, Özeltürkay & Doğrul, 2018; Bölen, 2020; Ada & Aksoy, 2020; Yıldız & Kütahyalı, 2021). Furthermore, investigating behavioral intention in emerging countries is a fruitful research area as stated by Zhang et al (2017). In this direction, this study aims to predict factors affecting smartwatch continuance intention and intention to recommend smartwatches and integrate healthology construct to technology acceptance model (TAM). Accordingly, the research question of the study is how to predict the antecedents of intention to adopt and recommend smartwatches which are one of the most used technologies to provide health information. Although there are several studies to explain intention to purchase smartwatch, there is a gap regarding to the continuance intention of those devices. The study also intends to extend TAM model, since TAM gives better results when it is extended by additional factors (Lin, Lin & Roan, 2012), therefore this study also measures satisfaction and healthology. As Zhang et al (2018) state, health behavior is a fundamental subject of social psychology and therefore healthology is included in the research model.

In the first section of the study, a literature review on the technology acceptance model and its elements, healtology, user satisfaction, continuance intention, and intention to recommend are presented. Hypotheses are proposed based on the previous literature. The second section of the study is the methodology. The results are given in the third section. The conclusion section includes theoretical contributions, practical implications, and limitations.

2. Literature Review

Smart Watch Continuance Intention

Continuous use of a product or service corresponds to users' decision to continue to use the product/service (Franque et al., 2020). The term is also associated with the benefits that keep customers use the product (Han, Lee & Kim, 2021). Continuance intention is defined as the intention to continue using smartwatches in this study.

As the technology matures and the market of smartwatches widens, the research interest has moved towards figuring out continuous usage rather than factors affecting intention to use. Most of the studies in smartwatch literature measure intention (Wu, Wu & Chang, 2016; Kim & Shin, 2015; Hsiao & Chen, 2018; Al-Emran et al., 2020). Early studies mostly focused on the adoption of smartwatches (Kim, 2016; Hsiao, 2017; Kranthi & Ahmed, 2018; Dutot, Bhatiasevi & Bellallahom 2019), intention to accept (Wu, Wu, Chang, 2016) whereas this study was carried out on actual users of smartwatches to explain long term use of smartwatches. Explaining determinants of continued usage can help to make better planning, assisting decision making and accordingly, keeping the users (Ding, 2019). Therefore, the long-term success of smartwatches in the digital industry is still a question that needs to be concentrated on.

User Satisfaction

Satisfaction denotes the post-consumption reaction and judgment (Kim, Chang, Park & Lee, 2015). In parallel, smartwatch user satisfaction is defined as smartwatch user's feeling that the smartwatch fulfills her/his general expectation (Cho, Lee & Yang, 2019). Satisfaction is commonly recognized as a predictor of customer intention to continue using (Loureiro, Kaufmann, & Rabino, 2014; Li & Fang, 2019; Khayer & Bao, 2019). It is also a remarkable construct to explore considering that there are many alternatives available in the smartwatch market and user satisfaction determines the decision to continue using (Pal, Funilkul & Vanijja, 2020). Literature on smartwatch user satisfaction underlines the importance of user satisfaction for keeping the customers. Studies found that high satisfaction leads to continued use of smartwatches (Ogbanufe & Natalie Gerhart, 2018). Researches point out that perceived usefulness is positively related to user satisfaction and user satisfaction leads to continue using smartwatches (Hong et al. 2017; Pal, Funilkul & Vanijja, 2020).

IJCEAS

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume: XI, Issue: 2, Year: 2021, pp. 354-373

Technology Acceptance Model to Explain Perceived Ease of Use and Perceived Usefulness

As proliferation of new technology continues, several models have been presented to understand the adaptation of new technology. The most widely recognized theory to explain new technology adaptation is the technology acceptance model which was introduced by Davis, Bagozzi, and Warshaw (1989). The theory implies that perceived usefulness, and perceived ease of use are the two factors that affect consumers' new technology adoption (Davis, 1989). Perceived usefulness is defined as "a person's belief that using a system helps him or her to attain the desired goals" whereas perceived ease of use is "the degree of usage facility related to a system" (Venkatesh et al., 2003).

UTAUT (Unified Theory of Acceptance, and Use of Technology, Venkatesh et al. 2003) and UTAUT 2(Unified Theory of Acceptance, and Use of Technology) are the models related to technology acceptance model and they are also used to explain the acceptance and use of new technology. According to UTAUT, the determinant of intention to use and technology use are performance expectancy, effort expectancy, facilitating conditions and social influence (Venkatesh et al. 2003). Performance expectancy refers to the degree to which a person believes that using a system or device will increase their performance; whereas effort expectancy describes the degree of ease related to the use of the system/ device. Social influence is defined as a person's perception that people matter to him/her believe that he/she should use the system/device. On the other hand, facilitating conditions delineate a person's belief that an there are some easing elements, organizations, or infrastructure to support use of the system/ device (Venkatesh, 2021). Effort expectancy corresponds to perceived ease of use whereas performance expectancy corresponds to perceived usefulness in TAM. Vankatesh et al. (2012) extended UTAUT and proposed UTAUT2 that added hedonic motivation, price value and habit constructs. The authors developed this theory since it is more suitable for customer context whereas UTAUT was more applicable in employee context. Habit is defined as a perceptual factor that shows the consequences of earlier experiences, while price value becomes positive when benefits exceed the monetary cost. Being another important predictor in consumer behavior and technology studies, hedonic motivation refers to the search of emotions (Mikahef et al.2012) and it is mainly related to fun seeking (Holbrook and Hirschman 1982).

