INTEGRATION OF TECHNOLOGY READINESS (TR) INTO THE TECHNOLOGY ACCEPTANCE MODEL (TAM) FOR M-SHOPPING

Pınar BAŞGÖZÊ
Department of Business Administration,
Hacettepe University,
Ankara, TURKEY

Abstract:

Based on earlier hypothetical researches, the present study integrates technology readiness (TR) into the technology acceptance model (TAM) in the context of consumer adoption of mobile shopping (m-shopping), and theorizes that the impact of TR on mobile shopping intention is mediated by both perceptions of usefulness and ease of use. Nested model was conducted in order to investigate the relations. Results show that technological readiness of a consumer influence the mobile shopping behavior. In addition, perceived usefulness mediates the relation between technology readiness and m-shopping.

Introduction

M-shopping can be defined as purchase behaviour with a mobile device and has become a progressively essential topic for practitioners and manufacturers. According to eMarketer (2014), by 2016 smartphone users are enhanced (more than two billion users). Also results of “Deloitte Global Mobile Consumer Survey” indicates that, by 2013 67% of the population in Turkey uses smartphones (Deloitte, 2013). A smartphone is a type of mobile phone which uses an operating system such as Apple iOS or Android by installing applications. Although using smartphone apps is the recent way of using technology, understanding technology readiness of customer is crucial, because most of the technological innovations are fundamental changes (Garcia and Calantone, 2002). This can cause anxiety in those who concern negative feelings about technological products. Results of a latest industry study shows that, 38 percent of smartphone users had purchase a product with a mobile app while a bit more (56%) intended to purchase with an app in the upcoming shopping (Adobe, 2013). Although companies want to use cost based benefits of technology, customers’ unwillingness to accept mobile shopping has become a difficulty for them. Hence, it is critical to discover the factors affecting customers’ readiness to adopt new technologies (Walker et al., 2002). Even tough, according to scholars (Johnson, 2012: 24; Garcia and Calantone, 2002) an inevitable “apps culture” is rising in the world; there is still lack of researches regarding the antecedents of mobile app shopping behavior.

Due to the previous justifications, clarifying user adoption of new technology is crucial both for academicians and practitioners. Dabhokar and Bagozzi(2002) found that in self-service technologies such as paying for a ticket by mobile phone, personality traits have affects on the technology readiness (TR) of a customer. Also, Susskind(2004) suggested supporting findings to this research. According to Parasuraman (2000), mental readiness is an significant factor that affects customers’ adoption to the new technologies. In 2007 Lin, Shih and Sher objected to adapt and extend TAM by considering technology readiness (TR) (Parasuraman, 2000) to better explain consumers’ intentions to use e-services. The reason for this integration is the evidences shows that TR is incapable of explaining consumer new technology adoption. TR is theorizing consumers’
overall beliefs about technology which also indicates their usage of technology-based products and services (Parasuraman, 2000). However, high-TR consumers do not always adopt new technologies, such as smart phones. Thus Lin et al. (2007), try to construct an integrated TRAM model in order to indicate the consumer adoption of high technology services by associating TR with the two dimensions of TAM (i.e., perceived usefulness and perceived ease of use). Among numerous models, the technology acceptance model (TAM) (Davis, 1989) appears to be the mostly used in the researches. TAM was originally developed to predict people’s technology-adopting behaviors. Although the mobile app purchase behavior continues to be unexamined in the academic literature, the aim of the study is fill part of this gap by investigating an integrated TRAM model for mobile shopping intention by posing three research questions:

RQ1. Does the technology readiness of a consumer influence mobile app shopping intention?
RQ2. Does the perceived ease of use and perceived usefulness of an app mediation effect on the relationship between Technology readiness and mobile app shopping intention?

