Wearable technology: What explains continuance intention in smartwatches?

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Abstract: Smartwatch is a recent and significant development in the domain of wearable technology. We study continuance intention and its determinants, using a combination of the expectation-confirmation model (ECM) with habit, perceived usability, and perceived enjoyment, to explain the continuance intention of smartwatches. Based on a sample of 574 individuals collected from the U.S.A., we show that relationships of ECM enhance the continuance intention, such as confirmation, perceived usefulness, and satisfaction, and also the role of habit and perceived usability. Additionally, we find that habit was the most important feature to explain the continuance intention of smartwatches. The paper ends with a discussion of the study's limitations and implications.

Keyword: Smartwatches; Wearables; Continuance Intention; Expectation-Confirmation Model (ECM); Habit; Perceived Usability

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1. Introduction

The smartwatch is a subcategory of smart wearable devices. It is "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" (Cecchinato, Cox, & Bird, 2015). Smartwatches give people lightweight and immediate access to messages, notifications, and other digital data while on the go. The global market has witnessed sustained growth in the acceptance of wearable devices in the last few years. By Q4 2014, one in every five Americans already owned some wearable device (PwC, 2014a). Wearable technology has a great potential and a growing acceptance as a novelty technology, but it is essential to study the intention of users to continue using it so that both companies and consumers can benefit.

Companies benefit from the continued use of technology not only because the cost of acquiring a new customer is five times that of retaining an existing user (Reichheld & Schefter, 2000), but also because IS success depends on continued use rather than first time use (Bhattacherjee, 2001; Zheng, Zhao, & Stylianou, 2013). In addition, according to Gao, Waechter, and Bai (2015), acquiring new customers and promoting usage is only the first step; companies also need to retain existing users and facilitate their continued purchase. While smartwatch sales cycles might be long (typically new devices are released only once per year), one must look at the bigger picture of app sales to understand how the continued use of a device is important. In 2016, developers selling apps on the App Store earned over $20B (Apple, 2017), and total revenue was likely to top $28B as Apple takes a 30% cut (Dignan, 2017). It can be assumed that the longer a user keeps using a device, the more apps they will buy, and the more profit they will generate for the company – hence the importance of studying continued use. Continued use is also important from a loyalty perspective. Earlier research suggests that satisfied customers have a higher probability of returning to the same brand they purchased (Lee, Choi, & Kang, 2009).

Consumers benefit from the continued use of a smartwatch because as a novelty technology, the more they use it, the more they can find out how it fits into their life, which is not always immediate: they can buy it for the novelty factor, due to good marketing, because someone else has it, or simply because they are early adopters, but it does not mean that they will immediately find a use (anecdotal evidence from the discussion boards we used in this study supports this belief). Furthermore, the more they use it, the easier it will be for them to use it (Gefen, 2004). Lastly, and most importantly, the more they use it, the more a company is likely to invest back into the product based on user feedback, and the more app developers are likely to develop apps, further benefiting the users.

Wearable technology and especially smartwatch technology, are exciting new technologies to be investigated because they allow for the continuous and reliable collection of data (Rawassizadeh, Price, & Petre, 2015) and the augmentation of human abilities and capabilities (Starner, 2001). The data collected have considerable potential in, for example, mobile health (mHealth) applications, not only for a healthier lifestyle, but especially with care of the elderly. At the same time, studies on this topic are relatively few, and mostly done by non-independent third-parties; hence the importance of an independent study to understand the continuance intention of IT.

The contribution of this research is fourfold. First, most extensive research has been conducted on the topic of technology acceptance, but the topic of technology continuance intention has a greater impact on the long-term viability of an information system (Bhattacherjee, 2001b). For this reason, this study aims to extend the knowledge on the latter topic.

Secondly, empirical work regarding wearables and, in particular, smartwatches is scarce. According to Juniper Research (Moar, 2016), an estimated 17.1 million smartwatches were shipped in 2015. Wearables, and in particular, smartwatches, do show potential benefits but are still far from reaching mainstream acceptance that is similar to that of smartphones (Danova, 2014). In fact, according to the PwC report (PwC, 2014b), only one in ten Americans used a wearable device every day in 2014. In 2015, North America accounted for roughly 40% of the global wearables market (Cisco, 2016). With a global revenue of $750M in 2012 (Ak, 2014), the smartwatch market is expected to reach $32.9B in 2020, growing at a compound annual growth rate of 67.6% (Kohli, 2015). Despite this growth, consumers still show some reluctance toward smartwatches (Danova, 2014; PwC, 2014b). With a big market and growth, smartwatches are an interesting technology to be studied. Also, very few studies were found by the authors on the topic of smartwatch continuance intention. A major contribution of this study is, in fact, the extension of the knowledge on this topic.

Third, this study extends the original empirically validated post-acceptance theoretical model, the expectation-confirmation model (Bhattacherjee, 2001). This model has been tested, for example, with smartphones (Choi & Yoo, 2015), e-learning (Lee, 2010), mobile internet (Hong, Thong, & Tam, 2006), and online banking (Bhattacherjee, 2001). Smartwatches, however, have several different characteristics from these technologies and one should expect the factors that influence their continued use to be different as well. Bhattacherjee's model is a good starting point, but it does not take into account specific smartwatch characteristics (e.g., the hedonic component, the small form factor, the novelty of the technology), and thus an extended model could provide a more complete explanation about users' post-adoption behaviour. Therefore, this study introduces constructs that correspond to those smartwatch specific characteristics, and which might account for more variance than the original model. They are: perceived enjoyment (due to the hedonic component of wearable technology (Wakefield & Whitten, 2006)), perceived usability (due to the small screen of the device (Budiu,

2015)), and habit (due to the novelty of the technology (Polites & Karahanna, 2012)). Investigating the habit that moderates the satisfaction and continuance intention may explain users' beliefs and behaviours toward their smartwatches. This study also tests this extended model with the topic of smartwatches for the first time.

Fourth, as a new technology, smartwatches are still understudied. This study may, therefore, help brands to understand the determinant factors that influence the continued use of the technology, and ultimately to develop products that deliver the most value to retain customers.

The structure of the paper is as follows. In the next section the concepts of wearables, smartwatches, continuance theory, and expectation-confirmation model are presented. Then, the research model is conceptualized. Then, the design, methodology, and results of this research are presented. Finally, the results of the study are discussed, including its implications for theory and practice, and possible further research directions are outlined.

2. Theoretical Background

2.1. The concepts of wearable technology and smartwatches

Wearable technology is a form of ubiquitous computing, according to Weiser (1991), as it weaves itself into the fabric of everyday life until it is indistinguishable from it. It translates the concept of having computing everywhere and anywhere, and also extends the mobile concept, as it can appear on any device, in any format, and at any location. Regarded as the father of wearable computing, Mann (1998) defines it as a computer that is always on and always accessible. Buenaflor and Kim (2013) define it as an electronic device that functions as a computer and can be worn, carried, or attached to the body. Some of the most common integrations of wearable technology include clothing (Kosir, 2015), glasses/goggles (such as the Google Glass and the Oculus Rift), bracelets (such as the Fitbit and Jawbone brands), and watches (such as the Apple Watch and the Samsung Galaxy Gear S).