Several studies utilized technology acceptance in smartwatch context. The recent literature on technology acceptance model appliance on smartwatch shows rhat the issue still draws much attention. Jeong, Park & Kim (2020) proved that perceived ease of use affects intention to use smartwatch positively while the complexity and financial risk has negative effect on intention to use the device. Baudier, Ammi & Wamba (2020) found that perceived ease of use does not affect attitude towards using smartwatch whereas perceived connectivity and culture are essential factors to explain adoption of such products. According to Sabbir et al.'s

(2020) study, attitude toward using smartwatch is the most important predictor of behavioral intention. Perceived enjoyment, perceived ease of use, perceived usefulness, fashion innovativeness and fashion involvement are the variables that affect attitude. Another study by Al-Maroof et al. (2021) was conducted on people working on medical centers and explored user acceptance of smartwatch for medical objective. Results underlined the essential role of perceived ease of use as the construct positively affect both perceived usefulness and behavioral intention.

This study defines perceived usefulness as the degree of gaining benefits from using smartwatches and perceived ease of use as the degree of effortlessness of use affiliated with using smartwatches. According to a study by Ha et al. (2017), users find smartwatches more beneficial than ordinary watches and smartphones. Considering that smartwatches are personal wearable devices that are used for various objectives, the importance of ease of use and usefulness is obvious for people to adopt those technological products (Al-Emran et al., 2020). Perceived usefulness (Al Gahtani et al. 2007; Chong, 2013; Bogart & Wichadee, 2015; Tarhini et al., 2017; Pfeiffer et al, 2016; Sergueeva et al., 2016) and perceived ease of use (Wong et al., 2015a; Dhaha et al,2014; Moya et al.,2018; Sun et al., 2014; Huang & Yang, 2020) are strong predictors of behavioral intention. In addition, Wang et al (2020) and Kim & Cho (2019) found that both performance and effort expectancy affect behavioral intention in smart wearables. Kim & Shin (2015) proved that the perceived usefulness of smartwatches is positively related to intention to use these devices while Ogbanufe & Gerhartb (2018) found a positive relationship between perceived usefulness and satisfaction. Therefore,

H1: There is a positive and significant relationship between perceived ease of use and user satisfaction.

H2: There is a positive and significant relationship between perceived ease of use continuance intention.

H3: There is a positive and significant relationship between perceived usefulness and user satisfaction.

H4: There is a positive and significant relationship between perceived ease of use and continuance intention.

Healthology

Current advances in smart wearables make it possible to get detailed health information. A recent study found that health industry is increasingly utilizing smart watches. Those devices are popular among both doctors and patients since they ease communication between its medical users (Al-Maroof et al., 2021). As the positive effects of wearable health devices are recognized, the health management functions of smartwatches increasingly appealing to customers. Wen et al. (2017) point out that there is a high demand for health functions of wearable products. Therefore, health motivation is an essential factor in the decision to purchase and continue using a smartwatch. As a novel term, healthology (formed by combining health and technology) is defined as the interplay between health concerns, informatics, and technology intended to present new methods to satisfy needs about health

(Dehghani, 2018; Dehghani, Kim & Dangelico 2018). Kim & Dangelico, 2018). Healthology refers to utilizing technology as a tool to achieve health consciousness and health motivation (Dehghani, 2018). Since health attributes (Zhang et al.,2017), and perceived health outcomes (Gupta et al., 2020) affect the adoption of healthcare wearable technology; healthology was added as external variables to the technology acceptance model. Dehghani et al. (2018) found that healthology affects the actual use of smartwatches and continuous, Therefore, healthology is expected to influence behavioral intentions regarding smartwatches.

H5: There is a positive and significant relationship between healthology and user satisfaction.

H6: There is a positive and significant relationship between healthology and continuance intention.

Intention to Recommend

Nowadays customers have the power to influence each other's purchase and intention to continue using decisions, especially through social media channels. The literature on new technologies points out that people who have a high level of intention to adopt new technology are expected to recommend it to other people (Talukder et al., 2019; Leong et al., 2013; Miltgen et al.,2013). Besides, a lot of wearable devices come with features that enable users to disseminate information and recommend people around them (Rahman et al., 2021). This information has led to the formation of these hypotheses:

H7: There is a positive and significant relationship between user satisfaction and continuance intention

H8: There is a positive and significant relationship between continuance intention and intention to recommend.

Furthermore, previous studies point out the mediating role of satisfaction in technological products or services (Jung, Chung, & Leue, 2015; Djelassi, Diallo, & Zielke, 2018; Rahi, Ghani, & Ngah, 2020). Therefore, the following hypotheses are suggested.

H9: User satisfaction mediates the relationship between perceived ease of use and behavioral intention.

H10: User satisfaction mediates the relationship between perceived usefulness and behavioral intention.

H11: User satisfaction mediates the relationship between healthology and behavioral intention.

