



Older People Online Shopping Acceptance

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Abstract. Online shopping is becoming increasingly popular, and the use of the Internet by older people is also increasing at an alarming rate. The elderly group is becoming an important potential market for e-commerce. In order to conduct a deeper analysis of online shopping behavior and attitudes, this paper will focus on studying the potential impact of the significant increase in the elderly, in order to provide a more comprehensive and specific data analysis of online shopping in the future. In this work, we will use the model established by predecessors as the theoretical basis to analyze the attitudes of elderly people before and after online shopping in a more in-depth and systematic manner, to test their use of technology and acceptance of new shopping forms. In addition, this work also focuses on the acceptance and willingness to shop online of elderly people aged under 50, 50–60, 60–70, and over 70 at different stages. Our research results indicate that age indirectly affects the acceptance of new technology use by older people, but does not affect their subsequent behavior in online shopping. The satisfaction and impression of online shopping systems and online products are more factors that affect the acceptance of older people. This includes the technical ease of operation and social impact of online shopping systems. This work also showed that the educational level of the elderly did not directly affect their acceptance of online shopping.

Keywords: Older people · Online shopping · Satisfaction · Acceptance

1 Introduction

In the current era of rapid development of science and technology, online shopping has become more developed, and the online shopping behaviour of the elderly has gradually attracted more attention. In the context of increasing aging, the research on older people online shopping acceptance is also more valuable. Lots of recent studies have found that older people meet technology more actively than the past time [1]. Including online shopping system.

In the past few decades, people have carried out extensive research on the adoption of information technology and tested a series of factors that are considered to be critical to improving communication. Some studies have analyzed the characteristics of information technology. For example, the Technology Acceptance Model was advanced by Davis et al. [2]. The purpose of this model is to explain the user's acceptance of a particular technology. The model divides acceptance into two parts. The first is Perceived

Ease of Use (PEOU), indicating that users want to accept or experience this technology without requiring additional learning or effort. The other part is Perceived Usefulness (PU), it indicates that users believe that this use improves the results of not using such things to a certain extent, that is, this use is useful [2]. In terms of acceptance of online shopping, TAM gives two dimensions of perceived ease of use and perceived usefulness [3, 4].

Through research, we have found that familiarity can increase the choice and acceptance of online shopping by older people [5]. Moreover, the follow-up behaviour after online shopping will not be affected by age, nor will it weaken with age. We believe that the growing of online shopping today is sufficient to create a new environment, and that the experience gained by personal from the online shopping experiences before can weaken and can even offset the impact of some unique features of online shopping, which are often labeled by older people. The elderly have a low acceptance of online shopping, but age is not the correct standard that affects acceptance, but is affected by experience and social communication environment. Once the elderly have access to more online shopping technology and experience, they are more likely to master and use these skills. The subsequent purchase behaviour is not subject to age restrictions. In addition, the TAM model studies that the number of users at that time or the lack of experience of these users in the technical field will affect the results of the data. The situation of e-commerce is similar. In recent years, the rapid development of online shopping has provided us with a large number of samples of online shopping users. The performance of these shoppers and potential users who are already familiar with and accustomed to this new model is significantly different [6]. However, there is less discussion about how social factors affect everyone's use. The paper starts with a discussion of TAM, and focuses on the age dimension, and according to the elderly's online shopping experience, social impact and post-purchase satisfaction from the two aspects of pre-purchase and post-purchase. In the article, we focus on the assumption of variables for the elderly as an independent group.

2 Literature Review

This article will analyze the acceptance of online shopping of the elderly based on the TAM model. In what follows, we review related works about (1) online shopping acceptance, (2) Older Adults' Online Shopping Intentions, and (3) Attitude and age differences in online buying.

2.1 TAM (Before Purchase)

The Technology Acceptance Model (TAM) is an information systems models theory which is used to explain how users accept and use the determined technology [2]. This model suggests When presenting a new technology to users, many factors will affect their decisions on how and when to use the technology. When predicting the user's adoption based on the user's attitude to a particular technology, there are two factors: perceived ease of use (a specific technology is easy to accept and use) and perceived usefulness (the use of specific technologies can bring them significant benefits [2]. If users understand

that the use of specific technologies will be better and useful to meet their demands, they will produce an active manner [7, 8]. Only a few empirical studies related to aging using TAM have considered age-related variables [1]. Due to their different physical, cognitive and social abilities, their needs and concerns of the elderly are different from those of the young [9, 10]. These concerns affect the attitude and behaviour of the elderly in online shopping [11–13]. According to the TAM model, we debate these three aspects including the perceived ease of use, experience, satisfaction and the perceived usefulness.

