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Extending the technology acceptance model: an investigation of factors affecting college students' downloading of smartphone fitness applications

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Extending the technology acceptance model: An investigation of factors affecting college students' downloading of smartphone fitness applications

by

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A thesis for Master submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Journalism and Mass Communication

Program of Study Committee:
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Ames, Iowa

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ABSTRACT

Technology Acceptance Model (TAM) is widely applied to explain how users come to adopt a new technology. Motivated by the need to have a better understanding of the rapid growth of fitness applications (apps) on smartphones, this study tests an extension of the TAM model through explaining how social influence and application characteristics affect college students' behavioral intention of downloading fitness applications to their smartphones. Based on a survey and a series of regression analyses, the results confirm the effects of two major determinants—perceived usefulness and perceived ease of use—on users' attitude toward using fitness apps. In addition, the findings show that electronic word of mouth (eWOM) and application characteristics significantly influence downloading of fitness apps. Finally, the results underline the crucial role of apps functional features. By adding external factors, the proposed research model fits in the context of fitness apps, and fills the literature gap by identifying how to motivate individuals to download fitness apps. The study provides researchers and marketers with empirical evidence about college students' reasons for selection of fitness apps.

CHAPTER 1

INTRODUCTION

Health communication research has shown that the use of web health information systems and mobile applications (apps) lead to increased health knowledge, positive health outcomes, and more proactive health behavior (Wantland et al., 2004). As people nowadays are spending more time on smartphone apps, organizations are thinking of a smartphone app as a new primary way to enhance customer experience and build customer relationships, which leads to more customer engagement and loyalty (Racherla, Furner, & Babb, 2012). Fitness apps are a major segment of the health apps for smartphone. In addition to tracking users' health and fitness activities, smartphone apps can provide users with tailored and detailed exercise instructions. With the help of fitness apps, users might find it easy to sustain motivation and enforce commitment to fitness goals. In order to promote smartphone fitness app usage, one of the key issues is to understand how people download smartphone fitness apps.

Technology Acceptance Model (TAM) (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989) has been widely applied to explaining how users come to adopt a new technology. The two determinants that influence user's decisions include perceived usefulness and perceived ease-of-use. Some extended TAM models suppose that the effects of external variables on intention to use are mediated by perceived usefulness and perceived ease of use. For example, social influence, system characteristics, and individual difference contribute to users' evaluation of technology product (Lewis, Agarwal, & Sambamurthy, 2003; Lu, Yao, & Yu, 2005; Venkatesh & Davis, 2000). Although TAM has become a well-established model to predict users' acceptance of technology over the past decade, few studies were found to integrate the impact of social influence and system

characteristics with TAM model to explain users' behavioral intention to download smartphone apps.

To fill this gap, this study attempts to identify the factors influencing customers' willingness to download fitness apps, by determining whether social influence through word of mouth (WOM) and satisfactory on system characteristics matter over this process. Specifically, the analysis focuses on how customers perceive usefulness and perceived ease of use concerning fitness apps. In other words, integrating TAM model with the notion of social influence and system characteristics, this study aims to better understand consumers' behavioral intentions of downloading fitness apps to their smartphones.

In the study, the literature related to TAM and WOM forms the theoretical rationale to develop an updated extended model of TAM. A survey was conducted to examine the effects of these determinants. The results of the study hopefully can be utilized as a tool to provide both researchers and healthcare industry with a better understanding about the selection of smartphone fitness apps. Theoretically, this study provides significant empirical support that functional features of apps are the most salient determinants of perceived usefulness and perceived ease of use. More importantly, this study integrates both application characteristics and social influence in one model. Practically, this study provides evidence on how to develop smartphone apps to improve people's health and maintain a good lifestyle, especially for university students. The results also can be used for marketers to conduct WOM communication strategies, and explore consumers' technical demands, thus encourage the use of fitness apps.

CHAPTER 2

LITERATURE REVIEW

Market of Smartphone Application

Smartphone apps have brought benefits to people's lives, providing users with information, entertainment, and convenience. With rapid development of information technologies, smartphone apps have become one of the major new sources of innovation that can deliver content, information, and services (Racherla, Furner, & Babb, 2012). For users, smartphone apps not only improve the way of communication, but also enable them to access information and obtain services. For marketers, smartphone apps improve interaction with consumers, diversify brand experience, and even create additional revenue. Therefore, the needs from both users and marketers facilitate the growth and competition of smartphone apps.

The Apple App Store is one of the primary distribution channels for apps with iPhone operating system. There are more than 1,200,000 apps in the Apple App Store in 2014 (Khalaf, 2014). From business to games, a variety of categories in smartphone apps provide users with different entertainments and services. One of the most useful and popular categories is health and fitness apps that help people keep a healthy lifestyle. A report from Flurry Analytics shows that the growth of health and fitness apps was faster than the overall app market in 2014. The analytics firm looked at data from more than 6,800 iPhone and iPad apps listed in health and fitness category, and found that a 62% increase in the category in the first half of 2014. Comparing to 33% growth for the entire market, the growth of health and fitness apps is 87% faster than the industry (Khalaf, 2014). While there are so many apps in app stores, the way apps are ranked and displayed within app stores influences which apps

are eventually downloaded (OECD, 2013). To better understand app marketing, this study examines the factors influencing smartphone app adoption, focusing on the fitness apps.

Technology Acceptance Model (TAM)

Technology acceptance model is widely applied to predict users' acceptance of new technology. The origins of TAM can be traced to the Theory of Reasoned Action (TRA), a model from social psychology (Venkatesh & Davis, 2000). Reasoned action predicts the behavioral intention, concerning what a person would like to do or plan to do. It suggests that individual's behavioral intention depends on attitude about the behavior and subjective norms (Fishbein & Ajzen, 1975). Reasoned action is concerned with the relationship between messages, attitudes, and behavior. Various studies have revealed that these predictions of reasoned action hold in a variety of situations such as consumer behavior (Fishbein & Ajzen, 1980), health-enhancing behavior (Hausenblas, Carron, & Mack, 1997) and voting (Fishbein, Ajzen, & Hinkle, 1980).

According to TRA, researchers develop two influential beliefs: perceived usefulness (PU) and perceived ease of use (PEOU), in order to explain a users' behavior with regard to new technology adoption. According to Davis et al. (1989), "the goal of TAM is to provide an explanation of the determinants of computer acceptance that is in general, capable of explaining user behavior across a broad range of end-user-computing technologies and user populations, while at the same time being both parsimonious and theoretically justified" (p. 322). The two determinants explain users' acceptance behavior are PU, defined as the degree to which a person believes that using a particular system will enhance his or her job performance, and

PEOU defined as the degree to which a person believes that using a particular system will be free of effort. Both PU and PEOU have a causal effect on users' attitude toward using the technology. The model supports that attitude and PU, then in sequence, shapes behavioral intention. Particularly, the model (Figure 1) mainly discusses the impact of PU and PEOU on attitude toward using technology and toward the users' technology acceptance behavior, where attitude involves assessment on technology and behavioral intention represents the degree to which individuals are prompted to behave (Davis, 1989). Following TRA, TAM postulates the relationship between attitude and behavioral intention. It posits that users form intentions to use a computer system largely based on their positive affection. The user's attitude toward using system is jointly determined by PU and PEOU (Davis et al., 1989).

