

Older Adults on Electronic Commerce: A Literature Review

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Received: March 26, 2018

Accepted: April 15, 2018

Online Published: April 23, 2018

doi:10.5430/ijba.v9n3p10

URL: <https://doi.org/10.5430/ijba.v9n3p10>

Abstract

Electronic commerce keeps proliferating in the globalized market, and according to the market trends in both academic and commercial studies, the youth segment seems to be the primary objective of market strategies and the greater subject of academic studies. However, there is not much information about if the same situation in the market applies to the older adult segment, despite the growth in the number of older persons in many countries. To have a broader understanding of this matter, we carried out a review of the literature about this topic, with particular emphasis on the older adult's acceptance of electronic commerce, mobile commerce, mobile phones and the factors that influence their use of the technology. We also discuss some utilization of model and investigation theories, and we propose some directions for future research in this area.

Keywords: e-commerce, mobile commerce, mobile phone, smartphones, acceptance, older adults

1. Introduction

Electronic commerce (E-commerce) as we know it today consists of transactions of business, buying or selling using the World Wide Web and it may also use other technologies such as e-mail and mobile phones. Some examples of E-Commerce may include the purchase of goods (Online shopping) such as books, music, clothing and customized products. E-Commerce also includes other types of business transactions such as electronic payments, online auctions, internet banking, online ticketing and more. It is important to point out that e-commerce is continually evolving and growing. E-commerce, as we know it today, is very different from what it was 30 years ago. These changes happened very rapidly and added new technologies and new characteristics in a very short span of time; only last year 1.4 billion people purchased goods and services online at least once (Ecommerce Foundation, 2016). One of the most significant changes in the previous decade was the shift to using mobile devices for online shopping. This is known as mobile commerce (M-commerce). M-commerce is an extension of E-commerce. The main characteristic of M-commerce is that the commercial activity is conducted through mobile telecommunication devices such as smartphones and tablets. Conversely, technology adoption has been widely studied, and several models of technology adoption have been proposed and tested (Davis, 1989; Rogers, 2003; Venkatesh et al.; 2003). However, upon reviewing the previous studies, there is not a significant body of empirical literature on older adults and electronic commerce adoption. The current paper focuses on studies related to the role of the older adults in electronic commerce and examines characteristics of the elderly with particular emphasis on the older adults' use of mobile commerce and the factors that influence their use of the technology.

2. E-commerce Acceptance and the Influencing Factors of the Older Adults

There is not a notable variety of literature on older adults and electronic commerce adoption; Nonetheless, most of the research done on this subject tended to look at specific variables such as "personal factors" and "external factors." Here follows a review of empirical literature that has considered the same or similar theoretical models and constructs in the investigation of the factors that influence older adults' acceptance of the new technology, to understand the impact of these factors and the influence these factors have on the older adults' acceptance of E-commerce.

2.1 Technology Acceptance Model

Technology adoption has been studied in different fields. In this section, we review the technology adoption model replicated by the empirical literature.

2.1.1 Innovation Acceptance Model (TAM)

This model recommends that convictions about the usefulness and use are fundamental components in deciding customer attitude towards adopting another innovation (Davies, 1989; Malhotra and Galletta, 1999; Kleijnen et al.; 2004). The theoretical foundation for TAM is based on Fishbein and Ajzen's hypothesis of reasoned action (TRA) model (Fishbein & Ajzen, 1975). TRA is often applied in social psychology where it is utilized to clarify why individuals act as they do in circumstances of 'reasoned action' by distinguishing causal relations between convictions, attitudes, expectations, and conduct (Kwon and Chidambaram, 2000; Pedersen, 2003). TAM is a unique instance of TRA for modeling technology adoption in institutions (Pedersen, 2003). TAM, as represented in Figure 1, incorporates six ideas (Davis et al.; 1989; Malhotra and Galletta, 1999).

Table 1. List of variables

External variables (EV)	Perceived usefulness (PU)	Perceived ease of use (PEU)	Attitudes towards use (A)	Behavioural intention (BI)
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Description: abbreviation of the variables

- (EV), such as demographic variables, influence (PU) and (PEU).
- (PU) is defined as 'the extent to which a person believes that using the system will enhance his or her job performance' (Venkatesh and Davis, 2000).
- (PEU) is 'the extent to which a person believes that using the system will be free of effort' (Venkatesh et al.; 2003).
- (A) is defined as 'the user's desirability of his or her using the system' (Malhotra and Galletta, 1999). (PU) and (PEU) are the sole determinants of attitude towards the technology system.
- (BI) is predicted by (A) combined with (PU).
- Actual use is predicted by (BI).