3. Methodology

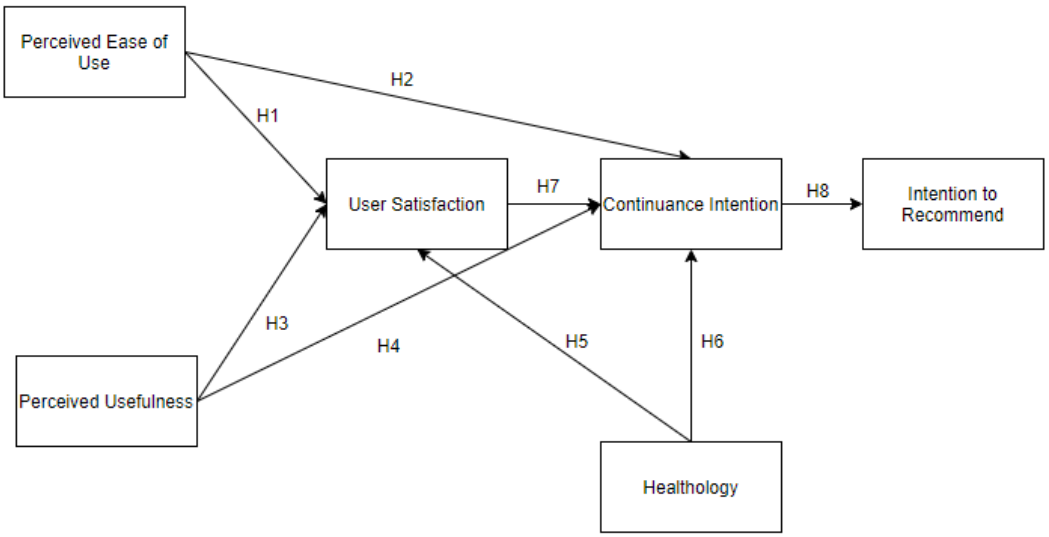


Figure 1. Research Model

Survey Design

The convenience sampling approach and online questionnaire method were used in the data collection. The online questionnaire was conducted on the Google Docs platform between 1 March 2021 and 7 March 2021. There was one criterion of selection that was respondents must be the actual smartwatch users. This selection criterion ensured that the sample ideally represents the research population of all smartwatch users in Turkey. At the beginning of the questionnaire form, there is a cover letter explaining the subject and the purpose of the study. In the first part of the study, 20 scale items are included, the statements were prepared as a 5-point Likert scale. Questions about participants' demographic information were in the second part of the questionnaire form. The sources of the scales are shown in Table 1. All scale items were rated using a five-point Likert scale. "Strongly disagree" was represented by 1 and "strongly agree" was represented by 5.

Table 1. Scale Sources

Scale	**Source**
Continuance Intention	Wang et al. (2015) and Venkatesh et al. (2012)
Intention to recommend	Oliveira et al. (2016) and Miltgen et al. (2013)
Perceived ease of use	Brown (2002)
Perceived usefulness	Chuah et al. (2016)
Healthology	Dehghani et al. (2018)
User satisfaction	Ghazali et al. (2020)

Sample and Data Collection

The sample consists of 457 actual smartwatch users living in Turkey. Table 2 demonstrates the demographic information regarding the participants. The analyzed data consisted of 239 females (52,3%) and 218 males (47,7%). It was observed that most participants were in the second category of age (%45,5%). The education level of participants showed 63,2% at master's degree and doctorate levels, %27,6 at the bachelor's degree and associate's degree levels, and 9,2% at primary and secondary education levels. The majority of the participants' household income is 10.001 TL and above (40,5%).

Table 2. Demographic Information

Education	**n**	**%**	**Gender**	**n**	**%**
Primary and Secondary Education	42	9,2	Female	239	52,3
Bachelor's Degree and Associate's Degree	126	27,6	Male	218	47,7
Master's Degree and Doctorate Degree	289	63,2	**Age**		
Household Income			18 - 25	77	16,8
2.500 TL and below	36	7,9	26 - 33	208	45,5
2.501 - 5.000 TL	43	9,4	34 - 41	115	25,2
5.000 - 7.500 TL	121	26,5	42 - 49	23	5
7.500 - 10.000 TL	72	15,8	50-57	15	3,3
10.001 TL and above	185	40,5	58 and above	19	42

3. Findings

Measurement model

The data collected during the research were analyzed using SPSS 21 and AMOS 23. Firstly, confirmatory factor analysis (CFA) and reliability analysis were applied to test the research model and to verify the scales. In the structural model, the comparative fit index (CFI), chi-square statistics are divided by degrees of freedom (CMIN / df), root means square residual (RMR), the goodness of fit (GFI), and adjusted fit index (AGFI) were used as fit statistics. Analysis results (CFI: 0.966; CMIN / df: 3.444; SRMR: 0.041; GFI: 0.900; AGFI: 0.864; RMSEA: 0.073) show that the data are suitable for the model (Doll et al., 1994; MacCallum and Hong, 1997; Hair et al., 2010).

Convergent validity and discriminant validity values were checked to test the structures and variables. Composite reliability (CR) and mean-variance extracted (AVE) values were used to test convergent validity, and Fornell and Larcker's (1981) approach was used to test discriminant validity.

Table 3. Convergent Validity Results

Items	Factor Loadings	Cronbach α	CR	AVE
PEU				
PEU1	0,885	0,901	0,906	0,707
PEU3	0,819			
PEU4	0,789			
PEU2	0,768			
PU				
PU3	0,931	0,989	0,989	0,968
PU1	0,924			
PU2	0,924			
H				
H3	0,905	0,922	0,923	0,799
H2	0,904			
H1	0,868			
US				
US2	0,863	0,949	0,949	0,790
US5	0,857			
US1	0,849			
US3	0,815			
US4	0,808			
CI				
CI3	0,860	0,975	0,976	0,931
CI1	0,844			
CI2	0,839			
R				
R2	0,934	0,913	0,915	0,843
R1	0,931			
KMO:	0,88 Bartlett's:	11047,86	df: 190,00	Sig.: 0,00

Table 3 shows the structural equation model's six core constructs and their items. The Cronbach's alpha values for perceived ease of use (PEU), perceived usefulness (PU), healthology (H), user satisfaction (US), continuance intention (CI), and intention to recommend (R) were 0,901, 0,989, 0,922, 0,949, 0,975, and 0,913. All constructs' Cronbach's alpha values were higher than the threshold level of 0,70. Thus, the constructs' reliability was supported (Hair et al., 2010).