Wearable technology is revolutionary in the sense that it is present at all times, and thereby allows an augmented interaction with the world around the user. For Mann (1998), wearables have a constancy characteristic, meaning that they do not need to be turned on or opened up before use. Salah, MacIntosh, and Rajakulendran (2014) suggest that in any industry in which hands-free data collection is highly valued, wearable devices have greater potential than smartphones. In addition, whenever information or communication is required, a hands-free interface is helpful, and consistent monitoring is beneficial. In several application areas of wearable technology, such as the medical industry (Park & Jayaraman, 2003; Pentland, 2004; Salah et al., 2014), wearables are also important in one's work and personal life for managing information (Billinghurst & Starner, 1999) and connecting in new ways (PwC, 2014a).

For Smartwatch Group, a smartwatch is defined by being worn on the wrist, able to indicate time, and being wirelessly connected to the internet (Smartwatch, 2015). For Rawassizadeh et al. (2015) a smartwatch is not just a device that tells time, but a general-purpose, networked computer with an array of sensors. Considering these many definitions, this study narrows those definitions and considers: *Smartwatch to be a device that is worn on the wrist, has a screen, is wirelessly connected to the internet on its own or through a smartphone, contains sensors (such as accelerometers, IR sensors, etc.), and can run either proprietary or third-party apps.*

Smartwatches might be easier to operate in certain work conditions due to their (mostly) water resistance, their battery life that lasts several days to years, and sensors that enable possible gesture interactions (Bieber, Kirste, & Urban, 2012). As a platform, a smartwatch is only as good as the quality of the apps it has at its disposal (O'Reilly, 2015). Apple is slightly ahead of other major players in the market when considering the number (Curry, 2015) and quality (Mitroff, 2012) of apps. According to the PwC (2014a) report on wearables, the Apple Watch is the sleek device that will help mainstream the entire wearable category, and users will adopt this technology, but only *if it is useful, interesting, and/or fun*. The growing amount of recent smartwatch studies reveals the increasing interest in this field. The target of these recent studies is purchase intention (Hsiao & Chen, 2018), continuance intention (Hong, Lin, & Hsieh, 2017), behavioural intention (Choi & Kim, 2016; Wu, Wu, & Chang, 2016), and adoption (Chuah et al., 2016). In the current study we focus on continuance intention of smartwatch, applying ECM model combined with perceived enjoyment, perceived usability, and habit to explain users' beliefs and behaviours to the continuance use.

2.2. Continuance Theory

Technology acceptance and use has been covered extensively by the information systems (IS) literature (Davis, 1989; Venkatesh, Morris, Davis, & Davis, 2003). However, according to Bhattacherjee (2001) and Zheng et al. (2013), IS success depends on continued use rather than first time use. Besides, companies benefit from the continued use of technology because the cost of acquiring a new user is five times that of retaining an existing user (Reichheld & Schefter, 2000). Furthermore, according to Gao et al. (2015), acquiring new customers and promoting usage is only the first step; companies also need to retain existing users and facilitate their continued purchase. Therefore, the topic of continued use is of growing importance in an ever-growing competitive landscape. This topic has been investigated with different technologies, including e-learning (Lin, 2011), internet banking (Eriksson & Nilsson, 2007), social networking (Jin, Cheung, Lee, & Chen, 2009), and personal IT devices (Chen, 2014).

Bhattacherjee (2001b) argues that when considering IS success, the initial acceptance of IS plays a significant role, but ultimately, it is the continued used that will determine its long-term viability.

Earlier studies have also considered the importance of continuance intention, including Rogers (2003) five-stage diffusion of innovations (DOI) theory. The DOI theory incorporates the decision to continue or discontinue the use of technology in its final confirmation stage. However, Rogers' (2003) study, like earlier ones, uses the same "pre-acceptance variables to explain both acceptance and continuance decisions" (Bhattacherjee, 2001b), and thus, does not account for users who discontinue IS usage after previously accepting it. Based on that, and motivated by the research gap, we provide further insights on technology continuance intention having a greater impact on the long-term viability of an IS (Bhattacherjee, 2001b).

2.3. Expectation-Confirmation Theory and Expectation-Confirmation Model

The expectation-confirmation theory (ECT), or expectation-disconfirmation theory (EDT), typically used in the marketing field, provides an explanation for consumers' repurchase intention through satisfaction. This theory demonstrates that consumers reach a repurchase intention in the following way. Before purchase, the consumers have expectations about specific products or services (Oliver, 1980) that are based on existing knowledge and prior experience (Zeithaml, Parasuraman, & Berry, 1990). This existing knowledge can be attained through the interactions with different branches of the communication channels, whether they are represented by mass-media or one-to-one marketing, and also from feedback from earlier users and discussions amongst peer consumers (Premkumar & Bhattacherjee, 2008; Rogers, 2003). Depending on these factors, the extent of the expectations can vary for different customers for the same product (Tse & Wilton, 1988).

Consumers might form perceptions about the performance of a product or service. However, if the information about the product or service is misleading, expectations will not be realistic (Boulding, Lee, & Staelin, 1994; Oliver, 1980). Figure 1 illustrates the expectation-confirmation theory process, which ultimately leads to a level of satisfaction.

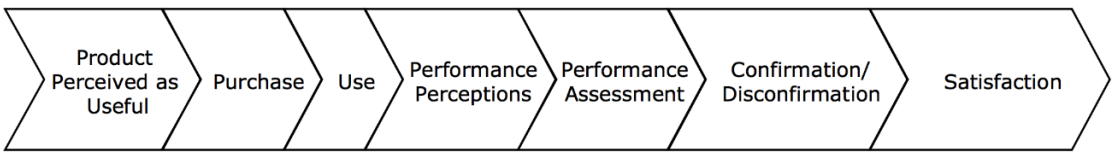

Figure 1 - Expectation-Confirmation Theory process

However, traditional ECT is limited when explaining the formation process of IS expectation (Khalifa & Liu, 2004). Consumers might wish to purchase a product even without having formed

strong expectations. Moreover, an IS that has an element of novelty may invoke expectations that vary from user to user. ECT deals with beliefs and attitudes toward a product's attributes or performance (Olson & Dover, 1979), but does not capture its quality factors. In response to this, IS researchers have adapted the ECT to overcome its limitations.

The most popular adaptation is that of Bhattacherjee (2001b): the expectation-confirmation model (ECM). The ECM (see, Figure 2) is established around the assumptions of the IS continuance theory, in which satisfied IT users are also more likely to use the technology continuously (Bhattacherjee, 2001b; Deng, Turner, Gehling, & Prince, 2010). It improves upon the ECT and previous models by focusing on post acceptance variables such as perceived usefulness, a post-usage expectation, rather than on pre-usage expectations. The ECM postulates that "the effects of any pre-acceptance variables are already captured within the confirmation and satisfaction constructs" (Bhattacherjee, 2001b).

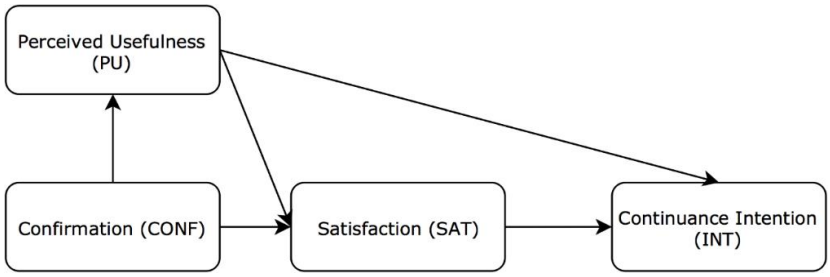

Figure 2 – Expectation-Confirmation Model (Bhattacherjee, 2001)

For instance, the perceived usefulness in Davis (1989) technology acceptance model (TAM) refers to a pre-usage usefulness, but in Bhattacherjee (2001b) ECM, it refers to a post-usage usefulness that reflects a long-term belief as a result of accumulated usefulness perceptions. The ECM builds on the ECT and adapts it to the context of IT continuance, not only by replacing ECT's expectation with post-usage perceived usefulness, but also by replacing ECT's repurchase intention with continued usage intention. Bhattacherjee's (2001b) model also removes the performance construct of ECT by assuming that the influence of perceived performance is explained by confirmation, which is defined as "the congruence between expectation and actual performance" (Bhattacherjee, 2001b).