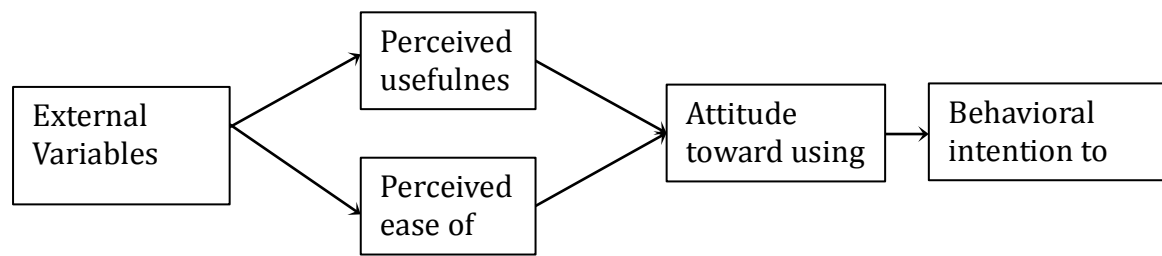


Figure 1. Original technology acceptance model

A large body of studies examines the role of external variables in individuals' intention to use new technologies. Venkatech and Bala (2008) summarize four different types of determinants of PU and PEOU, including individual differences, system characteristics, social influence, and facilitating conditions. Individual difference variable involves personality and/or demographics, such as age, gender, education level, culture, etc., that can influence individuals' intention to use new

technologies. System characteristics are the attributes of a technology that can help individuals develop favorable perceptions regarding the usefulness or ease of use. Social influence addresses the impact of interrelated social forces on individuals. Individuals' perceptions of usefulness and ease of use may increase in response to persuasive social information. Facilitating conditions refers organizational support that facilitates the use of a new technology.

In past studies, TAM was utilized to investigate consumers' intention to use websites for trip planning and hotel reservation (Kaplanidou & Vogt, 2006; Morosan & Jeong, 2008), to use blogs (Hsu & Lin, 2003), and to shop online (Baier & Stuber, 2010; Doong, Wang, & Foxall, 2011). In this work, additional variables are also discussed to explore whether there are other external factors that influence users' attitude toward using. In other words, their construction of a modified TAM extends the measurement scales to a wide scope of settings. Social influence has been employed as one of the significant moderator to build a comprehensive model. Researchers suggest that users are likely to formulate a favorable perception toward a new technology through social influence processes (Venkatesh & Bala, 2008).

However, few published works (Lim et al., 2011) extends TAM to include social influence and system characteristics in analysis of consumers' acceptance of fitness apps, a relatively new innovation for personal healthcare management. According to previous studies, it can be inferred that WOM transmitted within a consumer's social network takes its role in affecting the consumer's attitude toward technology acceptance. In addition, since the growth of fitness apps is a good indication on how many tracking devices the smartphones can replace (Khalaf, 2014), we believe technique improvement is another important determinant of fitness apps downloading. Thus, this study sheds light on the two aspects in particular. Individual

difference is controlled in the analysis to examine whether age, gender, education level, and fitness habits influence individuals' intention to use new technologies. Adding external variables to TAM model, this study tests whether the extension of the model will be more applicable in predicting college students' intentions to download fitness apps.

Effect of Word-Of-Mouth (WOM) on Technology Acceptance

The power of social influence through WOM communication has been systematically demonstrated in numerous marketing literature. Researchers establish a rich foundation to explain the causality between WOM and consumers purchase decision-making. WOM is generally defined as passing information in terms of experience and opinion about a particular brand, product or service through interpersonal communication (Arndt, 1967). Thus, as a social-based signal, WOM becomes an effective measurement helping potential consumers make a buying-decision. Traditional WOM occurs among acquaintances, friends, family members, and colleagues, and electronic word of mouth (eWOM) occurs among unknown regular consumers or experts via internet. Due to non-commercial message sources, consumers are more inclined to believe in WOM communicator compared to company. This study continuously investigates the nature of interpersonal influence on technology acceptance to understand how consumers use WOM and how they progress through to acceptance.

Social comparison theory supports that consumers evaluate their opinion and behavior by comparing themselves against others (Festinger, 1954). The subsequent studies suggest that this effect tends to be strongest if the comparative other is similar and shares goals with each other (Brown & Abram, 1986). Further, theories in social

information processing (Fulk, 1993; Schmitz & Fulk, 1991) found that information passed through individuals' social networks exert a direct influence on their perception of a target technology. Such influence is stronger in friendship networks, which effect individuals' attitude toward usage and stickiness (Brass, Butterfield, & Skaggs, 1998). Therefore, the effect of social influence on technology adoption gains more attention from TAM researchers recently. Social influence integrated with other variables has been used to extend TAM. Venkatesh and Davis (2000) revised the original TAM into TAM2, which states, "As the adoption decision becomes more of a team-rather than individual-level decision, the nature and role of social influence processes...need to be elaborated" (p. 187). Lu et al. (2005) also agree that consumers' PU may increase in response to persuasive social information. Therefore, it is reasonable to speculate that behavioral intention is closely related to WOM transmissions.

With the emergence of smartphone app market, eWOM undoubtedly extends its important role in affecting online purchasing decision-making. Traditional WOM usually occurs in an intimate conversation, where consumers seek information from their acquaintances, while eWOM occurs among unknown regular consumers or experts on Internet. Online consumer review and rating provide a platform for all the consumers to participate in WOM. The notable difference between WOM and eWOM is that WOM emanates from a sender who is known to the receiver of the information, thereby the credibility of the sender and the message are known to the receiver (Steffes & Burgee, 2008).

Thanks to technical advantage, eWOM reaches audiences of unprecedented scale and allows organizations to monitor and control their operations. In addition, eWOM is easy to obtain and available for relatively permanent periods, thus

researchers and marketers can retrieve a rich source of messages and analyze the impact of eWOM.

As a form of eWOM, online consumer review has some characteristics in common with traditional WOM. In a wireless environment, for an individual to use the data service of a digital device, a certain number of members of the subject's social network need to be users of the same feature (Sarker & Well, 2003). The recommendations from eWOM, like consumer reviews, reduce the risk involved in the purchase process. Users post their experiences and attitude about the products, and give recommendations to others who are interested in the products. Since it may not be feasible or economical for consumers to test all that they hear about products, they often look at the reviews from experts or consumers who have already done so. In this sense, eWOM through online reviews assists consumers in a more convenient way.

When it comes to spreading WOM online, there are three components that are intertwined and equally important: content, community, and communication. The message content has to inform the community and lead them to click, purchase, or download (Cakim, 2008). Due to user-generated content, consumer review can provide accurate and truthful information (Cheung, Luo, & Chen, 2009; Doong & Wang, 2009; Park & Lee, 2009). Therefore, eWOM can be instrumental in changing consumers' behavioral intention. Thanks to this content management system, cost-effective products and services can be developed in a short period. On one hand, the flexible and easy-to-use form of WOM aims to get consumers' voices heard and enhance the richness of information. On the other hand, the online reviews help organizations stay on top of the mind and satisfy users' needs according to valuable opinions gathered from reviews. Meanwhile, consumers get a chance to communicate and then develop a sense of community and trust in online reviews (De Valck, Van

Bruggen, & Wierenga, 2009; Utz Kerkhof & Van den Bos, 2012). The group's collective intelligence can provide significant value and knowledge to members and moderators, including insights on consumers' attitudes and behaviors. Further, the opinion leaders can develop a deeper affinity for the product. Those with strong opinions on an issue can step forward and take the lead in forum discussion. Consumers are inclined to search for their views, which is highly possible to make a difference in product selecting. Therefore, support from influential others has a significant impact on what action a potential adopter chooses to take in that consumers adapt their attitudes, behaviors and beliefs to their social context (Salancik & Pfeffer, 1978).