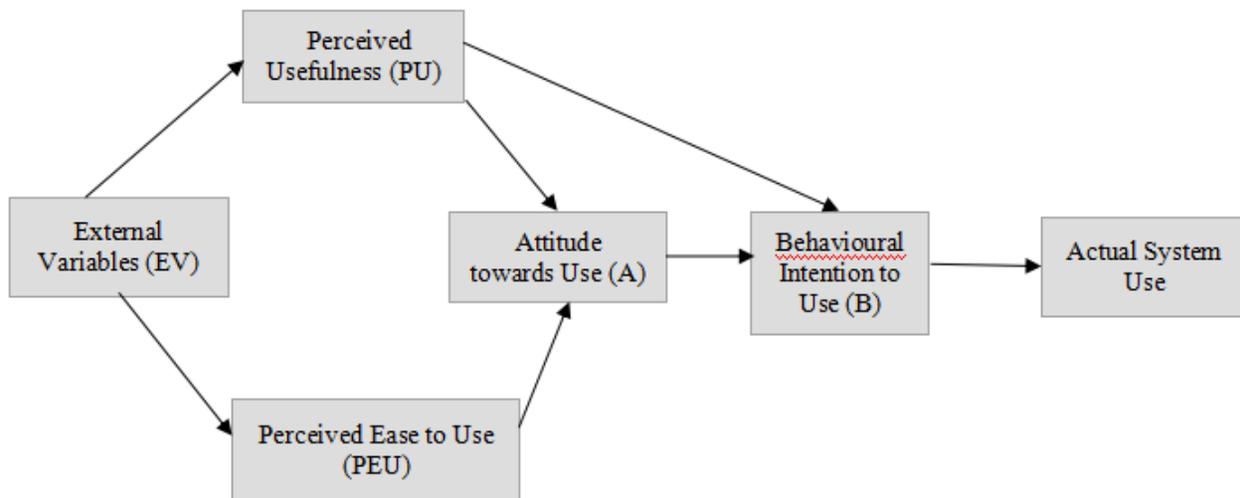


Figure 1. Technology adoption model (TAM)

Source: Extracted from Davis et al.; (1989).

While TAM is primarily connected to clarifying the adoption of technology within institutions, the builds of the model are intended to be broad and generally applicable to various sorts of computer frameworks and user populaces (Malhotra & Galletta, 1999). Over the years a few analysts have utilized TAM to clarify the states of attitudes and behaviors of information framework users. However, TAM has additionally been criticized for its inadequacies. For instance, the attitudes towards adopting technology are perceived to be the outcome of individual and social impacts,

and the fact that TAM does not represent social influence is a constraint (Malhotra and Galletta, 1999). Several categories of modifications have been proposed to TAM to counteract some shortcomings, including the following:

- Incorporation of factors suggested by other theories for improving TAM's predictive power. For example, including social influence as proposed by TRA and supported by studies involving social influence (Malhotra and Galletta, 1999) and the inclusion of prior factors, such as prior usage and experience (King and He, 2006).
- Incorporation of contextual factors such as age, gender, and technological development. Urbaczewski et al.; (2002) propose the addition of culture as a variable that might determine the success or failure of innovation.

Differentiation of the actual system uses components to measure number of calls, length of calls, and the type of use (personal or work-related) (Kwon and Chidambaram, 2000). Meso et al. (2005) found that in addition to the conventional TAM components of usefulness and ease of use, less complicated access and more noteworthy dependability of the technology contribute fundamentally towards increased certainty and subsequently more utilization of portable information and communication technology. TAM depends on the assumption of the 'free' availability of basic infrastructure and institutional settings necessary for the adoption of new technology (Malhotra & Galletta, 1999). If it's not the case, as with cell phone usage, encouraging conditions, for example, such as infrastructure, end up plainly imperative in technology adoption. The findings of Uzoke et al., (2006) accentuates the fact that infrastructural and administrative factors apply broad impact over the organizational choice to adopt e-commerce. The inclusion of encouraging conditions as determining variable is likewise proposed by Venkatesh et al., (2003).