The ECM has been well researched and validated in several technologies such as mobile banking (Susanto, Chang, Zo, & Park, 2012), microblogging (Barnes & Böhringer, 2011), and mobile internet (Hong et al., 2006). However, some studies (e.g. Sørebø, Halvari, Gulli, & Kristiansen, 2009; Thong, Hong, & Tam, 2006) have criticized the ECM for overlooking the role of users' intrinsic motivation in IT usage, which might also be a key user belief that affects continuance intention. As a matter of fact, this is one of the main reasons why Cheng (2014) extended the ECM with extrinsic and intrinsic motivators and tested the extended model with e-learning. Thong, Hong, and Tam (2005) extended the ECM with the perceived ease of use construct from TAM in the context of mobile data services.

Baker-Eveleth and Stone (2015) extended the ECM with usability because according to Agarwal and Venkatesh (2002) and Venkatesh and Davis (2000), a system's interface quality, often measured as usability, has been shown to influence technology adoption and use in meaningful ways. Thong, Hong, and Tam (2006) posit that the technology adoption literature has identified perceived ease of use and perceived enjoyment to play a salient role in user acceptance of technology, and as such, extended the ECM with these constructs. Their study is motivated by their belief that there may be various user expectations and beliefs that determine users' continued IT usage behaviour other than the one theorized in the original ECM. Likewise, Lee (2010) extends the ECM because it employs only three variables to explain behavioural intention. Lastly, Barnes and Böhringer (2011) draw from the literature to extend the ECM with the habit construct. When it comes to wearable technology and smartwatches, however, research on the continuance intention of the technology is virtually non-existent. Nonetheless, smartphones share some characteristics with wearables/smartwatches (mobility, always-on connection, type of applications, etc.), so a few parallels can be drawn between the two. However, research on the continuance intention to use smartphones is also scarce. This research fills this gap in the literature by analysing the continuance intention.

2.4. Habit

Habit and its explanatory and predictive capacity have been previously studied in contexts including enterprise resource planning implementations (Jasperson, Carter, & Zmud, 2005), web-based IS (Kim & Malhotra, 2005), internet based communication tools (Limayem & Hirt, 2003), mobile data services and applications (Kim, 2012), e-leaning (Limayem & Cheung, 2010), online gambling (Jolley, Mizerski, & Olaru, 2006), virtual communities (Li, 2016), e-commerce (Liao, Palvia, & Lin, 2006), microblogging (Barnes & Böhringer, 2011), and self-tracking devices (Buchwald, Letner, Urbach, Entreß-fürsteneck, & Urbach, 2015). It should be noted that in IS research, the TAM and other derived models deal mainly with conscious decisions and intentional behaviours that relate to the initial adoption of technology in a mandatory environment (Davis, Bagozzi, & Warshaw, 1989; Davis, 1989). The ensuing modifications, and extensions of the TAM were essentially intended for a broader explanation of intentional and conscious IS usage (Karahanna, Straub, & Chervany, 1999; Taylor & Todd, 1995; Venkatesh, Morris, Davis, & Davis, 2003).

However, if an IS has been well accepted after its initial adoption and has been continuously used voluntarily, then the behaviours that derive from habitual usage play a more influential role, while conscious behavioural intention is diminished (Guinea & Markus, 2009; Kim, Malhotra, & Narasimhan, 2005; Limayem, Hirt, & Cheung, 2007). Ouellette and Wood (1998) also contributed with a wide review of past research on the role of habit in predicting future intentions and behaviour,

reporting significant empirical evidence that supports a direct relationship between past behaviour and intentions regarding future behaviour.

Even more meaningful is the direct effect that past behaviour has on future behaviour in stable contexts that is well beyond the effect of intention (Ouellette & Wood, 1998). Likewise, Conner and Armitage (1998) also found empirical evidence of a direct relationship between both past behaviour and intentions and past behaviour and future behaviour. Most importantly, habitual users of technology are more likely to adopt the latest technologies time and time again (Jasperson et al., 2005; Kim et al., 2005; Limayem et al., 2007).

2.5. Perceived Enjoyment

Perceived enjoyment has been studied in the context of online auctions (Turel, Serenko, & Giles, 2011), t-commerce (Yu, Ha, Choi, & Rho, 2005), internet (Teo, Lim, & Lai, 1999), instant messaging (Lu, Zhou, & Wang, 2009), movie websites (Hans van der Heijden, 2004), mobile internet services (Verkasalo, López-Nicolás, Molina-Castillo, & Bouwman, 2010), and mobile games (Ha, Yoon, & Choi, 2007).

Heijden (2004) classified IS into utilitarian and hedonic. While utilitarian IS has the objective of increasing the user's task performance at the same time as encouraging efficiency, hedonic IS should provide enjoyment rather than instrumental value to the user, at the same time as encouraging prolonged rather than productive use. Wu and Holsapple (2014), however, say that it is reasonable to accept that some IS can play double roles in one's life, improving productivity and providing pleasure, and perhaps, reinforcing one another.

Bruner and Kumar (2005) indeed suggest perceived enjoyment as the greatest predictor on consumers' attitude when compared to the utilitarian factors – ease of use and usefulness – in a handheld internet device usage context.

3. Research model

This research addresses a technology that accompanies the user throughout the day and is more immediate than the smartphone. Information and user interface (UI) density in the small screen of the smartwatch might pose a problem when considering its continuance intention, and thus, the usability of the device must also be taken into consideration. Since this is a relatively new technology, using it may not be immediate, and overcoming certain less positive aspects of the device may require a degree of habit. Therefore, we propose a research model that is based on the well-grounded theoretical ECM model of Bhattacherjee (2001b) that includes the added constructs of perceived enjoyment, perceived usability, and habit. In this section each of the determinants of the ECM

(perceived enjoyment, perceived usability, and habit) are defined and the role of key moderators are specified. Figure 3 shows the research model.