There are two forms of online review, numerical rating (often denoted by star ratings usually ranging from 1 to 5) and a detailed review and each could influence consumers' perception of product quality. Numerous studies have proved the role of both forms. It has shown that consumer reviews positively affect the growth of sales (Chen Dhanasobhon & Smith, 2008; Chevalier & Mayzlin, 2006; Clemons, Gao, & Hitt, 2006; Ghose & Ipeiritis, 2006). Also, positive ratings have a positive effect on the growth of sales (Clemons et al., 2006). In order to measure the impact of eWOM, both star rating and detailed review should be considered as a part of measurement.

Effect of System Characteristics on Technology Acceptance

Following the original TAM, further studies predict the marginal effects of the factors underlying PU, PEOU, and intention to use a computer system. In the digital era, users are more sensitive to the features of technology products so that system characteristics make a significant contribution to technology acceptance. Rindova and Petkova (2007) investigate product innovations, and propose three product attribute

dimensions, functional (technological novelty and congruity), symbolic (visual similarity to existing products), and esthetic (product appealing). Lee, Ha, & Widdows (2011) also suggest that there are three domains of system characteristics that contribute to users evaluation of technology product: performance, appearance and communication. Performance refers to the degree to which a product fulfills its purpose or function as expected. Appearance is defined as the degree to which a product appeals visually. Finally, communication is defined as the degree to which a product helps users express themselves. However, there are few empirical studies on users' measurement of the features of smartphone apps. This study argues functional and interface characteristics can work as sub-components of system characteristics to arouse users' motivation to download smartphone apps.

Functional features serve as a basic criterion for users to evaluate the consequences by using a system. It can affect successful interaction with users. Rogers (2004) redefines the innovation attributes. One of the attributes is called functional advantage, which can either be considered to be the relative functional performance of the innovation compared to the products it substitutes, or the benefit the users experiences by making use of the product. An innovation that enables a user to perform a single or multiple tasks which is/are beneficial will thus be perceived represent greater functional advantage than if these functions could else not have been performed, or with less benefits.

While functional features benefit users by enabling users to complete tasks, design inspires users' affection or emotion. Norman (2002) supports that a pleasant design enhances usability, and affects users' cognition process. Wang, Hernandez, & Minor (2010) also proved that aesthetics design affect how users perceive smartphone app service and satisfaction. Interface design determines the sensory experience

delivered by a system and determines whether consumers continue to interact with a system (Cyr et al., 2006). As a medium between system and users, interface serves as the platform for user actions. A well-designed interface can help users to use the system more easily by reducing the effort to identify a particular object on screen (Hong, Thong, Wong, & Tam, 2002). Marcus (1995) concludes seven aspects of interface design: layout (formats, proportions, and grids); 2-D and 3-D organization; typography (selection of typefaces and typesetting, including variable width and fixed width); color and texture (color, texture and light that convey complex information and pictorial reality); imagery (signs, icons and symbols, from the photographically real to the abstract); animation (a dynamic or kinetic display, very important for video-related imagery); sound (abstract, vocal, concrete, or musical cues); visual identity (the additional, unique rules that lend overall consistency to a user interface). These aspects contribute to the overall decisions as to how the corporation or the product line expresses itself in visible language.

Based on the theoretical rationale, this study extends the original TAM model with the additional variables, WOM, detailed review, star rating, interface design, and functional features. Furthermore, it examines the effect of PU and PEOU that predicted by the five external variables on attitude and behavioral intention of downloading fitness apps.

CHAPTER 3

HYPOTHESES AND RESEARCH MODEL

This research adopts initial TAM for predicting consumers' intention to download fitness apps. According to the extended TAM (Figure 2), this study hypothesizes the relationships within the model in the context of fitness apps:

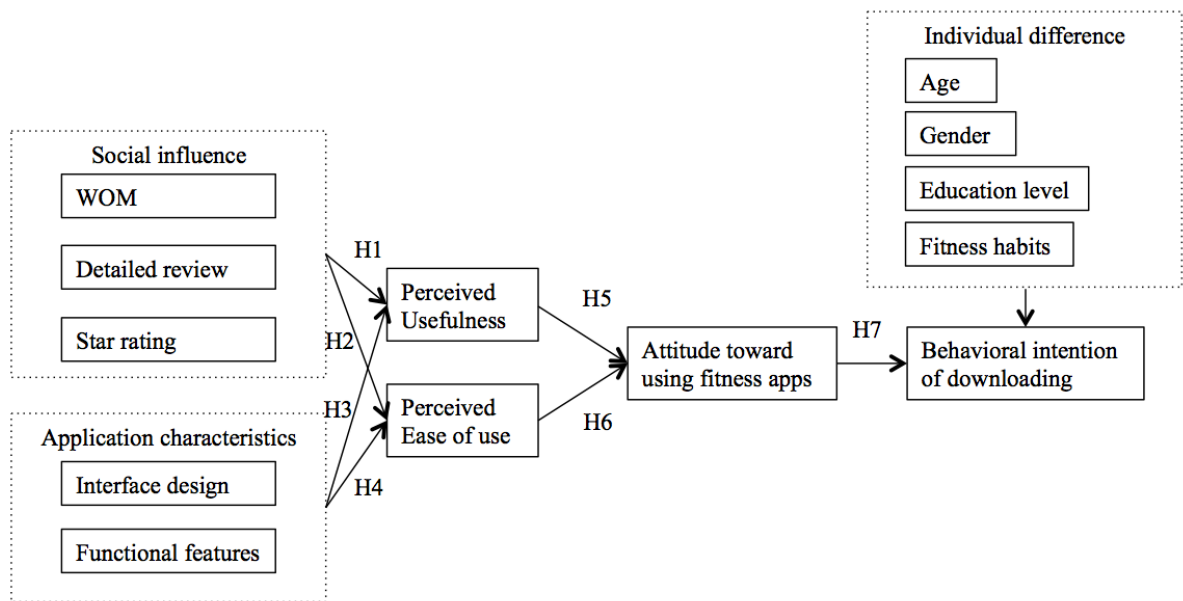


Figure 2. Proposed research model

Consumers are prompt to search information in order to gather sufficient elements to make a best decision. H1 and H2 investigate the effect of social influence through WOM and eWOM, as external variables, on TAM model in the context of fitness apps, the following hypotheses are proposed:

H1: Social influence affects the perceived usefulness of a fitness app.

H1a: WOM positively affects the perceived usefulness of a fitness app.

H1b: Detailed review positively affects the perceived usefulness of a fitness app.

H1c: Star rating positively affects the perceived usefulness of a fitness app.

H2: Social influence affects the perceived ease of use of a fitness app.

H2a: WOM positively affects the perceived ease of use of a fitness app.

H2b: Detailed review positively affects the perceived ease of use of a fitness app.

H2c: Star rating positively affects the perceived ease of use of a fitness app.

