

Exploring Consumers' Intention to Accept the Smartwatch

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Abstract

The smartwatch currently the most popular layout of wearable technology, a promising category of information appliances. As an integration of classic timepiece and fashionable IT industries, the smartwatch is a challenging business since these industries used to possess very different marketing strategies. However, few studies having discussed about consumers' attitude toward such innovations. This study intends to: (1) propose a research model for the smartwatch context, and (2) identify potential consumers.

Combined with the Unified Theory of Acceptance and Use of Technology (UTAUT), the Innovation Diffusion Theory (IDT), the Technology Acceptance Model (TAM), and perceived enjoyment concept, our proposed research model is expected to better fit into the smartwatch context and reflect an individual's perception more realistically. A quantitative questionnaire survey would be conducted mainly online, targeting on Taiwanese residents. Aside from the responds toward the core constructs, demographic data such as age, gender, industry of their job, as well as the educational level will also be recorded. Through cluster analysis, characteristics of the potential smartwatch customers will be exploited.

Expected academic contributions of this study are apparent, future researches related to the smartwatch, or even other wearable forms, can be benefited from the proposed framework. For management practice, the method and implications of this research can also assist companies in achieving better customer segmentation, along with exploiting potential application field or features.

Keywords: Smartwatch, Innovation Diffusion Theory (IDT), Technology Acceptance Model (TAM), Unified Theory of Accept and Use of Technology (UTAUT)

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Introduction

Wearable technology has become a widely discussed topic in recent years, among its various layouts, the smartwatch is one of the most popular and fast-growing product line. Almost every major information technology manufacturer has released products or platforms of its kind, such as Apple, Google, Samsung, etc. Predicted by Gartner Inc. smartwatches will comprise about 40 percent of consumer wristworn devices by 2016 (Rivera & ven der Meulen, 2014).

According to Wikipedia, the smartwatch is described as “a computerized wristwatch with functionality that is beyond timekeeping”, “modern smartwatches are effectively wearable computers.” (Wikipedia, 2015). Current smartwatches usually consist of the following features:

- (1) Timekeeping: clock, stopwatch, timer, etc.
- (2) Fitness management: monitor activity heartbeat, calories, and other physical data, along with planning features for training.
- (3) Notifications and communication: send/receive notification updates, messages, and phone calls.
- (4) Location service and Internet connectivity: GPS navigation, activity mileage recording, as well as online information providing, such as stocks, transport, and weather
- (5) Others: camera, remote, mobile payment, etc.

Users may expand the features by installing additional applications.

Unlike previous technological products, the smartwatch attempts to integrate two less interrelated industries. The first is classic timepiece industry, with a long development history and extremely emphasizing on the craft, the taste and social status symbols of its customers. Another one is the IT industry, which focuses on features, newness, mass production, and short product life cycle. The smartwatch is a challenging business, therefore, the market strategy for the smartwatch is expected to change.

This study aims to propose a new framework for smartwatch researchers and practitioners by reviewing prior IT acceptance literatures, three important theories: Innovation Diffusion Theory, Technology Acceptance Model, and Unified Theory of Acceptance and Use of Technology will play a major role in this study. On the other hand, identifying the characteristics of potential consumer is another primary mission. Through investigating on if smartwatch can successfully attract the potential customer of exquisite timepiece and information appliances market, as well as how do age, gender, profession, profession, and educational level affect consumers' evaluation. Implications for not only academic, but also management practice can then be made to get a better understanding about the product's future.

Innovation

Although smartwatches are generally considered as innovative products, this study has reviewed the definitions and taxonomy of innovation from authoritative literatures in order to give a discreet and clear examination.

Scholars have proposed various concepts of what an innovation is from their own perspective in the past decades. Some of them emphasizes on the newness or differences. Such as Rogers (2003), who simply put that an innovation is an idea, practice, or object regarded as new by its adopters; Blythe (1999) mentioned that the word innovation, as a noun, refers to a product which is significantly distinguished with its precursors or competitors. However, some literatures tried to explained the word from the organizational perspective, highlighting on the benefits to its stakeholders, such as manufacturers, service providers, and customers (Baregheh et al, 2009). This study summarized the above points and propose a new description, stating that an innovation is generally considered as a tangible or intangible entity that can make changes to current one and benefit the stakeholders.

Smartwatch acceptance is the theme issue of not only this study, but also the managerial practice. Therefore, a review of previous IT acceptance literatures has been conducted for seeking the theoretical basis of this research.