Theoretical Background

Mobile Applications and Purchase Behaviour

The application culture appeared with the invention of “The Apple iPhone” that is defined as a “handheld computer” (Wortham, 2009). According to Apple CEO Steve Jobs (Apple, 2010) the iPhone 4 innovation which is a revolution for mobile phone area was “the most successful product launch in Apple's history.” The remarkable policy behind the Apple iPhone success is the Apple Applications (“apps”). By using applications consumer may e-mail or text message much easier than web sites. Also consumer can use apps for different tools such as map using, book reading, games and significantly for online shopping. After the adoption of most consumers to this new way of technological life, competing smartphones, such as “Google Android-powered phones”, enter this new app market with limited options (Wortham, 2009). When smartphone industry launched app technology for online shopping activity, marketers have started to improved “branded apps”, theoretically defined as “software downloadable to a mobile device which prominently displays a brand identity, often via the name of the app and the appearance of a brand logo or icon, throughout the user experience” (Zhao and Balagué, 2015). According to Hutton and Rodnick (2009), mobile apps are user friendly, they have a positive effect on attitudes toward brand sponsorships and suggested as a new and powerful version of advertising (Bellman, Potter, Treleaven-Hassard, Robinson and Varan, 2011). Scholars show these details as the reason for the acceptance of mobile apps.

Technology Readiness

Technology Readiness (TR), which is defined as the individual’s general opinion about technology (Parasuraman, 2000). Parasuraman (2000) defines technology readiness as “the consumers’ desire to adopt and use technology in order to achieve their goals in their daily and business lives”. During the adoption stage of new technologies, consumers develop positive or negative feelings concerning the technological product, through their either positive or negative opinions regarding the product. These feelings are examined under four sub-dimensions as Optimism, Innovativeness, Discomfort and Insecurity. Although optimism and innovativeness specify consumers’ positive feelings, discomfort and insecurity states negative feelings (Parasuraman, 2000). Optimism dimension directs the consumer’s confidence it feels in its ability to enhance the control, flexibility and effectiveness in its life (Parasuraman, 2000). Therefore it is defined as “the individual’s tendency to believe that it will achieve good results throughout its life” (Walczuch et al, 2007). Innovativeness dimension directs an individual’s lead about technological products (Parasuraman, 2000). In other words, it measures the consumers’ intention to try new
products and services with high technology before others (Sophonthummapharn and Tesar, 2007). Insecurity dimension covers the cases where the consumer does not trust to a technological product and doubts about product fulfillment through its task ( Parasuraman, 2000). Doubt causes individuals to be in the tendency of avoiding computer use due to their innate fears from technology (Kwon and Chidambaram, 2000) and this feeling may arise from their skeptical attitudes of individuals against new technologies (Walczuch et al, 2007). Consumers who are highly scored in the discomfort scale believe that their knowledge of technology is not sufficient and therefore they may feel depressed ( Parasuraman, 2000). This dimension represents consumers’ anxieties in technological terms (Sophonthummapharn and Tesar, 2007). For instance, when consumers come across a technological product, they may think that they will be unable to have sufficient expertise on the product, become worried, believe that the product is not designed for them and therefore avoid purchasing the product (Sophonthummapharn and Tesar, 2007).

As it is mentioned before personality traits of a consumer may affect customer adoption of self service technologies such as mobile app usage (Dabholkar and Bagozzi, 2002; Susskind, 2004). Also, Ktoridou, Epaminonda and Kaufmann (2008) indicated a significant relation between cultural/technological factors and the acceptance of m-commerce. According to Lee and Lee (2010) gender and ethnicity have significant effects on the acceptance of m-commerce. Prior research (Jih, 2007; Phau and Teah, 2009) demonstrates an interaction between convenience perception of a consumer and mobile shopping as well as acceptance of mobile ads. Jin and Villegas (2008) stated that motivations such as social escapism, information, socialization and economic have effects on mobile usage through information search, shopping and business such as banking. Bigne’, Ruiz and Sanz (2007) suggest that structures (age, length and frequency) due to the mobile usage and positive attitudes regarding mobile shopping may play significant in m-commerce adoption. Besides, some scholars (Mort and Drennan, 2007; Roach, 2009) theorize that involvement and innovativeness of a consumer have positive effects on the mobile advertisement usage intention. An early framework (Sarker and Wells, 2003) about m-commerce found the influence of user characteristics. According to Meuter, Ostrom, Bitter and Roundtree (2003) technology anxiety is crucial in self service technology usage. Thus, technology readiness (TR), i.e. customers’ mental readiness to accept new technologies can be considered such a factor (Parasuraman, 2000). Thus, we hypothesised:

