Telematics and Informatics xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Telematics and Informatics

journal homepage: www.elsevier.com/locate/tele

Will smartwatches last? factors contributing to intention to keep using smart wearable technology

Milad Dehghani[a], Ki Joon Kim[b,*], Rosa Maria Dangelico[a]

[a] Department of Computer, Control, and Management Engineering, Sapienza University of Rome, Italy
[b] Department of Media and Communication, City University of Hong Kong, Kowloon, Hong Kong

ARTICLE INFO

Keywords:
Wearable technology
Smartwatch
Technology acceptance
Continuous intention
Actual usage

ABSTRACT

This study aims to deepen our understanding of the underlying factors affecting the intention to continue using increasingly popular wearable technology. A new theoretical model is developed and validated to extend traditional technology acceptance theories by identifying several value drivers of the continuous intention and actual usage of wearable devices. Hypotheses were tested using partial least squares path modeling on data collected from 383 actual smartwatch users. The results provide wearable device manufacturers with practical guidance for optimizing competition strategies. They also offer policy-making insights for practitioners to promote better wearable devices on the market, especially during the early stages of adoption.

1. Introduction

With the prevalence of mobile devices today, consumers can actively engage in the consumption of various offerings whenever and wherever they desire (Page, 2013). The popularity of mobile technologies has led to the emergence of smart wearable devices (Fang and Chang, 2016). Terms such as “smart wearable technologies” or “wearable devices” are used to describe seamlessly embedded portable computers and advanced electronics that can be worn on the body and allow for interactions between users and a smart environment (e.g., smart home appliances) anytime, anywhere (Dehghani and Dangelico, 2017). The successful introduction and application of these new devices allow for the production of a new generation of high-value-added products (Chuah et al., 2016). A 2016 report by the International Data Corporation (IDC) estimated that global wearable vendors would account for close to 214 million shipments by 2020. According to a wearable technologies database (Vandrico) in 2017, 427 devices have been identified across a range of industries, including the medical, entertainment, fitness, industrial, gaming, and lifestyle sectors. Smartwatches, smartglasses, clothing, headbands, wristbands, and jewelry (e.g., bracelets, rings, necklaces, and earrings) are examples of smart wearable products.

In the mobile device industry, smartwatches have been widely identified as the “next big thing” that will have a significant impact on our daily lives (Tehrani and Michael, 2014). Recent investments in smartwatches by mobile tech giants such as Apple, Samsung, and Motorola reflect the advancing era of smart wearable devices. Smartwatches (e.g., Samsung Galaxy Gear, Fitbit) are especially popular and have been hyped for possessing a multifunctionality that covers a broad range of consumer interests, such as health monitoring and fitness (Patel et al., 2015). Recent IDC polls on smartwatch adoption forecast that the market will continue to grow at an exponential rate: 373 million shipments in 2020, up from 100 million in 2016. According to that report, smartwatches—such as the Apple Watch and Android Wear devices—accounted for a quarter of all smart wearables in 2016, which is projected to increase to

* Corresponding author at: Department of Media and Communication, City University of Hong Kong, M5084 Run Run Shaw Creative Media Centre, 18 Tat Hong Avenue, Kowloon, Hong Kong.
E-mail address: kj.kim@cityu.edu.hk (K.J. Kim).

https://doi.org/10.1016/j.tele.2018.01.007
Received 29 October 2017; Received in revised form 14 January 2018; Accepted 16 January 2018

one-third by 2020.

With regard to technology adoption theories, research has come a long way, and many modifications have been made to account for new technological changes only implied in the original models (Davis, 1989; Venkatesh and Bala, 2008). However, in addition to technological changes, consumers have also changed as technology has become integrated into their daily lives (Venkatesh et al. (2012)). Furthermore, upon closer empirical examination of interactions with mobile technology devices (e.g., smartwatches), we find that consumers not only adopt these innovative products but also come to live with them over time. A number of technology acceptance models—such as the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)—have been proposed to examine various antecedents for technology adoption. However, they do not fully account for changes in use behaviors far into the future and with new technologies—especially mobile technology products. Since these emerging smart wearable devices are designed to be physically attached to the body, they should possess unique factors (e.g., aesthetic appeal).

Furthermore, there is a need for new constructs to consider technological contexts, accounting for continuous intentions and actual usage with these new devices. Therefore, we expect that this study will contribute to the existing literature in several aspects. First, this research introduces a new technology model and new determinants of continuous usage intention regarding mobile technology devices in particular smartwatches. Second, this study considers actual users who are involved with different brand preferences, as compared to previous studies on smartwatches, which collected their samples from potential users. Thus, this study aims to introduce a technology model based on new determinants in order to predict smartwatch usage, with suggestions and implications regarding future mainstream market demands. Finally, since the implications for technology consumers are presented based on use behaviors, values, and preferences, this paper can serve as a reference for companies when establishing marketing strategies for the successful early adoption of mobile technology devices and find the factors which affect abandoning smartwatches in the early stage of products.

The rest of this paper is organized as follows. Section 2 describes the theoretical background regarding wearable technology and especially smartwatches, followed by the development of our research model in Section 3. Section 4 describes the research method while Section 5 provides the results of the study. Finally, in Section 6, a discussion of the results is provided. Future research avenues are identified, and implications for research and practice are provided.

2. Theoretical background

2.1. Innovations in the smartwatch industry

Wearable devices are used externally on the body, attached as embedded or accessory devices (Raskovic et al., 2004). These smart technologies can be used in various applications equipped with Internet connections, processors, sensors, and operating systems. Users of watch and wristband types of wearable devices can receive text messages, e-mail, and phone notifications without having to pull out their cell phones. Smartwatches are not intended to replace smartphones but to work mostly as satellite devices to access requested data via a “wireless Bluetooth connection” from a paired smartphone. Furthermore, smartwatches provide faster and more convenient access to information, especially when using a smartphone is impractical. Earlier studies have conceptualized and defined smartwatches as shown in Table 1. Elaborating on these descriptions, this study defines a smartwatch as a multifunctional wrist-worn device that provides fast, convenient access to information and applications via a wireless/Bluetooth connection.

2.2. Previous studies on smart wearable technologies

Since smart wearables, and specifically smartwatches, are considered mobile technology devices by consumers, their social acceptance needs to be evaluated. Despite the wide use of technology adoption theories to assess different technologies, limited research has been devoted to evaluating consumers’ adoption of smart wearable devices. This section provides a brief overview of the

Table 1
Definitions of smartwatches.

Authors and Year	Definition
McIntyre (2014)	“Smartwatch is a multi-functional device that appeals to a broad range of user interests, including not only fitness, health-monitoring, and location tracking but also extended communication and smart features”
Kim and Shin (2015)	“Smart watches serve mostly as satellite devices for amassing useful data from a paired smartphone via wireless Bluetooth connection and providing more convenient, faster, and substitutable access to information, especially as its information processing is less demanding and using a smartphone is sometimes impractical”
Cecchinato et al. (2015)	“A wrist-worn device with computational power that can connect to other devices via short-range wireless connectivity; provides alert notifications; collects personal data through a range of sensors and stores them; and has an integrated clock”
Choi and Kim (2016)	“A smartwatch is a unique form of information technology in that its shape resembles an item that has been a close companion to us humans for many centuries, namely the ‘wristwatch”
Chuah et al. (2016)	“A mini device that is worn like a traditional watch and allows for the installation and use of applications”
Hsiao, 2017	“Smartwatch is devices that can connect with smartphones and receive a lot of information, such as time, text messages, schedules, and GPS data. While it can perform basic data and communications tasks, it is also capable of running mobile applications”