2.2 Perceived Ease of Use (PEOU)

Age adjusted the impact of perceived ease of use on mobile application use attitude. Regarding the acceptance of perceived ease of use by the elderly, first and foremost, the elderly still think that there are potential risks in using online shopping systems and will be more prudent when using them. Secondly, compared with young people, they tend to think that online shopping applications are difficult to use. Third, compared with young consumers, convenience and time-saving are not so important for elders. However, the result is contrary to the ideas from Venkatesh et al. and Yu, they detect that the influence of the expectation efforts on behavioural purpose is more significant for elders than the youngsters [14]. As we advert before, the reduction of workload and energy consumption will lead to the use tendency of online shopping applications, which will increase with age.

2.3 Perceived Usefulness (PU)

Age adjusted for the impact of user attitudes towards technology use in terms of perceived usefulness.

Experience

Through research, it has been found that increasing familiarity and experience during the process can make older people more confident in making choices [5]. We usually associate the acceptance of online shopping of the elderly with their age, but in fact, there is no direct relationship between their age and whether they conduct online shopping. Experience is the most important breakthrough. Specifically, it is not age that hinders internet transactions, but be short of experience, and that is usually showed in the elderly. Trocchia and Janda (2000) believe that the lack of experience with online media among older users prevents them from estimating the benefits of online shopping, thereby hindering their participation [15]. Therefore, due to the lack of Internet experience and the trust of the elderly, even if online shopping and e-commerce services are very mature, they will still have a low willingness to adopt new channels, which is more due to their less experience. If the elderly overcome the barriers to the first time shopping, their perception of revenue may become more direct. The purchase behaviour of the elderly is similar to that of any other buyers, regardless of age. In addition, with the passage of time, people are getting older, and today's young people will become old one day in the future. But they have enough experience to meet the new generation of e-commerce. Once online shopping service is accepted, subsequent purchase behaviour will be more independent of age. Therefore, age affects the initial decision of whether to purchase

online, but does not affect the subsequent behaviour of electronic shoppers, such as the number of transactions or the amount of consumption.

Social Influence

Like young people, the main factors that promote the elderly to shop online are social impact [10]. Even as the number of elderly people who shop online gradually increases, the elderly group has also become the group with the largest growth in online shopping, but they are always said to be the most technologically illiterate and limited users of online communication technology [16]. Since the spread of the COVID-19, epidemic restrictions have prompted more and more people to shop online. Recent studies have found that older people embrace technology more actively than ever [1]. Online shopping may be a challenge for the elderly, but the frequency of online shopping for the elderly is also increasing due to the impact of the environment and society. There will always be consumers who want to shop, especially in some cases. In the past, many elderly people had to walk, drive or use some public transportation to arrive offline shopping malls in order to shop, and it took varying lengths of time. In the process, there would also be some inevitable accidents, such as traffic or weather reasons. And the products provided by offline shopping malls may not necessarily have their own favourites. Online shopping avoids these situations. It reduces time costs, including search costs and transportation costs. Increasing the number of substitutes, providing more options, and reducing unwanted social contacts [17]. Despite these advantages of online shopping, elderly people may be hesitant due to high express transportation costs, inability to personally inspect goods, and long waiting times. According to expert prediction, people who start to buy products and services online will be shopping online constantly. To a certain degree, the experiences of e-commerce will be popular in the world. More people are buying things online for the first time. They are also full of confidence in science and technology and have a better understanding of the proceeds and risks from the e-commerce. The elderly invest time, energy and money to understand the principle of online shopping and the equipment and communication technology behind it to gain trust and enjoyment. With the COVID-19 burst out, older people have to learn how to use new technologies, learn new skills, adapt to new lives, and enrich their lives without being affected by the changes of the times. This is also why many elderly people have gradually adapted to online shopping for daily necessities. However, COVID-19 has triggered changes in the way the elderly shop, but the trust in online shopping remains to be verified. Currently, the interest of the elderly in online shopping can be improved by building a trusting relationship with such retail industry. Continuous work to improve the shopping experience is the key to this trust. The number of elderly people taking risks online is unprecedented - because they have to do so, because it works.