Furthermore, this study explores whether the quality of application characteristics is able to make an impact on downloading behavior of fitness apps. H3 and H4 test the effect of system characteristics through interface feature and functional feature, as external variables, on TAM model in the context of fitness apps.

The following hypotheses are proposed:

H3: Application characteristics affect the perceived usefulness of a fitness app.

H3a: Expected interface design feature positively affects perceived usefulness of a fitness app.

H3b: Expected functional feature positively affects perceived usefulness of a fitness app.

H4: Application characteristics affect the perceived ease of use of a fitness app.

H4a: Expected interface design feature positively affects perceived ease of a fitness app.

H4b: Expected functional feature positively affects perceived ease of use of a fitness app.

Although TAM was widely applied in the context of new technology, few studies (Venkatech and Bala, 2008) integrate social influence and system characteristics to examine the behavioral intention, and they are first applied to explaining smartphone fitness apps downloading. H5, H6 and H7 examine the

relationship between perceived usefulness, ease of use, attitude and behavioral intention of downloading fitness apps.

H5: Perceived usefulness, predicted by extended variables, is positively affect users' attitudes toward using a fitness app.

H6: Perceived ease of use, predicted by extended variables, is positively affect users' attitudes toward using a fitness app.

H7: Attitude is positively related to behavioral intention of downloading a fitness app.

CHAPTER 4

METHOD

Sample and Data Collection

To test the hypotheses, the study conducted an online survey to collect data among both undergraduate and graduate students at Iowa State University in April, 2015. This survey was distributed to the participants after receiving the approval from the Institutional Review Board (IRB). A convenience sample of total university students (3,4732; both male and female) was recruited to respond to the survey. Respondents filled out the questionnaire through a link provided in an email. A total of 348 questionnaires were returned and the valid response rate was 1%.

In the first part of the survey questionnaire, participants are asked to provide general demographic information about their gender and age, followed by questions about their experience of smartphone usage, app usage, and fitness activities. In the second part, participants are asked to respond to questions about their attitude and behavioral intention of using fitness apps with 5-point Likert scales (ranging from strongly disagree to strongly agree). Questionnaires are developed on the items comprising of perceived usefulness, ease of use, social influence, application characteristics, attitude and behavioral intention (see Appendix A. for the questionnaire wording).

Measurements

A total of nine variables in the extended model were measured: (1) word of mouth, (2) online review, (3) star rating, (4) interface design, (5) functional feature, (6) perceived usefulness, (7) perceived ease of use, (8) attitude, and (9) behavioral intention. The scales to measure TAM are developed from the study of Davis (1989).

Typically, participants who are recruited in the study are asked to provide measurement on a series of statements related to a given context. A pre-test was undertaken to validate the questionnaire. Eleven respondents were asked to comment on the length of the survey, the format, and wording of the questionnaires.

Adopted from Maxham (2001), WOM is operationalized as the degree to which participants receive recommendations from acquaintances. It is measured by asking respondents how much they agree with the following four statements: WOM1: when choosing what fitness app to download, I often turn to acquaintances around me for advice (Mean=3.37, SD=1.04); WOM2: when choosing what fitness app to download, I often follow the advice from acquaintances (Mean=3.41, SD=0.94); WOM3: I often find advice from acquaintances helpful for me to feel that using fitness apps will enhance my performance (Mean=3.36, SD=0.87); WOM4: I often find advice from acquaintances helpful for me to feel that it is easy to use fitness apps (Mean=3.34, SD=0.93). After calculated the Cronbach's alpha (=0.90) to support the reliability of the four items, WOM1, WOM2, WOM3, WOM4, are combined into a composite index, eWOM (Mean=3.37, SD=0.832), by calculating the average of the mean scores of the four items.

Similarly, detailed review developed from Maxham (2001), is operationalized as to the degree to which participants receive recommendations from online reviews. The measurement items are as follows: DR1: when choosing what fitness app to download, I often turn to consumer reviews for advice (Mean=3.81, SD=0.97); DR2: when choosing what mobile fitness app to download, I often follow the advice from consumer reviews (Mean=3.59, SD=0.91); DR3: I often find advice from consumer reviews helpful for me to feel that using fitness apps will enhance my performance (Mean=3.49, SD=0.92); DR4: I often find advice from consumer reviews helpful for

me to feel that it is easy to use fitness apps (Mean=3.58, SD=0.88). Cronbach's alpha (0.89) is also used to support the reliability of the four items, DR1, DR2, DR3, and DR4 are combined into a composite index, detailed review (DR) (Mean=3.62, SD=0.80).

Star rating, developed from Maxham (2001), is operationalized as the degree to which participants rely on star ratings. The first measurement item is SR1: When choosing what fitness app to download, I often look at star rating for advice (Mean=3.87, SD=0.84); and the second is SR2: when choosing what fitness app to download, I often make a decision according to star rating (Mean=3.49, SD=0.92). SR1, and SR2, ensured as reliable by Cronbach's alpha (0.82), are combined into star rating (SR) (Mean=3.70, SD=0.79).

Interface design is operationalized as the grade participants give to fitness apps by interface design. According to Marcus (1995), the measurement items are: the aspects of interface design of fitness apps, includes layout (ID1) (Mean=4.33, SD=0.69), typography (ID2) (Mean=3.71, SD=0.83), color and texture (ID3) (Mean=3.64, SD=0.83), imagery (ID4) (Mean=3.69, SD=0.90), animation (ID5) (Mean=2.82, SD=1.19), sound (ID6) (Mean=2.91, SD=1.14), visual identity (ID7) (Mean=3.62, SD=0.91), are aesthetically appealing to me; a good interface design often leads me to feel that using fitness apps will enhance my performance (ID8) (Mean=3.60, SD=0.91); a good interface design often leads me to feel that it is easy to use fitness apps (ID9) (Mean=4.13, SD=0.69). Cronbach's alpha of the nine items is 0.81. After the reliability is tested, interface design (ID) (Mean=3.60, SD=0.57) is developed by calculating the average of the mean scores of the nine items.

Functional feature is operationalized as the grade participants give to fitness apps by functionality. Azar, et al. (2013) summarizes the functional features of

tracking app, thus measurement items in this study are developed as follows: the aspects of functional features of fitness apps, includes work-out tracking (Mean=4.35, SD=0.76), built-in GPS (Mean=3.63, SD=1.20), health data logging (Mean=4.07, SD=0.90), goal setting (Mean=4.01, SD=0.94), providing nutrition information (Mean=3.94, SD=1.00), stimulus control (Mean=3.27, SD=0.92), social network sharing (Mean=2.22, SD=1.11) and others (Mean=2.97, SD=0.95) are important to me; a high-quality function often leads me to feel that using fitness apps will enhance my performance (Mean=3.65, SD=0.87); a high-quality function often leads me to feel that it is easy to use fitness apps (Mean=3.94, SD=0.66). Similarly, functional feature (FF) (Mean=3.63, SD=0.51) is developed by calculating the average of the mean scores of FF1, FF2, FF3, FF4, FF5, FF6, FF7, FF8, FF9, and FF10, after reliability of the ten items is supported. Cronbach's alpha of the ten items is 0.75.