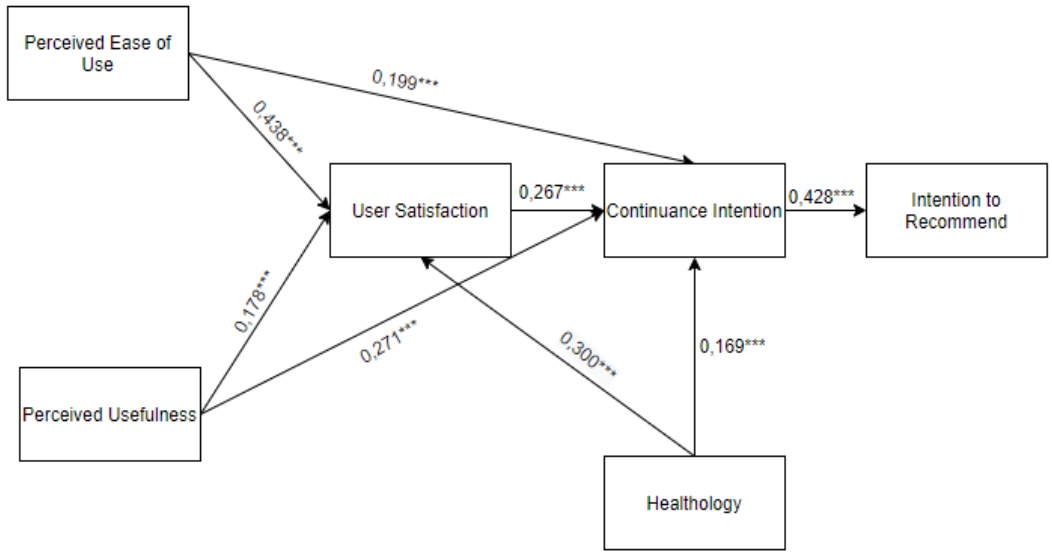
In addition, all factor loadings, CR values, and AVE values exceed the suggested values (FL>0,60; CR>0,70; AVE>0,50) (Bagozzi & Yi, 1988; Sekaran & Bougie, 2011). Hence, the measurement model has achieved convergent validity.

Table 4. Discriminant Validity Results

Factor	Mean	SD	Skew.	Kurt.	1	2	3	4	5	6
PEU	3,30	1,05	-0,31	-0,51	**0,841**					
PU	3,17	1,19	-0,35	-0,68	0,403	**0,984**				
H	4,00	0,97	-1,14	0,98	0,203	0,283	**0,894**			
US	3,63	0,96	-0,92	0,57	0,570	0,439	0,439	**0,889**		
BI	3,68	1,21	-0,95	0,06	0,495	0,516	0,403	0,574	**0,965**	
R	3,18	0,81	-0,24	0,54	0,223	0,125	0,195	0,196	0,424	**0,918**

Table 4 shows that the square roots of the AVE values are greater than the corresponding construct correlations; meaning that the measurement model's results meet the required criteria for discriminant validity (Fornell & Larcker, 1981; Bagozzi & Yi, 1988; Sekaran & Bougie, 2011; Henseler et al. 2015).

Structural model and hypothesis testing



**p < 0,001

Figure 2. Structural model and the standardized regression coefficients

The hypotheses were tested using structural equation modeling (SEM) on AMOS. Table 5 shows the proposed structural model fit indices. Model fit indices met threshold values (Hu and Bentler, 1999; Hair, 2006; Hair, 2013). In addition, all paths were significant (p<0,05) and positive.

H1, H3, and H5 state that perceived ease of use, perceived usefulness, and healthology have a positive impact on user satisfaction. The standardized regression coefficients revealed that perceived ease of use (β=0,438, p < 0,001); perceived usefulness (β=0,178, p < 0,001); healthology (β=0,300, p < 0,001) were significantly and positively related to user satisfaction. Thus, H1, H3, and H5 were supported.

H2, H4, and H6 show that perceived ease of use, perceived usefulness, and healthology have a positive impact on continuance intention. The standardized regression coefficients revealed that perceived ease of use (β=0,199, p < 0,001); perceived usefulness (β=0,271, p < 0,001); healthology (β=0,169, p < 0,001) were significantly and positively related to behavioral intention. Hence, H2, H4, and H6 were supported.

H7 suggests that customer satisfaction has a positive role in continuance intention. The standardized regression coefficients revealed that customer satisfaction (β=0,267, p < 0,001) was significantly and positively related to user satisfaction. Therefore, H7 was supported.

H8 investigates that continuance intention has a positive role on intention to recommend. The standardized regression coefficients revealed that behavioral intention (β=0,428, p < 0,001) was significantly and positively related to intention to recommend. As a result of the path analysis, H8 was supported.

Table 5. Path Results

Hypo.	**From -> To**		**Std. Estimate**	**S.E.**	**C.R.**	**P**	**Result**
H1	PEU	US	0,438	0,038	9,98	0,000	Supported
H2	PEU	CI	0,199	0,05	4,231	0,000	Supported
H3	PU	US	0,178	0,035	4,267	0,000	Supported
H4	PU	CI	0,271	0,042	6,663	0,000	Supported
H5	H	US	0,300	0,045	7,242	0,000	Supported
H6	H	CI	0,169	0,055	4,029	0,000	Supported
H7	US	CI	0,267	0,063	5,212	0,000	Supported
H8	BI	R	0,428	0,03	9,235	0,000	Supported
Model Fit Indices: CFI:0,965; CMIN/df:3,414; SRMR:0,043; GFI:0,898; AGFI:0,866; RMSEA: 0,073							

Testing Mediation Effects

User satisfaction was used as a mediator variable in the relationship between perceived ease of use - continuance intention, perceived usefulness - continuance intention, and healthology - continuance intention. To test the mediation effect of user satisfaction, two models were created. Model 1 includes all research variables except user satisfaction, Model 2 includes all research variables. Table 6 shows that comparing standardized estimated values of Model 1 and Model 2. Paths of both

models were significant (***p <0,001); however, standardized estimates decreased at Model 2.