Conci, Pianesi, and Zancanaro (2009) present an empirical model of acceptance of mobile phones by elderly people. Their study was focused on an extension of the widely used TAM Technology Acceptance Model and aims specifically at investigating the relationship among intrinsic and extrinsic motivations to use. The study used 740 questionnaires to gather data from participants over 65 years old. The authors looked at the relationship among intrinsic and acquired motivations to use, the influence of the social environment, the conditions that may make the usage of the mobile phone (MP) easier for the older person and a particular result of MP usage consisting of an increased sense of safety.

The authors test the intrinsic motivations mediated by utilitarian motives and concluded that the primary motivational structure of MP usage is mostly practical. But they also have significant results that show that social group influence (for instance children and relatives) enhance the perception of the practicality of the mobile phone. These findings appear to demonstrate how older adults can be affected by the use and acceptance of new technologies through the people in their environment (friends and family). These findings also appear to show that mobile phone usage by the elderly might not be very different, from a motivational point of view, from that of younger people. Further research with a larger sample size is needed to substantiate this suggestion. However, the results pointed out a non-significant general effect of personal factors like gender, income, and occupation.

Wu and Wang (2004) carried out a study in Taiwan to determine mobile user commerce (MC) acceptance based on an extended technology acceptance model (TAM) with the integration of the Innovation Diffusion Theory with the addition of two variables perceived risk and cost. They used a structural equation modeling technique to investigate what determines user mobile commerce (MC) acceptance.

This study did not only target the older adults segment, but older adults are still included in the sample since the subjects for this study were users or potential adopters who voluntarily engaged in online transactions via MC for personal purpose. Although age was one of the variables, the authors did not impose limitations in the ages of the participants. The authors reported that seventy-six percent of subjects were between the ages of 20–39 years old, but still reported subjects over 50 years old in the other twenty-four percent of the sample. They also integrate the TAM in the research model with the inclusion of the personal factors and measuring variables like cost, perceived risk, perceived usefulness and ease of use, which are related directly to mobile commerce acceptance and use. Taking into account the above, we found this study pertinent in the study of mobile commerce adoption and use within any demographic group.

Based on the TAM model the authors set up a survey questionnaire consisting of 22 items measuring the latent variables: the questions were divided into two parts, first the subject's demographic information: gender, age, the level of education, income level, the frequency of using a cellular phone and the degree of familiarity with using online services. The second part recorded the subject's perception of each variable in the model, using a five-point Likert-type scale. 850 questionnaires were applied through companies' customer service departments to users or potential adopters of MC as online banking, shopping, investing, and online services.

A particularly noteworthy finding of the study is how important compatibility (users' requirements, experience, lifestyle, and beliefs) is in determining behavioral intention to use. Also, in contrast to later studies, these findings show that cost was a less important variable in determining users' behavioral intent.

The authors also made an observation in their findings on how the influence of perceived risk on behavioral intention to use was positive, but do not offer a compelling explanation and data to support this result. The rest of the variables (except perceived ease of use) significantly affected users' behavioral intent to use. These results are limited by the sample bias and the consequence limitations such as the time and context in which this research was carried out. Between 2004 (when this study was published) and 2017 (our current time) the MC industry and technology have already evolved and acquired new features. Meanwhile, the users have adapted to these changes. Therefore, it is understandable that these findings do not have much agreement with later studies. Nevertheless, this study offers useful information for future research.

Ma, Chan, and Chen (2015) The authors conducted a confirmatory study based again on the TAM and other research models. They proposed and used a new theoretical model that was better adapted to current times and was also adapted to the cultural background of the older Chinese people in order to determine the relevant constructs in the Smartphone Acceptance Model for Chinese Older People (SAMCOP).

The authors used a structured questionnaire which was implemented face to face through individual interviews with older adults aged 55 and above. Their model revealed that personal circumstances were the most influential factors in the acceptance of smartphones.

The authors collected the demographic and personal detail information, such as age, economic status, education level, etc. Also, the first usage behaviors when using smartphones and mobile apps, including usage experience, usage frequency, the total number of mobile apps installed on their smartphones, the number of frequently used mobile apps, and the monthly cost of using smartphones were analyzed. Their model revealed that the personal circumstances were the most influential factors in the acceptance of smartphones. Specifically, economic factors, such as living with a relatively sound financial status, are very significant in the adoption of smartphones. Other important factors that indicated a tendency towards smartphone adoption are being in the early stage of aging, well-educated, non-widowed and still working. Also, their findings show that regardless of personal factors the costs of telephone plans is a critical element in smartphone acceptance by older Chinese adults.