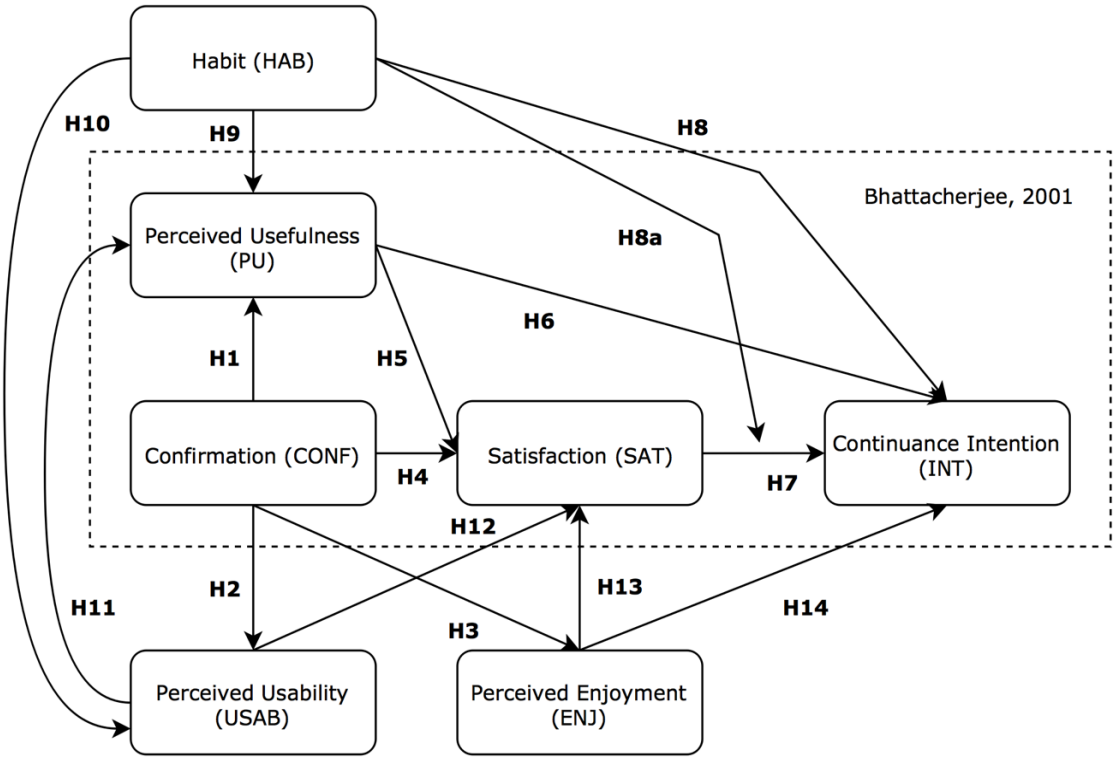

Figure 3 - Research model

3.1. Confirmation

Phenomena identified as cognitive dissonance may occur, when pre-acceptance usefulness perceptions are not confirmed in the post-purchase period (Bhattacherjee, 2001b; Festinger, 1957). In order to minimize this dissonance, users might adjust their perceptions of usefulness to match reality. According to research, confirmation leads to an increased perception of usefulness, and disconfirmation to a decreased one (Chiu, Hsu, Sun, Lin, & Sun, 2005; Roca, Chiu, & Martínez, 2006; J. Y.L. Thong et al., 2006). Despite the fact that the level of performance is captured by confirmation as posited by the ECM (Bhattacherjee, 2001b), it is likely that confirmation also influences the post-acceptance perceived usability and perceived enjoyment as expected benefits, which in turn motivate users to use continuously (Bhattacherjee & Barfar, 2011). According to Lin, Wu, and Tsai (2005), it is indeed expected that confirmation has an impact on perceived enjoyment. Thus, we hypothesize:

H1. Confirmation (CONF) has a positive impact on Perceived Usefulness (PU).

H2. Confirmation (CONF) has a positive impact on Perceived Usability (USAB).

H3. Confirmation (CONF) has a positive impact on Perceived Enjoyment (ENJ).

The research of Bhattacherjee (2001b) and Limayem, Hirt, and Cheung (2007) show that the level of users' confirmation positively affects their satisfaction with the technology. If the initial expectation is closer to, or lower than, the user's actual experience, it is expected that they have more satisfaction. In contrast, if the initial expectation exceeds the user's actual experience, dissatisfaction will occur. As such, we hypothesize:

H4. Confirmation (CONF) has a positive impact on Satisfaction (SAT).

3.2. Perceived Usefulness

According to Davis (1989), the perceived usefulness represents users' perceptions of the expected benefits of using an IS. It is connected with the aspect of performance of IS use (Bhattacherjee, 2001b; Venkatesh, Thong, Chan, Hu, & Brown, 2011). Not only does Bhattacherjee's (2001b) study establish a positive relationship between perceived usefulness and satisfaction, and perceived usefulness and continuance intention, but subsequent studies (Limayem et al., 2007; Lin et al., 2005; Venkatesh et al., 2011) also reinforce that relationship. The more benefits that users derive from smartwatches, the more satisfied they are, and thus, the more likely they are to continue using them. We therefore hypothesize:

H5. Perceived Usefulness (PU) has a positive impact on Satisfaction (SAT).

H6. Perceived Usefulness (PU) has a positive impact on Continuance Intention (INT).

3.3. Satisfaction

In the marketing literature, satisfaction is identified as a critical factor when considering customer loyalty. Satisfaction is considered key to building and retaining a loyal base of long-term consumers. Similarly, that relationship is also expected in the context of IS, in which satisfaction with an IS tends to reinforce a user's intention to continue using the system (Limayem et al., 2007). Bhattacherjee's body of work indicates that satisfaction is indeed a fundamental determinant in post-acceptance behaviour (Bhattacherjee, 2001b; Bhattacherjee & Barfar, 2011; Lin & Bhattacherjee, 2008). Although there is a certain cost of switching, it is expected that satisfied smartwatch users will continue to use them. Therefore, we posit:

H7. Satisfaction (SAT) has a positive impact on Continuance Intention (INT).

3.4. Habit

Limayem et al. (2007) define IS habit as the extent to which people tend to perform behaviours (use IS) automatically because of learning. Although conscious intention (motivated by both emotional and cognitive responses) is repeatedly mentioned by top IS researchers, the occasional or regular IT use could be habitual (Guinea & Markus, 2009). As one repeatedly carries out an action, one tends to

become better at doing that action (Ronis, Yates, & Kirscht, 1989). It is also expected that the more accustomed a user is to a technology, the greater the intention of continuing using it. According to Gefen (2003), habit does have a positive impact on the continued use intention. We thus hypothesize:

H8. Habit (HAB) has a positive impact on Continuance Intention (INT).

The mechanisms that trigger satisfaction in response to the action might become automatic over time (Verplanken & Aarts, 1999). Oliver (1980) defines satisfaction as a transient, experience-specific affect (expressed or observed emotional response). With the repeated use of technology, the overall relevance of evaluation decreases as a motivator of behavioural intention (Kim & Malhotra, 2005). It is therefore posited that the greater the habitual usage of the technology, the smaller the impact of satisfaction as a user evaluation on continuance intention. To better explain what this theoretical reasoning means, consider the following example: when a user is still in an initial usage stage he or she may be satisfied with the overall experience of the smartwatch, and thus, intend to continue using it, or dissatisfied, and have little intention of continuing to use it. After using the smartwatch for a longer period, it is expected that it will become more natural to them. This habit may make it so that, as the novelty wears off, and a certain awkwardness of the device is overcome, the initial satisfaction or dissatisfaction is moderated. Also, perhaps due to the cost of switching, the user may intend to continue using the smartwatch since it has become more automatic. We therefore posit:

H8a. Habit (HAB) moderates the effect of Satisfaction (SAT) on Continuance Intention (INT), such that the effect is weaker among people with high level(s) of Habit (HAB).