User satisfaction as a mediator in Model 2. The relationship's standardized estimate between perceived ease of use and the continuance intention was 0,319 and significant in Model 1. Therefore, the relationship's standardized estimate between health consciousness and continuance intention decreased in Model 2 (0,199). The standardized estimate in the relationship between perceived usefulness and continuance intention was 0,317 and significant in Model 1. Hence, the relationship's standardized estimate between perceived usefulness and continuance intention decreased in Model 2 (0,271). The standardized estimate in the relationship between healthology and continuance intention was 0,247 and significant in Model 1. Hence, the relationship's standardized estimate between healthology and continuance intention decreased in Model 2 (0,169).

In conclusion, user satisfaction act as a partial mediator in the relationship between perceived ease of use- continuance intention, perceived usefulness - continuance intention, and healthology - continuance intention. In conclusion H9, H10, H11, and H12 are partially supported.

Table 6. Mediation Analysis

Hypo.	**From**	**To**	**Model 1 (Without mediator) Std. β**	**Model 2 (With mediator) Std. β**	**Result**
H9	PEU	CI	0,319***	0,199***	Partial Mediation
H10	PU	CI	0,317***	0,271***	Partial Mediation
H11	H	CI	0,247***	0,169***	Partial Mediation
Model Fit Indices (Model 1): CFI:0,965; CMIN/df:3,414; SRMR:0,043; GFI:0,898; AGFI:0,866; RMSEA: 0,073					
Model Fit Indices (Model 2): CFI:0,979; CMIN/df:3,108; SRMR:0,045; GFI:0,934; AGFI:0,904; RMSEA: 0,068					

5. Conclusion

Advisements in technology has changed how business is conducted and also affected marketing methods (Baydaş, Bayat & Yaşar, 2019). Carefully analyzing and monitoring novel product trends is essentioanl for responding to unique consumer needs. The study is grounded on the technology acceptance model that is the fundamental theory to adopt technology and extends the theory with healthology and user satisfaction. Healthology was added considering that improving health and switching to healthy behavior is one of the objectives of using smartwatches (Zhang et al., 2017). The fundamental contribution of this research is to introduce a model that extends the technology acceptance model with healtology, which is a novel term to explain health motivation. The proposed model explains that

perceived ease of use, perceived usefulness, healthology, and user satisfaction are antecedents of behavioral intention towards smartwatches. Also, this study was conducted on actual users of smartwatches rather than potential users. By investigating the satisfaction and continuance intention of actual users, the study aims to provide solutions for keeping smartwatch customers. Considering the intense competition, the-real-life suggestions are expected to be helpful.

Firstly, the findings of the study show that both perceived ease of use (β=0,199) and perceived usefulness (β=0,271) are predictors of smartwatch continuance intention. Previous literature also supports these findings (Al-Emran et al. 2020; Nascimento, Oliveira, Tam, 2018). The results confirm the appropriateness of the technology acceptance model for explaining consumers' continuance intention of smartwatches. In addition to this, it is important to highlight that users' continuance intention primarily depends on perceived usefulness rather than perceived ease of use. The result points out that having useful features that provide benefits crucial for smartwatches devices as it increases the probability of continuance intention. Furthermore, perceived usefulness is positively related to user satisfaction as also presented by (Bölen, 2020) and perceived ease of use increases customer satisfaction as also proven by Park (2020). Perceived ease of use has a higher effect on user satisfaction (β=0,438) than perceived usefulness (β=0,178), although they both contribute positively to user satisfaction.

When the hypotheses regarding healthology are investigated, it can be seen that healthology is a significant determinant of the continuance intention towards smartwatches (β=0,169). Furthermore, healthology is also related to user satisfaction (β=0,300) underlining the importance of health technology and health motivation for the users to choose smartwatch.

The study also proves that user satisfaction is positively related to continuance intention (β=0,267), which is supported by the past literature (Bölen, 2020; Park, 2020; Nascimento, Oliveira & Tam, 2018). Considering that satisfied customers are the backbone of the sustainability of the companies, it is seen that companies should place emphasis on understanding and satisfying their customers to keep them. The results also provided evidence for the relationship between continuance intention and intention to recommend smart wearables. Therefore, it can be inferred that people who intend to continue using smartwatches are more likely to recommend those devices to people around them. Lastly, the findings also proved that user satisfaction has partial mediator roles in the relationships between healthology and behavioral intention; perceived ease of use and behavioral intention; perceived usefulness and behavioral intention.

In conclusion, the findings showed that perceived usefulness has a major role in the continuance intention of smartwatches. Perceived usefulness is found as the strongest determinant of consumers' continuance intention of smartwatches, followed by user satisfaction, perceived ease of use, and healthology.

The study contributes to the literature by explaining the continuance intention of actual smartwatch users. Considering that the demand for accessories, services, and follow-up models of smartwatches also counts on the actual use of smartwatches (Bölen, 2020; Siepmann & Kowalczuk, 2021), exploring actual users' motivations a crucial subject that needs to be investigated more. In addition, this study incorporated healthology to technology acceptance model, which is a relatively novel and essential construct in smartwatch context.