Innovation Diffusion Theory (IDT)

The Innovation Diffusion Theory was developed by Rogers (1962) in his *Diffusion of Innovations* literature, the latest edition was published in 2003. IDT was initially designed to explain the reasons, methods, and the adoption rate that an innovation spreads in a specific social system through time. The theory contains five key elements: innovation, adopters, communication channels, time, and social system in order to provide an objective analysis toward the diffusion process. The perceived attributes: relative advantage, compatibility, complexity, trialability, and observability proposed in IDT were useful for evaluating an innovation, often separately adopted by later innovation-related studies. Moore and Benbasat (1991) reviewed and adapted these attributes into seven perceived characteristics of information technology (IT) innovations, defined as follows (Moore & benbasat, 1991; Venkatesh et al, 2003):

- (1) Relative Advantage: “the degree to which an innovation is perceived as being better than its precursor.”
- (2) Ease of Use: “the degree to which an innovation is perceived as being difficult to use.”
- (3) Compatibility: “the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters.”
- (4) Result Demonstrability: “the tangibility of the results of using the innovation, including their observability and communicability.”
- (5) Image: “the degree to which an innovation is perceived to enhance one’s image or status in one’s social system.”
- (6) Visibility: “the degree to which one can see others using the system in the organization”
- (7) Voluntariness of Use: “the degree to which use of an innovation is perceived as being voluntary, or of free will.”

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), proposed by Davis (1989), was also an important information system theory. TAM investigates on an individual’s Perceived Usefulness and Perceived Ease of Use toward an innovation, which then determine

the Attitude toward Using, Behavioral Intention to Use, and finally the Actual System Use. The definition of each TAM constructs are as follows (Davis, 1989; Davis et al, 1989; Venkatesh et al, 2003):

- (1) Perceived Usefulness: “the degree to which a person believes that using a particular system would enhance his or her job performance.”
- (2) Perceived Ease of Use: “the degree to which a person believes that using a particular system would be free of effort.”
- (3) Attitude Toward Using: “an individual’s positive or negative feelings about performing the target behavior.”
- (4) Behavioral Intention to Use: “The degree to which a person has formulated conscious plans to perform or not perform some specified future behavior”

Notably, Perceived Usefulness also has a direct impact on Behavioral Intention, the reason is that an individual may possess a positive perception of usefulness which can enhance the intention, despite of the negative attitude toward the system. (Taylor & Todd, 1995; Mao & Palvia, 2010)

TAM was broadly used in IT researches, however, the theory was also criticized and questioned in some ways. One thing was the explaining capability toward the innovation usage, Benbasat & Barki (2007) argued that TAM ignored other important issues due to its oversimplified construction. Besides, the un-unified changes to the model which intend to fit into the new environments has caused chaos to the theory.

The term Perceived Usefulness was another controversial issue. Although Perceived Usefulness is considered very similar with Relative Advantage and are usually interchangeable (Moore & Benbasat, 1991; Davis et al, 1989; Venkatesh, 2003), the meaning of the term has not been clearly explained since the term was originally used to describe information in the electronic system design, instead of the system itself (Moore & Benbasat, 1991). Therefore, Relative Advantage is more recommended.

Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT), proposed by Venkatesh et al (2003), reviewed and integrated constructs from eight theoretical models including: Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivation Model (MM), Theory of Planned Behavior (TPB), Combined TAM and TPB (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT).

UTAUT model consists of the four independent variables (Venkatesh, 2003):

- (1) Performance Expectancy: “the degree to which an individual believes that using the system will help him or her attain gains in job performance.”
- (2) Effort Expectancy: “the degree of ease associated with the use of the system.”
- (3) Social Influence: “the degree to which an individual perceives that important others believe he or she should use the system.”
- (4) Facilitating Conditions: “the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system.”

The UTAUT and later researches of TAM removed the mediator Attitude Toward Using (Attitude), which originally existed in the initial TAM model since it was claimed as a “weak mediator” (Yi and Huang, 2003). Nevertheless in rationale, high performance in the perceived characteristics may not lead to the same degree of high intention. The elimination of Attitude neglected the influence of an individual’s emotional judgement, which is somewhat unrealistic.

Enjoyment

Perceived Enjoyment has become very important in recent studies regarding to the consumer-oriented products and services. Derived from the psychological theories including the playfulness theory and the flow theory.

Davis et al. (1992) stated that “consumer behavior and IS research have theorized and found various constructs related to hedonic motivation (e.g. enjoyment) are important in consumer product and/or technology use.”

Venkatesh et al (2012) proposed the UTAUT2, different from the original model which focused on the organizational level, the UTAUT2 model was from the customer perspective (Venkatesh, 2012). Therefore, additional attributes of and individual’s emotional perception such as Hedonic Motivation, Price Value, and Habit were included. Among them, Hedonic Motivation is conceptualized as Perceived Enjoyment.

Perceived Enjoyment is more widely-used and easy-to-understand term among related literatures, this study employs the term Enjoyment directly.

Research Method

This study decides to combine UTAUT with IDT and TAM, for several reasons: (1) Although the UTAUT model has already integrated models including IDT and TAM, some of the UTAUT constructs didn't reveal all of the definitions they merged. Take Facilitating Conditions for example, though it consists of Compatibility from IDT, whether an innovation is consistent with existing value or not was never discussed in Facilitating Condition. (2) IDT constructs can provide a more detailed evaluation of an innovation. (3) TAM’s Attitude toward Using and the relationships between other variables should be re-examined.

The PCIs of IDT are incorporated to replace some of the original UTAUT variables, however, since IDT and UTAUT originally focused on the individual behavior within a certain organization, Voluntariness and Visibility will be removed in this case, for smartwatches are still a consumer-oriented product, which decision of adoption is all up to the individual’s own. In addition, for such a new product, it is predicted not easy to see other social member using the smartwatch at this moment.