Adopted from Davis (1989), perceived usefulness is operationalized as the degree to which participants believe that using fitness apps will enhance his or her performance. The measurement items are: I find using fitness apps could improve my performance (Mean=3.83, SD=0.82); the fitness apps enable me to accomplish my fitness goals effectively (Mean=3.83, SD=0.77); the fitness apps can be advantageous in better managing my health (Mean=4.06, SD=0.71); overall, I find fitness apps useful for me to live a healthy lifestyle (Mean=3.88, SD=0.82). After Cronbach's alpha (0.86) supports the reliability of the four items, PU1, PU2, PU3, PU4 are combined into a composite index, perceived usefulness (PU) (Mean=3.89, SD=0.65).

Also consistent with Davis's study, perceived ease of use is operationalized as the degree to which participants believe that using fitness apps will be free of effort. The measurement items are: using fitness apps is easy for me (Mean=4.00, SD=0.72); my interaction with fitness apps is clear and understandable (Mean=3.96, SD=0.65); it

would be easy for me to become skillful at using fitness apps (Mean=4.06, SD=0.61); overall, I find fitness apps easy to use (Mean=4.06, SD=0.66). Supported by Cronbach's alpha (0.87), PEOU1, PEOU2, PEOU3, and PEOU4 are combined into a composite index, perceived ease of use (PEOU) (Mean=4.01, SD=0.59).

Davis (1989) initially collected data by asking IBM participants' attitude toward using the systems, and constructed a scale, developed by Ajzen and Fishbein (1980), to measure five different types of attitude that a person may have toward a system on a seven-point scale. Adopted from Davis, attitude is operationalized as the degree to which a participant has a favorable or unfavorable evaluation of fitness app download. This item is measured by 5-point Semantic Differential Scaling regarding respondents' use of fitness apps to manage health is: Good vs. Bad (Mean=1.69, SD=0.80); Wise vs. Foolish (Mean=1.86, SD=0.78); Favorable vs. Unfavorable (Mean=1.86, SD=0.75); Beneficial vs. Harmful (Mean=1.71, SD=0.77); Positive vs. Negative (Mean=1.66, SD=0.74).

The attitude ranges from positively-keyed to negatively-keyed words, the responses has to be recoded to develop a new variable, new attitude. The recoding process is a way to reverse a score on an item so that high scores indicate high levels of the attribute being measured. All 1's on this item were reversed to 5's, and all 2's were reversed to 4's. After transforming, the reverse-scored item now has a high score (a 5 instead of a 1), which indicates a high level of positive attitude toward using apps. The mean and standard deviation of recoding items are as follows: Good vs. Bad (Mean=4.31, SD=0.80); Wise vs. Foolish (Mean=4.14, SD=0.78); Favorable vs. Unfavorable (Mean=4.14, SD=0.75); Beneficial vs. Harmful (Mean=4.29, SD=0.77); Positive vs. Negative (Mean=4.34, SD=0.74). Cronbach's alpha (=0.90) is also used to support the reliability of the five recoded items, which are new A1, new A2, new

A3, new A4 and new A5, and they are combined into attitude (A) (Mean=3.72, SD=0.44).

Behavioral intention, developed from Davis (1989) and Davis et al. (1989), operationalized as the extent to which a person would like to download the apps. The measurement items are: I would be willing to download fitness apps (BI1) (Mean=4.11, SD=0.81). I intend to increase my use of the fitness apps in the future (BI2) (Mean=3.57, SD=0.95). BI1 and BI2 are combined into Behavioral intention (BI) (Mean=3.84, SD=0.78), after being judged by Cronbach's alpha (0.74) to ensure the reliability.

Data Analysis

The test of the proposed model includes reliability testing, correlation analysis, and regression analysis. First, in order to ensure the consistency of the survey data, all measurement scales are measured by Cronbach's alpha, an index of reliability associated with variation (Hatcher, 1994). According to a rule of thumb, an acceptable value would be at least 0.7 (Hatcher, 1994). Cronbach's alpha of each factor, WOM, detailed review, star rating, interface design, functional feature, PU, PEOU, A and BI in the model ranges from 0.74 to 0.90, all indicate high reliability. Next, Pearson Correlation analysis is used to examine the relationship between variables. Finally, a series of regression analysis is conducted to test the relationship between each set of the variables. External variables, including WOM, detailed review, star rating, interface design, and functional feature, are respectively used to predict PU and PEOU. A is predicted based on PU and PEOU by hierarchical multiple regression analysis, which can explain the contribution of predictors to the total variance, and BI is predicted by A.

CHAPTER 5

RESULTS

The online survey received 348 responses. Participants are excluded if they had no experience using smartphone or tablet apps, thus this study focuses on the data from those 235 participants who have the experience on the usage of smartphone apps. Among the subjects, 69% were female, and 31% were male. The largest age group is composed of students under 21 years (46%). Of the participants, 70% were undergraduate, including 20% freshman, 15% sophomore, 19% junior, and 15% senior students. Respondents reported a 95% percentage of engagement in fitness, and 89% respondents have used or plan to use fitness apps. Finally, in terms of purchasing fitness mobile apps, 81% respondents do not or will not pay for fitness apps.

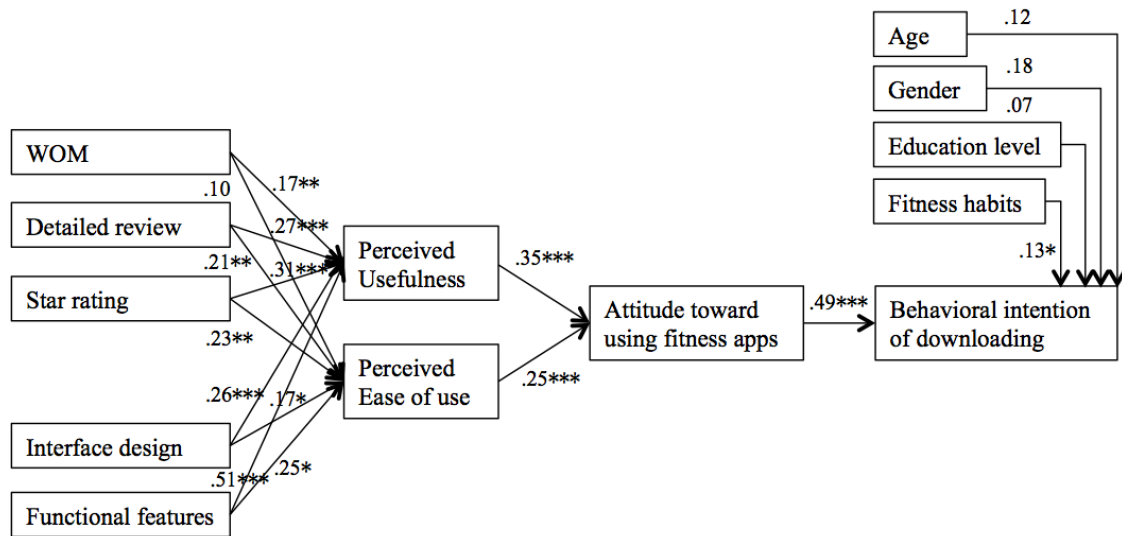
Pearson Correlation analysis is conducted to examine the relationship between the nine variables, WOM, detailed review, star rating, interface design, functional features, PU, PEOU, A, and BI. As expected, social influence through WOM ($r=0.17$, $p<0.05$), detailed review ($r=0.27$, $p<0.001$), and star rating ($r=0.31$, $p<0.001$) are found to be positively correlated with PU. Detailed review ($r=0.21$, $p<0.01$) and star rating ($r=0.23$, $p<0.01$) are found to be positively correlated with PEOU. In addition, interface design ($r=0.26$, $p<0.001$), functional feature ($r=0.51$, $p<0.001$) have a strong and significant relation with PU, whereas interface design ($r=0.17$, $p<0.05$), functional feature ($r=0.25$, $p<0.05$) have a weak relationship with PEOU. Consistent with previous studies about TAM, PU ($r=0.47$, $p<0.001$) and PEOU ($r=0.42$, $p<0.001$) are found to be correlated with A. A ($r=0.50$, $p<0.001$) is found to have a significantly strong relationship with BI. Table 1 summarizes correlation analysis on the nine variables.