The results also provide some significant insights for designers and manufacturers of smartwatches. Findings point out that smartwatches should provide obvious benefits and specific performance outcomes, satisfy customers with their functions. Furthermore, they should not require lots of effort to learn and use, and customers expect the smartwatches have health monitoring features. Those features of smartwatches will make consumers' adaptation to those devices easier and smoother. Designers of the product features of wearable health devices should keep in mind that consumers want to see clear advantages of using these products. Since those devices are sold at a premium price, unless consumers are convinced that they are capable of doing lots of things, consumers might not think it is wise to buy such expensive products. Findings also underline that consumer who have high health motivation are a considerable segment of the smartwatch market. As a final note, smartwatches are also useful for busy people who work from home, patients who avoid going to hospitals because of the covid-19 pandemic. Therefore, those technologies are expected to increase during the current pandemic and afterward. Smartwatches are also compatible with on-the go life style that is increasingly gaining population.

There are some limitations to this study. Collecting the data with convenience sampling is a limitation. Future researches may compare data from developed and developing countries. In addition, extending the research model with additional constructs such as perceived enjoyment and cost to explain consumer behavior regarding smartwatches would be fruitful. Motivations of specific smartwatch consumers can also be investigated.

REFERENCES

Ada, A. & Aksoy, R. (2020). Giyilebilir Teknolojik Ürünlerde Tüketicilerin Algıladıkları Risklerin Farklılaşması: Akıllı Saat Kullanıcılarına Dönük Bir Araştırma. *Herkes için Spor ve Rekreasyon Dergisi*, *2*(1), 50-61.

Al-Emran, M., Granić, A., Al-Sharafi, M. A., Ameen, N., & Sarrab, M. (2020). Examining the roles of students' beliefs and security concerns for using smartwatches in higher education. *Journal of Enterprise Information Management*, 1741-0398.

Al-Maroof, R. S., Alhumaid, K., Alhamad, A. Q., Aburayya, A., & Salloum, S. (2021). User acceptance of smart watch for medical purposes: an empirical study. Future Internet, 13(5), 127.

Al-Gahtani, S. S., Hubona, G. S., & Wang, J. (2007). Information technology (IT) in Saudi Arabia: Culture and the acceptance and use of IT. *Information & management*, *44*(8), 681-691.

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, *16*(1), 74-94.

Baudier, P., Ammi, C., & Wamba, S. F. (2020). Differing perceptions of the Smartwatch by users within developed countries. Journal of Global Information Management (JGIM), 28(4), 1-20.

Baydaş, A., Bayat, M., & Yaşar, M. E. (2019). An empirical research on the determination of consumer perceptions related to mobile marketing applications. *International journal of contemporary economics and administrative sciences*, *9*(2), 370-404.

Bölen, M. C. (2020). Exploring the determinants of users' continuance intention in smartwatches. *Technology in Society*, *60*, 101209.

Brown, I. T. (2002). Individual and technological factors affecting perceived ease of use of web-based learning technologies in a developing country. *The Electronic Journal of Information Systems in Developing Countries*, *9*(1), 1-15.

Cho, W. C., Lee, K. Y., & Yang, S. B. (2019). What makes you feel attached to smartwatches? The stimulus–organism–response (S–O–R) perspectives. *Information Technology & People*. *32*(2),319-343.

Chong, A. Y. L. (2013). Predicting m-commerce adoption determinants: A neural network approach. *Expert Systems with Applications*, *40*(2), 523-530.

Chuah, S. H. W., Rauschnabel, P. A., Krey, N., Nguyen, B., Ramayah, T., & Lade, S. (2016). Wearable technologies: The role of usefulness and visibility in smartwatch adoption. *Computers in Human Behavior*, *65*, 276-284.

Chuah, S. H. W., Rauschnabel, P. A., Krey, N., Nguyen, B., Ramayah, T., & Lade, S. (2016). Wearable technologies: The role of usefulness and visibility in smartwatch adoption. *Computers in Human Behavior*, *65*, 276-284.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management science*, *35*(8), 982-1003.

Dehghani, M. (2018). Exploring the motivational factors on continuous usage intention of smartwatches among actual users. *Behaviour & Information Technology, 37*(2), 145-158.

Dehghani, M., Kim, K. J., & Dangelico, R. M. (2018). Will smartwatches last? Factors contributing to intention to keep using smart wearable technology. *Telematics and Informatics*, *35*(2), 480-490.

Dehghani, M., Kim, K. J., & Dangelico, R. M. (2018). Will smartwatches last? Factors contributing to intention to keep using smart wearable technology. *Telematics and Informatics*, *35*(2), 480-490.

Dhaha, I. S. Y. A., & Ali, A. Y. S. (2014). Mediating effects of behavioral intention between 3G predictors and service satisfaction. *Jurnal Komunikasi: Malaysian Journal of Communication, 30.*

Ding, Y. (2019). Looking forward: The role of hope in information system continuance. *Computers in Human Behavior, 91*, 127-137.

Djelassi, S., Diallo, M. F., & Zielke, S. (2018). How self-service technology experience evaluation affects waiting time and customer satisfaction? A moderated mediation model. *Decision Support Systems, 111*, 38-47.

Doll, W. J., Xia, W., & Torkzadeh, G. (1994). A confirmatory factor analysis of the end-user computing satisfaction instrument. *MIS quarterly*, 453-461.

Dutot, V., Bhatiasevi, V., & Bellallahom, N. (2019). Applying the technology acceptance model in a three-countries study of smartwatch adoption. *The Journal of High Technology Management Research, 30(*1), 1-14.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, *18*(1), 39-50.

Franque, F. B., Oliveira, T., Tam, C., & de Oliveira Santini, F. (2020). A meta-analysis of the quantitative studies in continuance intention to use an information system. *Internet Research, 31*(1), 123-158.

Ghazali, E. M., Mutum, D. S., Pua, M. H. J., & Ramayah, T. (2020). Status-quo satisfaction and smartwatch adoption: a multi-group analysis. *Industrial Management & Data Systems, 120(*12), 2319-2347.