**H1:** Technology readiness of a consumer has positive effects on mobile app shopping intention.

**Consumer Acceptance of Mobile Shopping and Mediation Effect of TAM**

A number of studies (Rao and Troshani, 2007; Khalifa and Shen, 2008; Maity, 2010) have studied the acceptance of mobile commerce, which is defined as “the use of wireless devices such as mobile phones to conduct electronic business transactions” (Liang and Wei, 2004). Technology acceptance researches mostly emphasize the antecedents of intention or the real use of technology. The theory of reasoned of action (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), the theory of planned behaviour (Ajzen, 1991) and the technology acceptance model (Davis, 1989) were established in order to clarify the technology acceptance phenomenon. In this study we are interested to understand the interaction of technology acceptance model with mobile shopping.

**Technology Acceptance Model (TAM):** In general sense, Technology Acceptance Model explains the variables effective on accepting (adopting) computer use and also the actions of the end users of information technologies (Davis, 1989). According to the model, individuals’ adoption of information system is determined by means of two main variables as the perceived usefulness (PU) and the perceived ease of use (PEU) (Davis, 1989). Perceived usefulness (PU) is defined as the individual’s belief on the level of improvement it can achieve in its work performance by using the information technologies. On the other hand, perceived ease of use (PEU) is defined as the belief of the individual that it will be less challenged while using information technologies (Davis, 1989).
Additional researches attempt to apply these models in an m-shopping context. For example, Rao and Troshani (2007) suggest a relation between technology acceptance dimensions (perceived usefulness and perceived ease of use) and adoption intention. Although technology acceptance model appeared to be dominant in m-commerce adoption; Khalifa and Shen (2008) use the theory of planned behaviour to develop an m-commerce structure, where as perceived consequences of adoption, attitude and subjective norms have influences on the adoption. Maity (2010) use technology acceptance model to formulate m-commerce decision making and specified that this phenomenon is perceived as worrying. These studies, though, examine the antecedents of m-commerce without considering how respondents expect the technology mobile app shopping.

It is acknowledged that TAM and TR are interrelated (Lin, Shis and Sher, 2007). As it is defined before, Technology Readiness (TR), is the individual’s general opinion about technology (Parasuraman, 2000), which is one of the important variables that has to be included within TAM. Theoretically, consumer studies have hypothesized that general opinions have effects on perceived ease of use and perceived usefulness (Walczuch et al., 2007). Optimism is in an inverse relation with perceived risks such as emotional sadness, concern and anxiety related to bad experiences (Taylor et al., 1992). Since optimistic persons do not focus on negative things, they also welcome technology with a more open and positive point of view. According to the study of Karahanna, Straub and Chervany (1999), more innovative people have less complicated opinions concerning new technologies. Besides, doubt causes individuals to be in the tendency of avoiding computer use due to their innate fears from technology (Kwon and Chidambaran, 2000) and this feeling may arise from their skeptical attitudes of individuals against new technologies (Walczuch et al., 2007). Chen et al., (2002), determined that the significant obstacles against the adoption of technology originate from the doubts concerning the reliability of technologies and the confidentiality of the information shared by means of technological products. In addition, consumer who received high scores in the discomfort scale believes that their command of technology is not sufficient and therefore feel depressed (Parasuraman, 2000). This dimension represents consumers’ concerns in technological terms (Sophonthummapharn and Tesar, 2007). For instance, when consumers come across a technological product, they may think that they will be unable to have sufficient command on the product, become anxious, believe that the product is not designed for them and therefore abstain from purchasing the product (Sophonthummapharn and Tesar, 2007).