The authors also noted that older adults who have higher self-satisfaction are more likely to have a higher degree of perceived usefulness and perceived ease of use. In other words, the more they enjoy the use of the MP the more useful they found the MP.

What is clear from both of these studies Qi, Chan, and Chen (2015) and Huber & Watson, (2014) is that the influence of external factors is crucial to the final adoption and acceptance of smartphones. Also of note is that the external facilitating conditions have a significant impact on the older adults; training and family support help older adults to build self-confidence, encourage favorable attitudes and boost the intention to use technology.

3. Influencing Factors for Acceptance and Use of Technology

The factors that affect usage and acceptance of new technology has been studied before, and different models have been proposed to explain how these factors influence the technology acceptance behavior, Among the most used models are the Technology acceptance model (TAM) (Davis, 1986), the technology acceptance model 2 (TAM2) (Venkatesh and Davis, 2000), and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al. 2003). The specialized literature for older adults is scarce but exists; here follows a review of empirical literature that has considered similar design and constructs in the investigation of the factors that influence older adults' acceptance of the new technology.

3.1 Unified Theory of Acceptance and Use of Technology Model

Venkatesh et al., (2003) developed the Unified Theory of Acceptance and Use of Technology (UTAUT) model to explain user intentions to use an information system and subsequent usage behavior. UTAUT was developed through a review and consolidation of the constructs of the following models: theory of reasoned action (Fishbein and Ajzen, 1975), technology acceptance model (Davis, 1989), motivational model (Davis et al.; 1992), theory of planned behaviour (Ajzen, 1991), a combined theory of planned behaviour/technology acceptance model (Taylor and Todd, 1995), model of PC utilization (Thompson and Higgins, 1991), innovation diffusion theory (Moore And Benbasat, 1991), and social cognitive theory (Compeau and Higgins, 1995). UTAUT, as depicted in Figure 2, proposes performance expectancy, effort expectancy, social influence and facilitating conditions as the four fundamental constructs that determine usage intention and behavior. Gender, age, experience, and voluntariness (i.e., the degree to

which use of the innovation is perceived as being of free will) are mediating factors in the impact of the critical constructs on usage intention and behavior. An essential contribution of UTAUT is to distinguish between mediating factors and determining factors.

Wilkowska and Ziefle (2009) investigated on Which Factors for Older Adults' Acceptance of Mobile Information and Communication Technologies? The study investigates long- and short-term effects on technology acceptance for a personal digital assistant (PDA) in older users. To assess short-term effects on acceptance, PDA acceptance was measured after participants were given a PDA tutor training and interacted with a simulated PDA. The study found out that individual factors largely determine people's acceptance showing that acceptance is mainly influenced by the individuals' learning history with technology. Also, the tutorial training significantly affected acceptance outcomes, especially in the older group.

Ma, Chan, and Chen (2015) also studied the topic of personal and other external factors affecting acceptance of smartphone technology by older Chinese adults. Their study aims to explore and confirm, for older adults in China, the critical influential factors of smartphone acceptance, and to describe the personal circumstances of Chinese older adults who use the smartphone. The study employed a well-structured questionnaire and also conducted face to face individual interviews with 120 Chinese older adults (over 55). Structural Equation Modeling was utilized to confirm a proposed smartphone acceptance model based on Technology Acceptance Model (TAM), and the Unified Theory of Acceptance and Use of Technology (UTAUT). The study revealed that those who were younger, with higher education, non-widowed, with a better economic condition related to salary or family support, were more likely to use a smartphone. The study further indicated that the cost factor was a critical factor influencing behavior intention. Their study finally affirmed that self-satisfaction and facilitating conditions were important factors that influence perceived usefulness and perceived ease of use. The study recommended that telecommunication operators and smartphone manufacturers should provide special monthly data plans and deals for the older population to promote usage by older people since older people in China are especially concerned with the costs of using a smartphone every month.

Huber & Watson, (2014) The authors surveyed older adults from 52 to 91 years old in an education event at Indiana University. They examined how personal factors and social factors: age, gender, education level, and technology experience affected buying preferences, the preferred way to learn how to operate new devices, and sources of support when they encounter problems using a new appliance (smartphones, computers, the internet, online shopping and others).

The authors found that familiarity with technology, age, education, and gender are associated with experience with using new technologies as well as using and shopping for new electronic devices. However, because the sample was relatively well educated; 82% of the participants had completed a bachelor degree or higher, we have to assume the results of this study don't represent the general population of older adults.