Ha, T., Beijnon, B., Kim, S., Lee, S., & Kim, J. H. (2017). Examining user perceptions of smartwatch through dynamic topic modeling. *Telematics and Informatics, 34*(7), 1262-1273.

Hair JF, Black WC, Babin BJ, Anderson RE. (2009). *Multivariate data analysis. A global perspective*. Upper Saddle River, NJ: Pearson

Hair, J., Anderson, R., Tatham, R., Black, W. (2006). *Multivariate Data Analysis*, 6th Ed., Prentice Hall, NJ.

Hair, J.F. Jr, Hult, G.T.M., Ringle, C., Sarstedt, M. A. (2013). *Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM*), Sage Publications Inc., Thousand Oaks, CA.

Han, M., Lee, S., & Kim, J. (2021). A hybrid approach to discern customer experience for facilitating the adoption of smartwatches. *Technology Analysis & Strategic Management*, 1-15.

Henseler, J., Ringle, C.M., Sarstedt, M. A. (2015). New criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*, 115-135.

Hirschman, E. C., & Holbrook, M. B. (1982). Hedonic consumption: emerging concepts, methods and propositions. Journal of marketing, 46(3), 92-101.

Hong, J. C., Lin, P. H., & Hsieh, P. C. (2017). The effect of consumer innovativeness on perceived value and continuance intention to use smartwatch. *Computers in Human Behavior, 67*, 264-272.

Hsiao, K. L. (2017). What drives smartwatch adoption intention? Comparing Apple and non-Apple watches. *Library Hi Tech, 35*(1), 186-206.

Hsiao, K. L., & Chen, C. C. (2018). What drives smartwatch purchase intention? Perspectives from hardware, software, design, and value. *Telematics and Informatics, 35*(1), 103-113.

Hu, L. T., Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*, 1-55.

Huang, C. Y., & Yang, M. C. (2020). Empirical Investigation of Factors Influencing Consumer Intention to Use an Artificial Intelligence-Powered Mobile Application for Weight Loss and Health Management. *Telemedicine and e-Health, 26*(10).

Jeong, M., Park, K., & Kim, K. (2020). A survey of what customers want in smartwatch brand applications. International Journal of Mobile Communications, 18(5), 540-558.

Jung, T., Chung, N., & Leue, M. C. (2015). The determinants of recommendations to use augmented reality technologies: The case of a Korean theme park. *Tourism management, 49*, 75-86.

Khayer, A., & Bao, Y. (2019). *The continuance usage intention of Alipay: Integrating context-awareness and technology continuance theory (TCT)*. The Bottom Line.

Kim, K. J. (2016). Round or square? How screen shape affects utilitarian and hedonic motivations for smartwatch adoption. *Cyberpsychology, Behavior, and Social Networking, 19*(12), 733-739.

Kim, K. J., & Shin, D. H. (2015). An acceptance model for smart watches. *Internet Research. 25*(4), 527-541.

Kim, M., Chang, Y., Park, M. C., & Lee, J. (2015). The effects of service interactivity on the satisfaction and the loyalty of smartphone users. *Telematics and Informatics, 32*(4), 949-960

Kim, S. J., & Cho, J. (2019). Technological and Personal Factors of Determining the Acceptance of Wrist-Worn Smart Devices. *Asian Journal for Public Opinion Research, 7*(3), 143-168.

Kranthi, A. K., & Ahmed, K. A. (2018). Determinants of smartwatch adoption among IT professionals-an extended UTAUT2 model for smartwatch enterprise. *International Journal of Enterprise Network Management, 9*(3-4), 294-316.

Leong, L.Y., Hew, T.-S., Tan, G.W.H. and Ooi, K.B. (2013), Predicting the determinants of the NFC enabled mobile credit card acceptance: a neural networks approach, *Expert Systems with Applications, 40*(14), 5604-5620.

Li, C. Y., & Fang, Y. H. (2019). Predicting continuance intention toward mobile branded apps through satisfaction and attachment. *Telematics and Informatics, 43,* 101248.

Lin, C., Lin, I.-C. and Roan, J. (2012), Barriers to physicians' adoption of healthcare information technology: an empirical study on multiple hospitals, *Journal of Medical Systems,* 36(3), 1965-1977.

Liu, D., & Guo, X. (2017). Can trust and social benefit really help? Empirical examination of purchase intentions for wearable devices. *Information Development*, *33*(1), 43-56.

Loureiro, S. M. C., Kaufmann, H. R., & Rabino, S. (2014). Intentions to use and recommend to others: An empirical study of online banking practices in Portugal and Austria. *Online Information Review, 38*(2), 186-208.

MacCallum, R. C., & Hong, S. (1997). Power analysis in covariance structure modeling using GFI and AGFI. *Multivariate Behavioral Research*, *32*(2), 193-210.

Marangoz, M., & Aydın, A. E. (2018). Tüketicilerin Giyilebilir Teknoloji Ürünlerini Benimsemesinde Etkili Olan Faktörler: Akilli Saatler Üzerine Bir Araştirma. *Pazarlama Teorisi ve Uygulamaları Dergisi, 4*(1), 1-20.

Mikalef, P., Giannakos, M. N., & Pateli, A. G. (2012, June). Exploring the Business Potential of Social Media: An Utilitarian and Hedonic Motivation Approach. In Bled eConference.

Miltgen, C. L., Popovič, A., & Oliveira, T. (2013). Determinants of end-user acceptance of biometrics: Integrating the "Big 3" of technology acceptance with privacy context. *Decision support systems*, *56*, 103-114.

Moya, M., Nakalema, S. E., & Nansamba, C. (2018). Behavioural intention: Mediator of effort expectancy and actual system usage. *Orsea Journal, 7*(1).