Gefen, Karahanna, and Straub (2003) posited that knowledge about a technology is gained through its habitual use, and thus, with habit users should learn how to operate it. This heightened understanding should translate into a greater perception of the usefulness of the technology. Karahanna, Straub, and Chervany (1999) also report evidence that compared to those with limited experience, users who have more experience with an IT might perceive more technology usefulness. At the same time, Gefen et al. (2003) also found that familiarity translated into a greater perceived ease of use and less cognitive effort expenditure. Karahanna et al.'s (1999) research also supports this position, as users find an IT easier to use with experience. With frequent mobile phone usage, a mental model of how it works is established by the user (Yamashita, Barendregt, & Fjeld, 2007), and it is expected that the same happens with smartwatches. As it happens with most repetitive behaviours, the cognitive processing eventually disperses and leads to routinized behaviour (Bargh, 1994; Logan, 1989; Ouellette & Wood, 1998). Furthermore, users are expected to adjust their objective usability and perceived enjoyment as their experience with the system grows to match their system interactions (Holden & Rada, 2011). Thus, we posit:

H9. Habit (HAB) has a positive impact on Perceived Usefulness (PU).

H10. Habit (HAB) has a positive impact on Perceived Usability (USAB).

3.5. Perceived usability

Flavián, Guinalíu, and Gurrea (2006) define usability as the user's ability to know where he or she is at any time and what can be done. Optimizing small screen usability is a primary concern for information designers (Churchill & Hedberg, 2008). According to Hong, Thong, Wong, and Tam (2002), the characteristics of a system are a fundamental feature that affects users' continuance of a system. Tractinsky (1997) established that UI aspects that lead to an increased perceived usability could produce an increased acceptance of the technology. Davis (1989) and Parikh and Verma (2002) indeed defend that certain system features of user interfaces such as menus and icons are precisely designed to augment usability. Branscomb and Thomas (1984) suggest that a good user interface might enable various ways for users to access a specific function, and such user interface would enhance the perceived usefulness of the technology. Acton, Golden, Gudea, and Scott (2004) argue that not only is the usability of a system fully connected to the user acceptance of a UI through mediation, but at the same time comprises user satisfaction. Park and Lim (1999) propose that the usability of user interfaces is one of the factors that affect user satisfaction. Therefore, we posit:

H11. Perceived Usability (USAB) has a positive impact on Perceived Usefulness (PU).

H12. Perceived Usability (USAB) has a positive impact on Satisfaction (SAT).

3.6. Perceived enjoyment

Motivation theorists distinguish between two types of motivation - extrinsic and intrinsic - with extrinsic motivation being related to the activity as an instrument to attain a valued outcome (Ryan & Deci, 2000). For Davis, Bagozzi, and Warshaw (1992), perceived usefulness is an example of extrinsic motivation. Perceived enjoyment, on the other hand, is an example of intrinsic motivation, as it refers to the satisfaction of the activity itself (Davis et al., 1992). Meso, Musa, and Mbarika (2005) consider that ubiquitous technologies like smartphones can be used for business or social functions. Thong et al. (2006) suggest that perceived enjoyment could indeed affect user satisfaction since some technologies are used for fun and enjoyment rather than for performance enhancement (e.g., iPod, PlayStation, surfing the World Wide Web). Earlier research highlighted the importance of perceived enjoyment as a determinant of IT usage, especially in TAM studies (Agarwal & Karahanna, 2000; Davis, 1989; Heijden, 2003; Venkatesh et al., 2003). Of special interest, Davis et al. (1992) uncovered perceived enjoyment as the key motivator of PC usage intention. These validated and positive relationships between perceived enjoyment and IT usage are not expected to change in the case of

wearable technology, and in particular, smartwatches. Users may wish to use smartwatches to increase their productivity while also having an enjoyable experience when doing so. Therefore, we propose:

H13. Perceived Enjoyment (ENJ) has a positive impact on Satisfaction (SAT).

H14. User's Perceived Enjoyment (ENJ) has a positive impact on their Continuance Intention (INT).

4. Methods

4.1. Measurement instruments

All measurement items were adapted, with slight modifications, from the literature. CONF and SAT were adapted from Bhattacherjee (2001b); PU from Venkatesh et al. (2011) and Thong et al. (2006); HAB from Limayem et al. (2007); USAB from Kirakowski, Claridge, and Whitehand (1998), Lin, Choong, and Salvendy (1997), Roy, Dewit, and Aubert (2001), Flavián et al. (2006), and Zviran, Glezer, & Avni, (2006); ENJ from Lin and Bhattacherjee (2008); INT from Bhattacherjee and Barfar (2011), Venkatesh and Goyal (2010), and Venkatesh et al. (2011). The items for all constructs are included in Appendix 1.

The questionnaire was developed in English and hosted on a free platform. Most items were measured through a seven-point quantitative scale, ranging from "totally disagree" (1) to "totally agree" (7). The items for satisfaction (SAT) were the exception by being based on seven-point semantic differential scales, as per Bhattacherjee and Barfar (2011).

4.2. Data collection

Firstly, a pilot survey with 80 responses was conducted to refine the questions and obtain further comments about the content and structure. The most significant change was in the items of perceived usefulness (PU), which initially were from Bhattacherjee and Barfar (2011). These generated misunderstandings and the simulation of the PLS estimation with a few responses, gave statistically poor results. The original items from the theory were "Using On-Board Diagnostic (OBD) improves my performance in managing personal finances", "Using OBD increases my productivity in managing personal finances", "Using OBD enhances my effectiveness in managing personal finances", and "Overall, OBD is useful in managing personal finances". When adapted to the context of this study, the questions lost the object ("in managing personal finances", in the original), and thus resulted in loose items such as "Using smartwatches improves my performance" or "Using smartwatches increases my productivity". These items were replaced by similar, but more adequate, items from Venkatesh et al. (2011) and Thong et al. (2006). The main survey excluded data from the pilot survey.

To obtain the main survey the link to the questionnaire was shared with online discussion boards (specifically, smartwatch-related "subreddits" on Reddit) and social networks (specifically,

smartwatch-related groups on Facebook) amongst smartwatch users. The survey was open to all respondents regardless of country. Of the 1,271 users who visited the survey, 922 replied, representing a 73% completion rate. The 922 responses were filtered to U.S.A. respondents only, resulting in 574 responses that were then selected for this study.

Concerning demographic data (Table 1), 93% of the respondents are male, and the average age is 27 years. Their education level corresponds to "Some college" for 32% of individuals, with 16% below that and 52% above.

Table 1 - Demographic data of responses

Age			Gender			Education		
< 18	36	6.3%	Male	532	92.7%	No schooling completed	1	0.2%
18 - 24	233	40.6%	Female	42	7.3%	Elementary	6	1.0%
25 - 34	217	37.8%				High school (no degree)	46	8.0%
35 - 44	59	10.3%				High school graduate	40	7.0%
45 - 54	23	4.0%				Some college	186	32.4%
55 - 64	3	0.5%				Associate degree	38	6.6%
64 >	3	0.5%				Bachelor degree	187	32.6%
						Master degree	44	7.7%
						Professional school degree	17	3.0%
						Doctoral degree	9	1.6%

5. Results

Structural equation modelling (SEM) is a statistical method for testing and estimating causal relationships using a mix of statistical data and qualitative causal assumptions. The models were estimated with partial least squares (PLS) which is a variance-based method, and the one used in this study. Selection of PLS was based on the fact that some of the items in the data are not distributed normally ($p < 0.01$ using the Kolmogorov-Smirnov test), the research model has not yet been tested in the literature, and the research model is regarded as complex. Smart PLS v. 3.2.3 was the software used to analyse the relationships defined by the theoretical model (Ringle, Wende, & Becker, 2014).