UTAUT has already included Image in Social Influence, the later focuses more on an individual’s consideration of important others’ belief, slightly different from the former which discusses the individual perceived improvement to his or her social status. This study decides to keep the Social Influence term, but add items from both constructs to the questionnaire.

Smartwatch is a personal gadget, which means that it should improve not only one's job performance, but also the convenience of one's daily life. Thus, this study uses the term "relative advantage" to emphasize on the comparison with previous technologies of its kind, such as traditional watches or existing sport wristbands. Therefore, Performance Expectancy of UTAUT will be changed to Relative Advantage.

Finally, Perceived Enjoyment and Attitude are added to the framework, Facilitating Conditions will be deleted from the model, because current smartwatches are working with the smartphone, which is very popular these days.

The research model also encompasses four demographic variables as moderators which are age, gender, profession, and educational level in order to conduct customer segmentation.

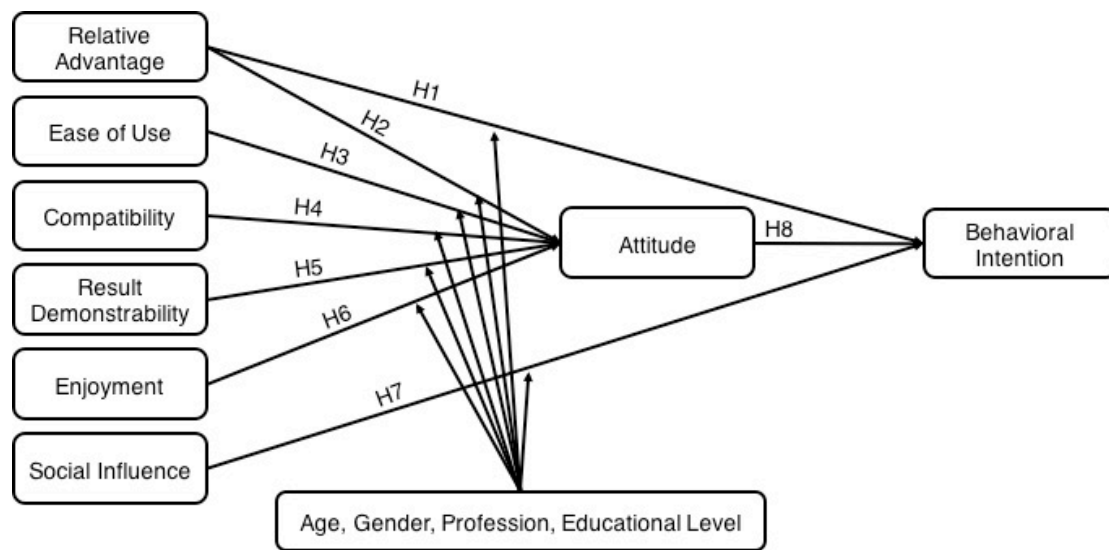


Figure 1: Proposed research model

The hypotheses are as follows:

Hypothesis 1: Perceived relative advantage has a positive effect on behavioral intention to use the smartwatch.

Hypothesis 2: Perceived relative advantage has a positive effect on the attitude toward using the smartwatch.

Hypothesis 3: Perceived ease of use has a positive effect on the attitude toward using the smartwatch.

Hypothesis 4: Perceived compatibility has a positive effect on the attitude toward using the smartwatch.

Hypothesis 5: Perceived result demonstrability has a positive effect on the attitude toward using the smartwatch.

Hypothesis 6: Perceived enjoyment has a positive effect on the attitude toward using the smartwatch.

Hypothesis 7: Perceived social influence has a positive effect on the attitude toward using the smartwatch.

Hypothesis 8: Attitude toward using the smartwatch has a positive effect on the behavioral intention.

The research samples are targeted on Taiwan residents, with no limits on demographic data. Cluster analysis is expected to be applied for fulfilling the objective of this research – identify the potential consumers.

Conclusion

This study aims to achieve the following academic contributions: (1) Proposing a new and available research model that is more suitable for the smartwatch, even the wearable technology context. (2) Proving the perceived characteristics of IDT can be partially applied to provide a more detailed evaluation of innovations than original UTAUT constructs. (3) Re-examining the status of the mediator Attitude Toward Using, which was often ignored or claimed unimportant.

Also, this study is expected to benefit management practice with a better customer segmentation method for not only smartwatches, but also other wearable products that combines heterogeneous businesses. Last but not least, helping the firms to exploit more potential application fields is also an anticipation.

Unavoidably, there are at least research limitations due to the time and resources available. One is that some variables, such as perceived price value and brand value are not able to be included. However, they are important, even critical in real market environment. Another is the lack of detailed lifestyle evaluation, the Activity-Interest-Opinion (AIO) analysis that frequently used in lifestyle research can reflect an elaboration of a consumers value, which is more helpful for marketing research than general demographic analysis. Future researches are encouraged to complement this to improve the research model.

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