Nevertheless, these results may offer information to analyze and to contrast the other part of the older adults demographic, the less educated ones. The comparison may help to understand if they have similar or very different personal and social factors that affect their buying preferences, a preferred way to learn how to operate new devices, and the choice of sources for support when they face problems learning to use new devices. Moreover, regarding technology, the authors found a negative correlation between technology level and willingness to contact a friend or seek other kind of help when they encounter a doubt or problem. Further research can delve into these findings to understand more how these users resolve their problems with technology.

They also found a strong negative correlation between education level and being comfortable shopping for a technological device. In regards to age, the authors noted a representative positive relationship between age and the willingness to seek help when they need assistance to operate or understand a new electronic gadget; in other words, the older a person is the more likely they are to ask for help. A similar tendency was shown in regards to gender; females were more likely to call friends for assistance before making a purchase. The results of this study would appear on the surface to agree with those of Qi, Chan, and Chen (2015) regarding how help from friends and family have a positive impact on the older adults users.

Table 2. Research models factors

Author(s) year	Model	Influencing Factors
Davis et al, (1989)	Technology Adoption Model (TAM)	External variables (EV), Perceived usefulness (PU), Perceived ease of use (PEU), Attitudes towards use (A) and Behavioral intention (BI).
Venkatesh et al., (2003)	Unified Theory of Acceptance and Use of Technology Model	Performance expectancy, Effort expectancy, Social influence and Facilitating conditions

Description: This table show the factors used by the theoretical models describe before.

Table 3. Personal and external factors of the empirical literature

Model	Personal factors	External factors	Author(s)
Integrated model: Extended Technology Acceptance Model (TAM2) and Innovation Diffusion Theory with the addition of two variables perceived risk and cost	(1) gender (2) age (3) the level of education (4) income level (5) the frequency of using a cellular phone (6) the degree of familiarity with using online services	(1) cost (2) perceived risk (3) compatibility (4) behavioral intention to use (5) actual use (6) perceived ease of use (7) perceived usefulness	Wu and Wang (2004)
The Empirical model of acceptance of mobile phones by elderly people. It is based on an extension of the widely used TAM2	(1) gender (2) age (3) the level of education (4) income level (5) enjoyment (6) self-actualization	(1) perceived usefulness (3) perceived safety (4) support for the use of mobile phone	Conci, Pianesi, and Zancanaro (2009)
Users' technology acceptance was assessed by original items from the Technology Acceptance Model (TAM)	(1) age (2) computer expertise (3) subjective technical confidence (4) self-confidence when using technology	(1) perceived ease of use (2) perceived usefulness	Wilkowska and Ziefle (2009)
Personal factors and social factor Survey	(1) gender (2) age (3) the level of education (4) income level (5) technology experience		uber & Watson, (2014)
Smartphone Acceptance Model for Chinese Older People (SAMCOP)	(1) age (2) education (3) marital status (4) working status (5) economic status	(1) perceived usefulness (3) attitude towards using (4) facilitating conditions (5) self-satisfaction (6) cost tolerance (6) perceived ease of use	Qi, Chan, and Chen (2015)

Description: Revision of empirical literature treating the issue influencing factors for users' acceptance.

4. Conclusion

Electronic commerce (EC) and mobile commerce (MC) are proliferating in the globalized market, according to both academic and commercial research. Preparing for the economic and social shifts associated with an aging population is thus essential to ensure progress in development. Therefore, the older adults as a research subject are more relevant than ever, and nowadays older adults are using the web and smartphones on a daily basis; this makes them a potential market for electronic commerce. However, there is not much information about the older adults' segment on EC and MC. This paper sought to review how the papers on the topic have in common the analysis of the factors influencing older adults' acceptance of new technology. Notably, the results set out to ascertain the knowledge of mobile commerce by older adult users; and also to identify the factors that influence the acceptance and usage of mobile commerce.

We suggest broader research on this subject. A more profound understanding of the factors that motivate older adults to use E-commerce can lead to the development of new communication strategies and marketing; this can be beneficial to the academic and the private field; and mainly to the older adult users.

It is essential to outline the nature of E-commerce as a continually evolving technology. Therefore, it is vital to keep the research on the subject updated to maintain data that is as relevant as possible to our current times. The present literature review seeks to contribute to this goal. Nonetheless, this paper manifests as a constraint its little depth on the subject.

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