5.1. Measurement model

Construct reliability was tested using the composite reliability coefficient. PLS prioritizes indicators according to their individual reliability. As demonstrated in Table 2, with exception of Cronbach's

alpha for confirmation construct, all the constructs have a composite reliability above 0.7, which suggests that the constructs are reliable (Straub, 1989). Cronbach's alpha reliability coefficient varies between 0 and 1, with higher values indicating higher levels of reliability. Cronbach's alpha values of 0.60 to 0.70 are acceptable in exploratory research (Hair Jr, Hult, Ringle, & Sarstedt, 2016). However, there is actually no lower limit to the coefficient (Gliem & Gliem, 2003).

Table 2 - Correlation matrix, composite reliability (CR), Cronbach's alpha (CA), and square root of AVEs

Constructs	**Mean**	**SD**	**CR**	**CA**	**CONF**	**PU**	**SAT**	**HAB**	**USAB**	**ENJ**	**INT**
Confirmation	5.37	1.29	0.84	0.61	**0.85**						
Perceived Usefulness	5.41	1.31	0.90	0.85	0.52	**0.83**					
Satisfaction	5.77	1.08	0.94	0.92	0.68	0.65	**0.90**				
Habit	5.66	1.38	0.87	0.77	0.46	0.62	0.61	**0.83**			
Perceived Usability	5.38	1.28	0.89	0.86	0.58	0.52	0.65	0.51	**0.77**		
Perceived Enjoyment	5.82	1.15	0.94	0.90	0.44	0.47	0.60	0.39	0.49	**0.91**	
Continuance Intention	6.45	1.01	0.98	0.97	0.42	0.59	0.62	0.64	0.44	0.44	**0.96**

Indicator reliability was assessed based on the criteria that the loadings should be greater than 0.7 and that every loading less than 0.4 should be excluded (Churchill, 1979; Henseler, Ringle, & Sinkovics, 2009). As shown in Table 3, the loadings (in bold) are greater than 0.7 with the exception of two items (USAB3 and USAB4), which are lower than 0.7 but greater than 0.4. Items USAB1 and USAB2 were eliminated due to a low loading. Overall, the instrument presents good indicator reliability. To test convergent validity, average variance extracted (AVE) was used as the criterion. The AVE should be higher than 0.5 so that the latent variable explains more than half of the variance of its indicators (Fornell & Larcker, 1981; Hair, Sarstedt, Ringle, & Mena, 2012; Henseler et al., 2009). As shown in Table 2, all constructs have an AVE higher than 0.5, meeting this criterion.

Discriminant validity of the constructs was assessed using two measures: Fornell-Larcker criteria and cross-loadings. The first criterion postulates that the square root of AVE should be greater than the correlations between the construct (Fornell & Larcker, 1981). The second criterion requires that the loading of each indicator should be greater than all cross-loadings (Chin, 1998; Götz, Liehr-Gobbers, & Krafft, 2010; Grégoire & Fisher, 2006). As seen in Table 2, the square roots of AVEs (diagonal elements) are higher than the correlation between each pair of constructs (off-diagonal elements). Table 3 shows that the patterns of loading are greater than cross-loading. Thus, both measures are satisfied.

The assessments of construct reliability, indicator reliability, convergent validity, and discriminant validity of the constructs were satisfactory, indicating that the constructs can be used to test the conceptual model.

Table 3 - Loadings and cross-loadings for the measurement model

Construct	ITEM	CONF	PU	SAT	HAB	USAB	ENJ	INT
Confirmation	CONF1	**0.87**	0.48	0.61	0.39	0.52	0.40	0.39
	CONF2	**0.83**	0.40	0.54	0.39	0.47	0.34	0.32
Perceived Usefulness	PU1	0.51	**0.86**	0.66	0.59	0.49	0.46	0.62
	PU2	0.41	**0.84**	0.50	0.49	0.41	0.35	0.45
	PU3	0.39	**0.83**	0.45	0.49	0.39	0.36	0.42
	PU4	0.39	**0.78**	0.47	0.45	0.41	0.36	0.43
Satisfaction	SAT1	0.64	0.61	**0.92**	0.59	0.62	0.54	0.62
	SAT2	0.63	0.59	**0.93**	0.59	0.59	0.54	0.58
	SAT3	0.57	0.55	**0.87**	0.50	0.54	0.48	0.47
	SAT4	0.59	0.56	**0.88**	0.50	0.58	0.57	0.54
Habit	HAB1	0.39	0.53	0.54	**0.89**	0.41	0.34	0.62
	HAB2	0.43	0.52	0.55	**0.88**	0.46	0.33	0.53
	HAB3	0.31	0.49	0.41	**0.72**	0.40	0.30	0.43
Perceived Usability	USAB3	0.36	0.33	0.42	0.32	**0.66**	0.31	0.28
	USAB4	0.38	0.30	0.39	0.30	**0.69**	0.27	0.26
	USAB5	0.47	0.42	0.52	0.43	**0.81**	0.43	0.34
	USAB6	0.49	0.44	0.53	0.41	**0.84**	0.42	0.37
	USAB7	0.48	0.40	0.51	0.40	**0.81**	0.38	0.34
	USAB8	0.47	0.46	0.57	0.44	**0.78**	0.40	0.39
Perceived Enjoyment	ENJ1	0.33	0.34	0.47	0.30	0.38	**0.89**	0.36
	ENJ2	0.39	0.46	0.54	0.36	0.45	**0.92**	0.39
	ENJ3	0.46	0.48	0.61	0.38	0.49	**0.93**	0.44
Continuance Intention	INT1	0.42	0.57	0.60	0.60	0.42	0.42	**0.95**
	INT2	0.42	0.58	0.59	0.60	0.43	0.43	**0.97**
	INT3	0.39	0.56	0.59	0.63	0.42	0.42	**0.97**
	INT4	0.40	0.57	0.58	0.62	0.40	0.40	**0.95**

5.2. Structural model

The structural model was estimated using R^2 measures and path coefficients' level of significance. Figure 4 shows the model results. The R^2 of dependent variables are 0.47, 0.41, 0.19, 0.66, and 0.59 for perceived usefulness, perceived usability, perceived enjoyment, satisfaction, and continuance intention, respectively. The significance of the path coefficients was assessed using a bootstrapping

procedure (Hair, Ringle, & Sarstedt, 2011; Henseler et al., 2009) with 5,000 iterations of resampling (Chin, 1998). Figure 4 also shows the path coefficients and t-value (in parentheses) results.