Table 1. Pearson Correlations Analysis

	WOM	DR	SR	ID	FF	PU	PEOU	A	BI
WOM	1								
DR	0.17*	1							
SR	0.13	0.47***	1						
ID	0.11	0.29***	0.27***	1					
FF	-0.04	0.14	0.10	0.53***	1				
PU	0.17**	0.27***	0.30***	0.26***	0.51***	1			
PEOU	0.10	0.21**	0.23**	0.17*	0.25*	0.48***	1		
A	0.09	0.13	0.22**	0.24***	0.24*	0.47***	0.42***	1	
BI	0.26***	0.27***	0.33***	0.35***	0.36**	0.64***	0.50***	0.50***	1

Note * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A series of regression analyses were conducted to test the hypotheses. Figure 3 presents the results of the regression analysis. Specifically, PU can be predicted by WOM, detailed review, star rating, interface design, and functional feature. However, the results show WOM lost its significance in predicting PEOU. As the results show, attitude, determined by PU and PEOU, is a predictor of behavioral intention. The result explains up to 46% variance in the behavioral intention on downloading fitness apps. Figure 3 and Table 2 present the results of regression analysis.



Note: *p < 0.05, **p < 0.01, ***p < 0.001

Figure 3. Regression analysis results

Table 2. Regression Analysis

	PU		PEOU		A		BI	
	B	Sig.	B	Sig.	B	Sig.	B	Sig.
Step 1								
WOM	0.17	p < 0.01	0.10	p = 0.135				
Detailed reviews	0.27	p < 0.001	0.21	p < 0.01				
Star rating	0.31	p < 0.001	0.26	p < 0.001				
Interface design	0.26	p < 0.001	0.17	p < 0.05				
Functional features	0.51	p < 0.001	0.25	p < 0.05				
Step 2								
PEOU					0.35	p < 0.001		
PU					0.25	p < 0.001		
Step 3								
A							0.49	p < 0.001
R ²	0.30		0.18		0.27		0.46	

Note *p < 0.05, ** p < 0.01, *** p < 0.001

Based on the regression analyses results, H1, H3, H4, H5, H6 are supported, while H2 is partly supported.

H1a is supported. WOM positively affects the perceived usefulness of a fitness app. The relationship between WOM and PU is supported in the model, because results indicate this interaction is significant ($\beta=0.17$, $p < 0.01$)

H1b is supported. Detailed review positively affects the perceived usefulness of a fitness app. The results report the effect of detailed review on PU was strong ($\beta=0.27$, $p < 0.001$).

H1c is supported. Star rating positively affects the perceived usefulness of a fitness app. The results indicate that there is a strong significance and positive relationship between star rating and PU ($\beta=0.31$, $p < 0.001$).

H2a is not supported. WOM positively does not affect the perceived ease of use of a fitness app. The effect of WOM on PEOU is not found to be significant ($\beta=0.10$, $p=0.135$)

H2b is supported. Detailed review positively affect the perceived ease of use of a fitness app. The results indicate that detailed review has a significant effect on PEOU ($\beta=0.21$, $p < 0.01$).

H2c is supported. Star rating positively affects the perceived ease of use of a fitness app. The relationship between star rating and PEOU is found to be significant ($\beta=0.23$, $p < 0.01$).

H3a is supported. Expected interface design feature positively affects perceived usefulness of a fitness app. The data confirms that there is a positively relationship between interface design and PU ($\beta=0.26$, $p < 0.001$).

H3b is supported. Expected functional feature positively affects perceived usefulness of a fitness app. This effect is strongly significant ($\beta=0.51$, $p < 0.001$).

H4a is supported. Expected interface feature positively affects perceived ease of a fitness app. The results support a positive effect of interface feature on PEOU ($\beta=0.17$, $p<0.05$).

H4b is supported. Expected functional feature positively affects perceived ease of use of a fitness app. The results indicate a positive relationship between functional feature with PEOU ($\beta=0.25$, $p <0.05$).

H5 is supported. Perceived usefulness, predicted by extended variables, is positively affect users' attitudes toward using a fitness app. The coefficient of PU and attitudes toward using is found statistically significant ($\beta=0.35$, $p<0.001$). The result also indicates that PU is a primary predictor of intention to use.

H6 is supported. Perceived ease of use, predicted by extended variables, is positively affect users' attitudes. The results posit PEOU has a significant impact on attitude toward using a fitness app ($\beta=0.25$, $p<0.001$). Furthermore, PEOU is found as a secondary predictor of intention to use.

H7 is supported. Attitude is positively related to intention to downloading a fitness app. The results explain that attitude has a significant effect on intention to downloading apps ($\beta=0.49$, $p<0.001$). The influence of demographics, including gender, age, education level and fitness habit, is investigated in this research model. While gender, age, and education level is found to have no significant role on behavioral intention to download fitness apps, fitness habit has a correlation with behavioral intention.

CHAPTER 6

DISCUSSION

This study reveals that TAM model with social influence and application characteristics as external factors are applicable in the context of fitness apps. The proposed research model supports the external factors exert a significant direct effect on usage intentions over and above perceived usefulness and perceived ease of use. Although not all the hypotheses are confirmed, the results were consistent with the work of Venkatesh and Davis (1989) that supports that perceived usefulness and perceived ease of use are the two most important determinants for system use.

The demographics of the survey respondents provide the statistical evidence about current usage of smartphone apps. About 68% respondents reported that they used smartphone or tablet, and downloaded apps, which showed a moderate level of popularity about smartphone app usage. Also, the data reports high engagement of college students in fitness activities, thus users might find it easy to sustain motivation and enforce commitment to fitness goals via fitness apps. Thus, it is becoming increasingly important to identify what factors are able to encourage college students to download fitness apps. In addition, demographic information is also used to examine the relationship between individual difference and behavioral intention of downloading fitness apps. BI is found to have no significant relationship with age, gender, and education level. In fact, fitness habit has significant impact in the prediction of BI. The results indicate that college students who have fitness habit are more inclined to download fitness apps.

The effects of social influence in terms of WOM, detailed review, and star rating on PU are examined in the model. As this study finds, WOM, detailed review,

and star rating have a significant effect on PU respectively, while the effect of WOM is weaker than the other two factors. The messages transmitted in the real life may provide individuals with effective information and examples to enhance their confidence in their beliefs. However, more and more college students use detailed review and star rating to make a judgment about a product. The online messages appear to enhance the perception of usefulness on fitness apps. As a form of eWOM, star rating is also shown to exert an importantly significant effect on PU. This study is in accordance with literature review, which claims that positive ratings have a positive effect on the growth of sales (Clemons et al., 2006). The nature of star rating system may help individuals have a clear and quick review about the usefulness perception on fitness apps, which can explain why the coefficient between the star rating and perceived usefulness is the highest among the three measures of social influence, including WOM, detailed review, and star rating.