Nascimento, B., Oliveira, T., & Tam, C. (2018). Wearable technology: What explains continuance intention in smartwatches?. *Journal of Retailing and Consumer Services, 43*, 157-169.

Ogbanufe, O., & Gerhart, N. (2018). Watch it! Factors driving continued feature use of the smartwatch. *International Journal of Human–Computer Interaction, 34*(11), 999-1014.

Oliveira, T., Thomas, M., Baptista, G., Campos, F. (2016). Mobile payment: understanding the determinants of customer adoption and intention to recommend the technology. *Computers in Human Behavior, 61*, 404-414.

Özeltürkay, E. Y., Şahin, A., & Doğrul, Ü. (2018). Akıllı saatlerin satın alınma nedenlerini belirleyen faktörler: Keşifsel bir çalışma. *23th National Marketing Congress, 23*, 536-542.

Pal, D., Funilkul, S., & Vanijja, V. (2020). The future of smartwatches: assessing the end-users' continuous usage using an extended expectation-confirmation model. *Universal Access in the Information Society, 19*(2), 261-281.

Park, E. (2020). User acceptance of smart wearable devices: An expectation-confirmation model approach. *Telematics and Informatics, 47*, 101318.

Pfeiffer, J., von Entress-Fuersteneck, M., Urbach, N., & Buchwald, A. (2016). Quantify-me: consumer acceptance of wearable self-tracking devices.

Istanbul, 12-15 June, 2016. *24th European Conference on Information Systems (ECIS*).

Rahi, S., Ghani, M. A., & Ngah, A. H. (2020). Factors propelling the adoption of internet banking: the role of e-customer service, website design, brand image and customer satisfaction. *International Journal of Business Information Systems, 33*(4), 549-569.

Rahman, M. S., Das, S., Hossain, G. M. S., & Tajrin, T. (2021). Teenagers' behavioural intention towards wearable technologies and intention to recommend others: an empirical study in Bangladesh. *Journal of Science and Technology Policy Management,* 2053-4620.

Sabbira, M. M., Akterb, S., Khanc, T. T., & Dasd, A. (2020). Exploring Factors Affecting Consumers' Intention to Use Smartwatch in Bangladesh: An Empirical Study. Asia Pacific Journal of Information Systems, 30(3), 636-663.

Sekaran, U., & Bougie, R. (2011). *Business Research Methods: A skill-building approach*. Chichester: John Wiley& Sons Ltd.

Sergueeva, K., Shaw, N., & Lee, S. H. (2020). Understanding the barriers and factors associated with consumer adoption of wearable technology devices in managing personal health. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration, 37*(1), 45-60.

Siepmann, C., & Kowalczuk, P. (2021). Understanding continued smartwatch usage: the role of emotional as well as health and fitness factors. *Electronic Markets*, 1-15.

Sun, Y., Liu, L., Peng, X., Dong, Y., & Barnes, S. J. (2014). Understanding Chinese users' continuance intention toward online social networks: an integrative theoretical model. *Electronic Markets, 24(*1), 57-66.

Talukder, M. S., Chiong, R., Bao, Y., & Malik, B. H. (2019). Acceptance and use predictors of fitness wearable technology and intention to recommend. *Industrial Management & Data Systems, 119*(1), 170-188.

Tarhini, A., Al-Busaidi, K. A., Mohammed, A. B., & Maqableh, M. (2017). Factors influencing students' adoption of e-learning: a structural equation modeling approach. *Journal of International Education in Business, 10*(2), 164-182.

Van De Bogart, W., & Wichadee, S. (2015). Exploring students' intention to use LINE for academic purposes based on technology acceptance model. *International Review of Research in Open and Distributed Learning*, *16*(3), 65-85.

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

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,* 157-178.

Venkatesh, V. (2021). Adoption and use of AI tools: a research agenda grounded in UTAUT. Annals of Operations Research, 1-12.

Wang, H., Tao, D., Yu, N., & Qu, X. (2020). Understanding consumer acceptance of healthcare wearable devices: An integrated model of UTAUT and TTF. *International Journal of Medical Informatics,* 104156.

Wang, X., White, L., Chen, X., Gao, Y., Li, H., Luo, Y. (2015). An empirical study of wearable technology acceptance in healthcare. *Industrial Management & Data Systems, 115,* 1704-173.

Wen, D., Zhang, X., & Lei, J. (2017). Consumers' perceived attitudes to wearable devices in health monitoring in China: A survey study. *Computer Methods and Programs in Biomedicine, 140*, 131-137.

Wong, C.H., Tan, G.W.H., Loke, S.P. and Ooi, K.B. (2015), Adoption of mobile social networking sites for learning, *Online Information Review, 39*(6), 762-778.

Wu, L. H., Wu, L. C., & Chang, S. C. (2016). Exploring consumers' intention to accept smartwatch. *Computers in Human Behavior, 64*, 383–392.

Yang, H., Yu, J., Zo, H., & Choi, M. (2016). User acceptance of wearable devices: An extended perspective of perceived value. *Telematics and Informatics, 33*(2), 256-269.

Yıldız, B., & Kütahyali, D. N. (2021). Tüketici yenilikçiliğinin akıllı saat kullanmaya devam etme niyeti üzerindeki etkisinde hedonik ve faydacı değerin aracı rolü. *Alanya Akademik Bakış, 5*(2), 705-726.

Zhang, J., Sun, L., & Khan, A. (2018). A review and assessment of the existing health consciousness models. *International Management Review, 14*(1), 17-23.

Zhang, M., Luo, M., Nie, R., & Zhang, Y. (2017). Technical attributes, health attribute, consumer attributes and their roles in adoption intention of healthcare wearable technology. *International journal of medical informatics, 108*, 97-109.