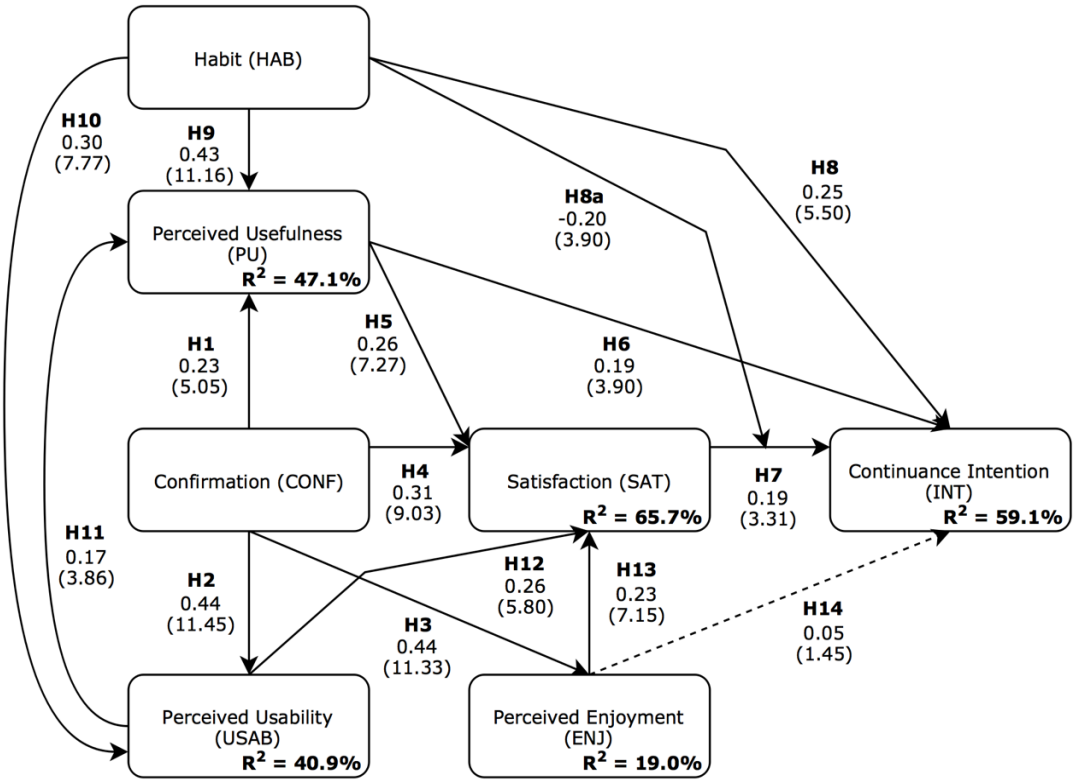

Figure 4 - Model with results

The model explains 47.1% of the variation in perceived usefulness, and all variables are statistically significant, namely, confirmation ($\hat{\beta}$ = 0.23; p < 0.01), habit ($\hat{\beta}$ = 0.43; p < 0.01), and perceived usability ($\hat{\beta}$ = 0.17; p < 0.01). Respectively, hypotheses H1, H9, and H11 are confirmed.

The model explains 40.9% of the variation in perceived usability, with the effects of confirmation ($\hat{\beta}$ = 0.44; p < 0.01) and habit ($\hat{\beta}$ = 0.30; p < 0.01) being statistically significant. Respectively, hypotheses H2 and H10 are confirmed.

Perceived enjoyment is explained through confirmation ($\hat{\beta}$ = 0.44; p < 0.01), which is statistically significant and explains 19.0% of the variation in perceived enjoyment; therefore, hypothesis H3 is confirmed. As for satisfaction, 65.7% of its variation is explained through confirmation ($\hat{\beta}$ = 0.31; p < 0.01), perceived usefulness ($\hat{\beta}$ = 0.26; p < 0.01), perceived usability ($\hat{\beta}$ = 0.26; p < 0.01), and perceived enjoyment ($\hat{\beta}$ = 0.23; p < 0.01), which are all statistically significant; respectively, hypotheses H4, H5, H12, and H13 are confirmed.

Finally, 59.1% of the variation in continuance intention is explained through perceived usefulness ($\hat{\beta}$ = 0.19; p < 0.01), satisfaction ($\hat{\beta}$ = 0.19; p < 0.01), habit ($\hat{\beta}$ = 0.25; p < 0.001), and the moderation effect of habit in the relationship between satisfaction and continuance intention is statistically significant ($\hat{\beta}$ = -0.20; p < 0.001), which are statistically significant, but perceived enjoyment ($\hat{\beta}$ = 0.05; p > 0.10), is not; respectively, hypotheses H6, H7, H8, and H8a are confirmed, but H14 is not. In sum, of the 15 hypotheses, only one is not confirmed.

To evaluate the moderating effect of habit on the relationship between satisfaction and continuance intention, was accessed applying PLS product-indicator approach (Chin, Marcolin, & Newsted, 2003). The moderating effect occurs when the habit changes the strength of a relationship between two constructs. Specially, the relationship between satisfaction and continuance intention has been shown to be weaker (based in the negative $\hat{\beta}$ value) for people with high level of habit than for people with low level of habit. When the moderating effect of habit was included in the model to predict continuance intention, the variation of continuance intention was 59.1%, whereas without this moderating effect the variation for continuance intention dropped to 51.4%. Including the moderating effects in the model to predict continuance intention caused variation to improve by 7.7%.

6. Discussion

6.1. Theoretical implications

This study's results suggest that theoretically, habit (HAB), perceived usability (USAB), and perceived enjoyment (ENJ) increase the predictive power of the ECM model in explaining continuance intention (INT). Perceived usefulness (PU), confirmation (CONF), and satisfaction (SAT) explain 44% of the variation in continuance intention (INT) in A. Bhattacherjee (2001b) ECM; however, by coupling it with HAB, USAB, and ENJ, variance explained increased by 15 p.p., thus providing a better explanatory power (Table 4). Not only is this a significant modification of the ECM for the context of smartwatches, but is also an extension of its generalizability from general IS use to the smartwatch technology. The survey instrument was tested for validity and reliability of the scales, and it can be easily used by future researchers in other countries.

Table 4 - Comparison between Bhattacherjee's ECM and the research model

Bhattacherjee's (2001) ECM			**Research model**		
Construct	**R^2**	**R^2 Adj.**	**Construct**	**R^2**	**R^2 Adj.**
Continuance Intention	0.45	0.44	Continuance Intention	0.59	0.59
Perceived Usefulness	0.27	0.27	Perceived Usefulness	0.47	0.47

Satisfaction	0.57	0.57	Satisfaction	0.66	0.65
			Perceived Usability	0.41	0.41
			Perceived Enjoyment	0.19	0.19

In line with Bhattacherjee's (2001b) research, the effects of SAT and PU in INT were consistent, meaning that users value their satisfaction with the smartwatch, as well as its perceived usefulness when considering its continued use. Some studies examined the role of usability on satisfaction (Legris, Ingham, & Collerette, 2003; Liu, Liao, & Pratt, 2009; Zviran et al., 2006), but this study extended it to the continuance intention to use smartwatches. The effect that perceived usability has on satisfaction presents an important contribution that is often overlooked in the topic of IS continuance. Interestingly, perceived enjoyment had neither a significant direct nor total effect on continuance intention, but had a significant effect on satisfaction. By showing no statistical significance between enjoyment to continuance intention, these results contradict the literature (e.g. Chang, Liu, & Chen, 2014; Hong, Lin, & Hsieh, 2017). This indicates that smartwatch users are more likely to value its utilitarian component than the hedonic one when considering its continued use (Batra & Ahtola, 1991). Although smartwatch technology is known as a fashion product, the investigation of utilitarian value in the current research is a significant contribution for manufacturers and IT companies.

Lastly, earlier studies in IS have also focused on habit as a moderation between continuance intention and actual continued usage (Bhattacherjee & Barfar, 2011; Limayem, Cheung, & Chan, 2003; Limayem et al., 2007). However, this study also demonstrates the significant effect of habit on IS continuance intention on the specific context of smartwatches. Figure 5 shows the impact of the statistically significant moderator, habit, over satisfaction to smartwatch continuance intention. The habit moderator suggests the major impact of satisfaction over continuance intention among people with low habit. For people with high habit the satisfaction is not important in explaining the continuance intention.