Next, this study discusses the impact of social influence on perceived ease of use. As the results show, there is no significant relationship between WOM and PEOU. The possible reason to explain this unsupported hypothesis is that users find it unnecessary to get advice from acquaintances. Rationally, PEOU is based on hands-on experience, thus word of mouth may not provide strong evidence for persuasion. In their study (2000), Venkatesh and Davis found that individuals relied less on social information in motivating behavioral intention, as they gained direct experience with a system over time. But some other previous studies found the significant role of social influence. In this study, while the results reject the positive effect of WOM on PEOU, the results reinforce the positive effect of eWOM, includes detailed review and star rating. eWOM represents abundant sources of information in the internet. Since detailed review and star ratings provide a platform for sharing information, all

the available comments and image help users compare different choices. Thus, system quality and operation can be easily observed through eWOM.

As hypothesized, application characteristics in terms of interface design and functional features take great importance in the usefulness perception. Expected interface design and functional feature are found to positively affect perceived usefulness of a fitness mobile app. Similar interaction effects between technical characteristics and usefulness perception have been observed in other research (Goodhue, 1995). This study explores what characteristic is more influential to technology acceptance. According to the results, functional feature is found to have more significance as a predictor to PU. The correlation between functional feature and PU is the strongest among the significant correlations in the study. This implies function concerns are the major measurement for individuals to evaluate a fitness app as useful. Additionally, interface design enables a user to perform a single or multiple tasks which is/are useful. Therefore, when marketers encourage individuals to be receptive to the idea of using fitness apps, it is important to improve the quality of fitness application characteristics, especially work-out tracking, and the layout.

Besides the significant effect of application characteristics on PU, this study explores the relationship between application characteristics and PEOU. The perception of easy to use is influenced by interface design and functional feature. Lim, et al. (2011) claim that the conversion of their intention to actual behavior hinges on technical concerns and design factors. This study provides a further discussion about how and what technical concerns and design factors serve as a basic criterion for users to download apps. Similarly, functional feature is found to be a more salient predictor than interface design in PEOU. This implies that expected functional feature is effective to help individuals to operate fitness apps effortlessly. The reason may lie

on the advantages of using mobile apps, their small size and mobility. According to Hong, et al. (2002), the expected interface design can help users to use the system more easily by reducing the effort to identify a particular object on screen, which provides a possible reason for the results. Therefore, marketers are recommended to enhance ease of use of fitness apps by focusing on technical characteristics and interface design.

Encompassing social influence (WOM, detailed review, and star rating) and application characteristics (interface design and functional feature), this study finds PU and PEOU, the primary variables of TAM, are able to predict the attitude construct from the original model. Based on the results, PU continues to be the major predictor of attitude toward using fitness apps, even with the incorporation of external variables, including word of mouth, detailed review, star rating, interface design and functional features. PEOU is the secondary predictor of attitude. Those findings are consistent with previous studies, which applies TAM in different context (Kaplanidou & Vogt, 2006; Morosan & Jeong, 2008; Hsu & Lin, 2003; Baier & Stuber, 2010; Doong, Wang, & Foxall, 2011). It is understandable that users would like to use a system only if it is useful and easy to use for them. Furthermore, this study confirms that positive attitude leads to the behavioral intention of downloading fitness apps. This implies the decision to download fitness app is driven by utilitarian motivations, providing specific value to users. In other words, in order for individuals to download fitness apps, they should be convinced that the fitness apps were useful and easy to use.

CHAPTER 7

CONCLUSION

This study extends the original TAM model, and applied it in the context of fitness apps. Motivated by the need to have a better understanding of the rapid growth of fitness app, this study investigates the effect of WOM, detailed review, star rating, interface design, and functional features on the relationships among users' attitude and behavior. Social information and technical characteristics are found as powerful evolution tools for choosing fitness apps. The results provide some important insights for both researchers and marketers.

Implications for Research

The main theoretical contribution of this study is that it provides significant empirical support that system characteristics are the most salient determinants of PU and PEOU. Venkatech and Bala (2008) summarized the four different types of determinants of PU and PEOU are system characteristics, social influence, facilitating conditions, and individual differences. Compared with the previous extended TAM, the proposed model integrates both application characteristics and social influence in one model, and extends application characteristics and social influence with more specific sub-factors. The inclusion of these extended variables can increase the predictive power of TAM to measure behavioral intention towards using fitness apps. This study mainly examines two of them, system characteristics and social influence, and ranked the significance. Therefore, this study might provide a detailed explanation to researchers about the increasing trend of college students' fitness apps downloading.

Further, system characteristics are found to be more important determinants of PU and PEOU, followed by social influence. In this study, specific factors of system characteristics and social influence are further discussed. Although some studies generally discussed the effect of social influence, no specific factors about social influence were receptive to TAM. This study demonstrates that detailed review and high star rating could be an influential factor on forming positive attitude about fitness apps. However, WOM is not applicable to reinforce individual perception of ease of use.

Another theoretical contribution is that a TAM that integrates external factors is first employed to explain fitness smartphone apps. TAM is widely applied to explain users' acceptance of a new technology. By adding external factors, TAM fits in the context of different innovations, such as online shopping, and online games. Compared to the model in these contexts, the research model proposed in this study is more suitable for fitness apps, excluding prior experience and enjoyment. The role of social influence and application characteristics in smartphone app acceptance decisions remains unclear in research, thus they are examined in this study. Therefore, this study fills the gap by identifying how to motivate individuals to download fitness apps.

Implications for Practice

This study provides empirical evidence on college students' selection of fitness apps. Results suggest fitness app usage needs to be provided with effortless and useful interface design and functional technologies. For application developers, it is highly recommended that marketers should endeavor to emphasize on application characteristics that help them satisfy users' needs, which leads to more downloading

and even adoption of fitness apps. Meanwhile, PU remains the dominant determinant on user's attitude toward fitness apps. The more useful perception of fitness app users have, the more positive and favorable attitude created for the fitness apps. Thereby, application developers should increase usability through functional features and interface design.

This study also reminds that the marketers should be aware of the importance of social influence. Information passed through detailed review and star rating are so important to keep up with user needs and feedback. A plausible finding in this study is the indispensable effect of eWOM. Detail review and star rating system are used in many aspects to help consumers identify the quality of a product or service. This study supports that eWOM can be instrumental in changing consumers' behavioral intention. Marketers thereby should provide incentives to users to rate and post reviews on the apps.

Limitations

The study exhibits some limitations that have to be mentioned. First, a limitation emerges from the representativeness of the sample. A convenience sample was recruited from relatively homogeneous student in Iowa State University subjects of a shared culture and lifestyle. Although this study reports that sex, gender, and education level do not affect behavioral intention, it does not explore the effect of cultural difference or personality, which are also composed of individual difference. It is possible that cultural difference or personality cause different impact on user's decision of downloading fitness app.