Within a purchase process, consumers mostly primarily involve in internal information such as experiences (Bettman, 1979). These experiences, which may gained through consumer’s general beliefs about technology (Lin et al., 2007) and through previous use of technology, have effects on user perceptions of its ease of use and usefulness (Gefen, Karahanna and Straub, 2003; Karahanna, Straub and Chervany, 1999). Also Yoh, Damhorst, Sapp, and Laczniai, (2003) suggest that consumer use cognitive information of TR before online behavioral intentions. Some scholars (Wang, Wang, Lin, and Tang, 2003; Venkatesh and Davis, 1996) also support the relation between computer self-efficacy and perceptions of usefulness and ease of use. Above studies provides strong evidence for the relation between TR and TAM. Lin et al., (2007) also found that Perceived usefulness and perceived ease of use have mediation effects between technology readiness and consumers’ e-service use intentions. Thus, in this paper TRAModel will be tested in mobile shopping context.
H2: Perceived ease of use mediates the relation between technology readiness and shopping through mobile application

H3: Perceived usefulness mediates the relation between technology readiness and shopping through mobile application

Figure 1: TRAM model for M-shopping

RESEARCH DESIGN

Measures of the Constructs
In the first section of the questionnaire, seven questions intended to determine the demographical characteristics of the answerers were asked. Also, in order to measure perceived usefulness and perceived ease of use Technology Acceptance Model was employed (Davis et al., 1989). In addition to these, the work of Parasuraman (2000) and Technology Readiness Index¹ was adapted accordingly in order to measure participants’ technology readiness.

Sample and Procedure
The sample of the study consists of the smartphone users living in Turkey. The analyses of the study were conducted through the 345 questionnaires. According to the obtained data, 49,3% of the participants were females while 50,7% were males. Furthermore, while 1,2% of the participants were primary school graduates, 7,9% graduated were high school graduates, 70,3% were university graduates and 20,5% had post graduate/doctoral degrees. As for the ages, 52,5% of the participants were between the ages of 18 and 24, while 19,6% were between the ages of 25 and 30, 14,1% were between 31 and 39, 6,4% were between 40 and 49, and 7,4% were older than 50 years. As for the income levels, while it was determined that 1,7% of the participants had a very low level of income, 3,5% had low, 65,6% had medium, 25,2% had high and 3,9% had very high levels of income.

¹ TRI which is also known as Techqual™, requires a license from Rockbridge Associates, Inc. So, we contact the authors and obtain a free license for the research.
Measurement model: Scale reliability and normality
With the purpose of testing the reliability of the scales used in the questionnaire, Cronbach Alpha value of each scale was examined separately. It was determined that the results pertaining to all scales were higher than 70\%, therefore higher than the 60\% recommendation made by Hair et al., (2000:391), and therefore acceptable. In order to determine the extent with which the expressions included in the questionnaire explain the variables aimed to be measured, confirmatory factor analysis was carried out. All concordance statistics and reliabilities found in consequence of the analysis were at an acceptable level. Concordance statistics for perceived ease of use and perceived usefulness was found out to be $x^2$ 189.92, df 42, RMR 0.055, GFI 0.93, RMSEA 0.08 with 0.92 reliability for the, and $x^2$ 138.66, df 58, RMR 0.054, GFI 0.85, RMSEA 0.08 with 0.83 reliability for technology readiness.

Tests of Framework
Basic aim of the study is to test the mediation effects of perceived ease of use and perceived usefulness between technology readiness and shopping trough mobile application. Therefore the mediation effect was tested using nested model described by Anderson and Gerbing (1988). The tests of mediation were achieved by exploring if there were differences among the partially mediated model (Model 1), which included the direct effect from technology readiness to m-shopping, and the altered variations of fully mediated models (Models 2 and 3), which removed this direct effect. Furthermore chi-square difference tests were implemented (Hoyle and Panter, 1995).