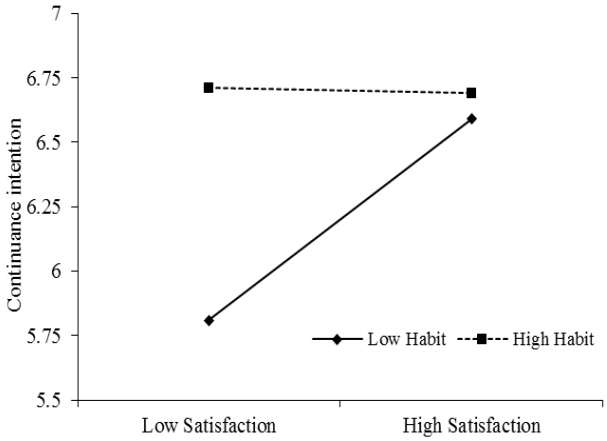

Figure 5 –Continuance intention – Moderation between Habit and Satisfaction.

6.2. Managerial implications

The findings of this study reveal that satisfaction is an important factor affecting a user's intention to continue using a smartwatch, especially for those users with a low level of habit. Therefore, in order to retain them, managers need to focus on the users' satisfaction (Bhattacherjee, 2001a). The focus should therefore be, as previously noted, on confirmation, perceived usefulness, perceived usability, and perceived enjoyment. Selling a smartwatch that delivers on its promise, or, on the other hand, under-promises and over-delivers, will result in a higher confirmation level, and likewise, satisfaction (Limayem et al., 2007; Oliver, 1980). Product managers should improve their market research and employ a culture of design thinking in order to ensure that the smartwatch has characteristics and functions that fit users' needs, and implement such characteristics and functions in a usable way. Likewise, a smartwatch that displays information clearly, does not have a cluttered user interface, is easy to understand, and is generally usable, will bring greater satisfaction to the user (Park & Lim, 1999). Improving the perceived enjoyment factor of the smartwatch will also lead to greater satisfaction. This does not necessarily imply the addition of games to the smartwatch, but rather making the experience as a whole enjoyable.

However, habit was the most significant factor affecting a user's intention to continue using a smartwatch, and at the same time, an effect moderator of satisfaction on the continuance intention. Managers and marketers should focus on strengthening the habitual use of a smartwatch by proactively reinforcing the relationship with its users and giving them exclusive benefits, or promoting experimentation with new or more advanced features (Limayem et al., 2007). Based on Figure 5 we can conclude that satisfaction has a greater impact on continuance intention for users who have a low habit level.

6.3. Limitations and future research

While this study adds to the current body of knowledge, we also recognize its limitations. The first concerns the sampling. The respondents of this study were mostly male, and thus, what they value might partially differ from the population average. This skewed sample can be explained by three different factors. First, the distribution of the survey amongst smartwatch-related "subreddits" on Reddit: a 2016 statistic from Statista (2016) shows 69% of male users on Reddit, and that average is expected to be the same or higher on the targeted "subreddits". Second, a report from NPD Connected Intelligence (2015) shows that 71% of all smartwatch users were male. When coupled with the previous factor, it is expected that the pool of available respondents got reduced even further. Third, another factor that might explain the skewed sample are a lack of more feminine designs, according to Fumo (2016). The second limitation concerns the lack of inclusion of a model/operating system (OS)

variable. Considering that smartwatches vary in their characteristics according to the model and OS, it can also be said that they vary in their levels of usability and perceived usefulness. These differences might have slightly affected the variance of our sample. Lastly, this study considered only one stage of post adoption, and earlier research has showed that usefulness and attitude perceptions fluctuate over time (Bhattacherjee & Premkumar, 2004; Venkatesh et al., 2011).

It is recommended that future research tests both segments of men and women, in order to uncover significant differences (if any), as with earlier studies in different areas (Moores & Chang, 2006; Morris & Venkatesh, 2000). Future research can also take this study as a starting point, and build on it by testing this model on different smartwatch models or OSs in order to understand their differences and similarities. Furthermore, future research should take the assumptions of this study and apply them to a two-stage IS continuance model, such as the one developed by Venkatesh et al. (2011). Lastly, it would also be of interest to apply this model to the same topic in other regions, especially in Asia/Pacific, which is predicted to become the highest revenue generating geography by 2020 in the smartwatch market (Kohli, 2015).

7. Conclusions

Much research on the IS area has focused on IT acceptance, but IT continuance was found to have a greater impact on an IS' long-term viability. The topic of smartwatches, to the best of our knowledge, had not been studied in an IS context until now. In addressing this gap, this study contributes to the continuance theory, developing a conceptual framework that combines the ECM with habit, perceived usability, and perceived enjoyment. Satisfaction and perceived usefulness were found to have a significant effect on continuance intention – thereby confirming the ECM's results – and habit and the moderation effect of habit on satisfaction to explain continuance intention had the greatest impact. Thus, by including habit, perceived usability, and perceived enjoyment in the proposed framework, a stronger predictive power was added to the existing ECM.

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Appendix 1 - The items

Constructs		Items	Adapted from
Confirmation (CONF)	CONF1	My experience with using the smartwatch is better than what I expected.	(Bhattacherjee & Barfar, 2011)
	CONF2	Overall, most of my expectations from using the smartwatch were confirmed.	
Perceived Usefulness (PU)	PU1	I find the smartwatch useful in my daily life.	(J. Y.L. Thong et al., 2006; V. Venkatesh et al., 2011)
	PU2	Using the smartwatch helps me accomplish things more quickly.	
	PU3	Using the smartwatch increases my productivity.	
	PU4	Using the smartwatch helps me to perform many things more conveniently.	
Satisfaction (SAT)	SAT1	How do you feel about your overall experience of smartwatch use: Very dissatisfied/Very satisfied.	(Bhattacherjee & Barfar, 2011)
	SAT2	Very displeased/Very pleased.	
	SAT3	Very frustrated/Very contented.	
	SAT4	Absolutely terrible/Absolutely delighted.	
Habit (HAB)	HAB1	Using the smartwatch has become automatic to me.	(M. Limayem et al., 2007)
	HAB2	Using the smartwatch is natural to me.	
	HAB3	When faced with a particular task, using the smartwatch is an obvious choice for me.	
Perceived Usability (USAB)	USAB1*	Every feature and function in the smartwatch is easy to understand.	(Flavián et al., 2006; Kirakowski et al., 1998; H. X. Lin et al., 1997; Roy et al., 2001; Zviran et al., 2006)
	USAB2*	The smartwatch is simple to use, even when using it for the first time.	
	USAB3	The contents of the smartwatch are organized in such a way that makes it easy for me to know where I am when navigating it.	
	USAB4	The amount of information displayed in the smartwatch is appropriate.	
	USAB5	Searching and checking the information that I need from the smartwatch is quick.	
	USAB6	It is easy to find the information I need from the smartwatch.	
	USAB7	It is easy to find the functions I need from the smartwatch.	
	USAB8	The smartwatch provides accurate information and functions that I need.	
Perceived Enjoyment (ENJ)	ENJ1	I have fun interacting with the smartwatch.	(C.-P. Lin & Bhattacherjee, 2008)
	ENJ2	Using the smartwatch provides me with a lot of enjoyment.	
	ENJ3	I enjoy using the smartwatch.	
Continuance Intention (INT)	INT1	I intend to continue using the smartwatch, rather than discontinue its use.	(Bhattacherjee & Barfar, 2011; V. Venkatesh & Goyal, 2010; V. Venkatesh et al., 2011)
	INT2	I plan to continue using the smartwatch.	
	INT3	I will continue using the smartwatch.	
	INT4	I predict I will continue using the smartwatch in the future.	

Note: * eliminated due to low loading.