Another potential limitation is related to the external factors that could predict PU and PEOU. This study attempts to understand what factors would affect users'

behavioral intention to download fitness app, emphasizing on the application to marketing orientation. However, some studies adopt self-efficacy as a predictor to analyze individuals' behavioral intention toward fitness activities involvement. Other studies adopt perceived enjoyment as a predictor to innovation adoption. These factors could also be included into future studies to better understand how to increase fitness app acceptance.

Lastly, this study did not employ structural equation modeling to test the relationship between the whole set of predictors and dependent variable. Regression analysis was only used to test the direct relationships between variables, omitting the indirect relationships, resulting in the parameter instability in the structural model.

Smartphones are becoming a major platform for individuals to get health information and to help keep a healthy lifestyle. It is widely applied in the field of healthcare. This study is an exploratory tool to understand college students' behavioral intentions of downloading fitness apps to their smartphones. Future studies could seek to discuss how fitness apps could be utilized to encourage fitness activity and healthy diets. In addition, by encompass other theoretical constructs to the model with additional variables, future studies could provide both researchers and marketers valuable insights on the motivation of downloading and use of fitness apps. Finally, a suggestion for future study is that a larger sample size and a longitudinal design should be implemented to measure the reliability of the influential factors on innovation adoption.

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APPENDIX QUESTIONNAIRE

You are invited to participate in a research study – Factors affecting college students’ downloading of smartphone fitness applications. You will be asked to provide your answers regarding your attitudes and intentions to download fitness mobile apps, as well as some basic demographics. There are 37 questions, which will take approximately 10 minutes or less. There are no foreseeable risks from participating in this study. You may choose to withdraw at any time. Your survey responses will be anonymous and confidential and will NOT be linked to any data that can ascertain your identity.

For further questions regarding this survey, feel free to contact me at yliao@iastate.edu. If you have any questions about the rights of research subjects, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office of Research Assurances, 1138 Pearson Hall, Iowa State University, Ames, Iowa 50011.

Your participation and input are greatly appreciated.

Please tell us a little about yourself:

1. What is your gender? (check one) Male Female Other

2. How old are you?

Under 21

21-24

25-28

28-31

31-34

35 or older

3. What best describes your current level of education? (check one)

Freshman

Sophomore

Junior

Senior

Graduate

4. Which of the following best describes your employment status? (check all that apply)

Unemployed

Employed full-time

Employed part-time

Student

5. Which of the following best describes you? (check all that apply)

White / Caucasian

Black / African-American

- Hispanic/Latino
 Asian/ Pacific Islander
 American Indian/Alaskan Native
 Biracial
 Other
6. Have you exercised within the last three months? Yes No
7. Do you use smartphone or tablet, and download apps?
 Yes No
8. Which operating system you are using now?
 Android IOS Windows Symbian Blackberry
 Other
9. Do you pay for fitness app?
 Yes No
10. Have you ever used, or planned to use, a fitness smartphone app to attain your goal? Yes No

For each statement below, indicate how much you agree or disagree.

11. When choosing what fitness app to download, I often turn to acquaintances around me for advice.

Strongly Disagree 1 2 3 4 5 Strongly Agree

12. When choosing what fitness app to download, I often follow the advice from acquaintances.

Strongly Disagree 1 2 3 4 5 Strongly Agree

13. I often find advice from acquaintances helpful for me to feel that using fitness apps will enhance my performance.

Strongly Disagree 1 2 3 4 5 Strongly Agree

14. I often find advice from acquaintances helpful for me to feel that it is easy to use fitness apps.

Strongly Disagree 1 2 3 4 5 Strongly Agree

15. When choosing what fitness app to download, I often turn to consumer reviews for advice.

Strongly Disagree 1 2 3 4 5 Strongly Agree

16. When choosing what fitness app to download, I often follow the advice from consumer reviews.

Strongly Disagree 1 2 3 4 5 Strongly Agree

17. I often find advice from consumer reviews helpful for me to feel that using fitness apps will enhance my performance.

Strongly Disagree 1 2 3 4 5 Strongly Agree

18. I often find advice from consumer reviews helpful for me to feel that it is easy to use fitness apps.

Strongly Disagree 1 2 3 4 5 Strongly Agree

19. When choosing what fitness app to download, I often look at star rating for advice.

Strongly Disagree 1 2 3 4 5 Strongly Agree

20. When choosing what fitness app to download, I often make a decision according to star rating.

Strongly Disagree 1 2 3 4 5 Strongly Agree

21. The following aspects of interface design of fitness apps are aesthetically appealing to me.

Strongly Disagree	1	2	3	4	5	Strongly Agree
Layout (format or organization)	1	2	3	4	5	
Typography (typesetting)	1	2	3	4	5	
Color	1	2	3	4	5	
Texture	1	2	3	4	5	
Imagery	1	2	3	4	5	
Animation	1	2	3	4	5	
Sound	1	2	3	4	5	
Visual identity (Unique design)	1	2	3	4	5	

22. A good interface design often leads me to feel that using fitness apps will enhance my performance.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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23. A good interface design often leads me to feel that it is easy to use fitness apps.

Strongly Disagree	1	2	3	4	5	Strongly Agree
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24. The functions of fitness apps are important to me.

	1	2	3	4	5	Strongly Agree
Strongly Disagree						
Work-out tracking	1	2	3	4	5	
Build-in GPS	1	2	3	4	5	
Health data logging	1	2	3	4	5	
Goal setting	1	2	3	4	5	
Providing nutrition information	1	2	3	4	5	
Stimulus control	1	2	3	4	5	
Social network sharing	1	2	3	4	5	
Others(please specify)	1	2	3	4	5	

25. A high-quality function often leads me to feel that using fitness apps will enhance my performance.

	1	2	3	4	5	Strongly Agree
Strongly Disagree						

26. A high-quality function often leads me to feel that it is easy to use fitness apps.

	1	2	3	4	5	Strongly Agree
Strongly Disagree						

27. I find using fitness apps could improve my performance.

	1	2	3	4	5	Strongly Agree
Strongly Disagree						

28. The fitness apps enable me to accomplish my fitness goals effectively.

	1	2	3	4	5	Strongly Agree
Strongly Disagree						

29. The fitness apps can be advantageous in better managing my health.

	1	2	3	4	5	Strongly Agree
Strongly Disagree						

30. Overall, I find fitness apps useful for me to live a healthy lifestyle.

Strongly Disagree 1 2 3 4 5 Strongly Agree

31. Using fitness apps is easy for me.

Strongly Disagree 1 2 3 4 5 Strongly Agree

32. My interaction with fitness apps is clear and understandable.

Strongly Disagree 1 2 3 4 5 Strongly Agree

33. It would be easy for me to become skillful at using fitness apps.

Strongly Disagree 1 2 3 4 5 Strongly Agree

34. Overall, I find fitness apps easy to use.

Strongly Disagree 1 2 3 4 5 Strongly Agree

35. All things considered, my use of fitness apps to manage health is:

Good	_____	_____	_____	_____	_____	Bad
Wise	_____	_____	_____	_____	_____	Foolish
Favorable	_____	_____	_____	_____	_____	Unfavorable
Beneficial	_____	_____	_____	_____	_____	Harmful; and
Positive	_____	_____	_____	_____	_____	Negative.

36. I would be willing to download fitness apps.

Strongly Disagree 1 2 3 4 5 Strongly Agree

37. I intend to increase my use of the fitness apps in the future.

Strongly Disagree 1 2 3 4 5 Strongly Agree

Thank you for participating in this study!