In order to control which model fit is optimal, three models Model 1, 2 and 3) were fit to the data. Model 1 was fit to the data and resulted in acceptable fit indexes (Hair et.al., 2014, TabachnickveFidell, 2013): chi-square627.49, p .001; chisquare/df 2.85; GFI .89; CFI .90; NFI .88; NFNI .89. However, t value for path through the perceived ease of use to mobile shopping was found insignificant (1.34). Thus, Model 2 was set the parameter value of the construction between perceived ease of use and mobile shopping to zero, resulted in these fit indexes: chi-square 628.29, p .001; chisquare/df 2.84; GFI .92; CFI .93; NFI .89; NFNI .90. Chi-square difference tests indicated that Model 2 was not a significantly poorer fit to the data than Model 1, chi-squarediff0.80, ns. Finally, Model 3 was applied in order to test the full mediated relation between technology readiness and mobile shopping. In the test of the fully mediated Model 3, the parameter values of the mobile shopping and technology readiness was set to zero and resulted in these fit indexes: chi-square 638.63, p .001; chisquare/df 2.87; GFI .92; CFI .93; NFI .89; NFNI .90. A chi-square difference test indicated that Model 3 was significantly worse fit to the data from Model 2, (chisquare/df ratio 2.84) chi-squarediff 10.34, ns. According to the chi square critical value table (Sincich, 1995: 1200), this difference found to be significant (TabachnickveFidell, 2013:726). Therefore, the path between mobile shopping and technology readiness is significant for the model. Thus, Model 3 was rejected. Since testing these three, Model 2 is the most parsimonious of the three models, Model 2 was considered the best model (Anderson andGerbing, 1988). Accordingly, perceived usefulness partially mediates the relation between technology readiness and mobile shopping.
Figure 2: Standardized factor loadings and parameter estimates of the final structural model

Figure 2 presents the standardized factor loadings and parameter estimates for the paths of the final structural model. The coefficients at each arrowhead in Fig. 2 denote the proportions of variance in the endogenous latent variable that was not explained by other variables in the model. The results presented in Fig. 2 provide clear support for the hypothesized direct relation between technology readiness and mobile shopping, in addition the mediational role of perceived usefulness in the experience of mobile shopping and technology ready consumers.

Conclusion

Lin et.al, (2007) incorporated the concept of technology readiness with technology acceptance model in order to find the antecedents of consumers’ intention to use e-services. Although an inevitable “apps culture” is rising in the world, the antecedents of intention to use applications is crucial. Thus, we aimed to investigate an integrated TRAM model for mobile shopping intention and have two major findings. First, technology readiness was hypothesized as an antecedent of both perceived usefulness and perceived ease of use. Second TAM dimensions tested as a mediator between technology readiness and m-shopping. According to the results, technology readiness has a direct effect on m-shopping. Besides, perceived ease of use has no mediation effect between technology readiness and M-shopping while perceived usefulness has a partial mediation between technology readiness and M-shopping. In other words, perceived usefulness is a significant factor of mobile shopping. Consumers are intent to shop with a mobile application because of the usefulness of the invention. Existing model provides a perception about the expectencies of consumers’ from a mobile app, which is usefulness. So a retailer that has a mobile app can make transaction process much quicker. For example, retailers could provide quick payment methods or without member choices. If consumer perceives increased efficiency with the transaction, she/he will much more intent to use mobile applications for shopping. So these kinds of applications should work 7/24. However, consumers’ attitude toward a technology could be motivated by their technology readiness. Thus, retailers that use mobile applications can segment their target market according to TR.
Theoretical and Practical Implications
The findings of the present study suggest theoretical and practical implications. This joined model discovers the importance of personal traits in technology acceptance. As Lin et.al. (2007) provides an evidence, this study also suggests that technological service providers should concentrate more on individual differences. Furthermore, this research could explain why people who score high in technology readiness do not always adopt high-tech gadgets available in the markets, because usefulness also dominates in purchase behavior.

REFERENCES