On the other hand, because social influence determines the attitude of use to a certain extent, there is also the saying of marketing. For the elderly, the opinions and experience of other users have a positive effect on their acceptance, will promote their attitudes and form positive incentives [18]. But at the same time, the acceptance and participation of the elderly to other mobile applications also affect the acceptance of online shopping. There are many online marketing methods. In a society where internet social networking is sweeping the globe, people often communicate online on media applications, but the elderly group is also the least involved, and the number of marketing is also less

than young people. Therefore, the analysis of online shopping acceptance has much in common with the study of other mobile applications.

Research shows that perceived ease of use and perceived usefulness will affect personal attitudes with online shopping. But, only practicality can significantly affect users' attitude towards the application. Through research on the TAM model and the use of online shopping systems, we have found that age is a major factor in the impact of perceived usefulness on acceptance. Therefore, in terms of the design and tutorial guidance of online shopping systems, enhancing the friendliness of elderly users and providing more simpler and convenient instructions and guidance videos is the best way to address the acceptance of online shopping by elderly users.

2.4 Satisfaction (After Purchase)

Related studies including Reisenwitz et al. (2007) noticed that in the elderly group (people over 65 years old), the frequency of online or shopping will be lower for the nostalgic elderly [19]. This study also shows that individual innovation ability will affect online shopping behaviour. Other online experiences of older people can affect their risk judgments about using online shopping systems. Through a study of trust in the TAM model, McCloskey (2006) studied the acceptance and attitude of older people towards online shopping activities in the United States [20]. They found that the usefulness and participants trust of websites have a positive impact on user behaviour. In addition, perceived ease of use can also affect the perceived usefulness of users. Finally, trust can affect participants' perception of usefulness and ease of use. This study found that the TAM model is still useful in analyzing participants' acceptance of new technologies, but there are different age limits.

The evaluation of website quality, including customer service and privacy security, will affect the elderly's trust and enjoyment of online shopping system, thus affecting the elderly's acceptance of online shopping.

According to the CSS customer satisfaction model, it is believed that logistics support, technical features, information features, homepage presentation, and product features are significantly related to customer satisfaction. Logistics support is the most important [21].

Trust

A key reason for many consumers to choose whether to shop online is the security of online behaviour [6]. Compared with offline stores, online virtual shopping experience will lead consumers to feel uncertainty and risk in the final decision of online shopping due to the inability to touch and actually see products. Trust is one of the best ways to reduce uncertainty and risk, and can gain a sense of security [22, 23]. Previous empirical studies have incorporated trust into the TAM model in many ways. And they agree that trust is a prerequisite for perceived ease of use, perceived usefulness, and attitude [24].

Trust in online services helps the elderly to accept online shopping. The elderly consumer group is a special group. The elderly are more traditional and nostalgic than the young people, and have a slow response and acceptance ability to accept new things and innovative behaviours. However, the elderly can still obtain self-satisfaction from shopping websites. The trust of elderly consumers in shopping websites can be derived

from the experience of the overall service provided by the store. Most successful websites and physical stores have a good reputation in terms of business ethics, because there are enforceable laws and regulations to protect customers.

Enjoyment

Researchers investigating the motivation of online shopping believe that the main advantages of online shopping include not only its own practical features, such as convenience, competitive pricing and greater access to information, but also the hedonic aspects of online shopping, such as enjoyment and self-satisfaction, will affect a person's shopping activities [25, 26]. Therefore, a person will shop online through the tendency to seek enjoyment and self-satisfaction, which may also affect their choice of online shopping. And enjoyment is the main element which prompts users to use new technologies [27]. Ease of use, enjoyment and trust are prerequisites for usefulness [28].

3 Research Model and Hypotheses

Based on the above literature review, the assumptions below have been made (see Fig. 1). H1: Consumer age (H1a) and education level (H1b) have a positive impact on the perceived ease of use of online shopping operating technology. H2: The perceived ease of use (H2a) and product impression (H2b) of online shopping operating technologies have a positive impact on satisfaction. H3: Product impression (H3a) and social impact (H3b) have a positive impact on perceived usefulness. H4: Perceived ease of use (H4a), satisfaction (H4b), and perceived usefulness (H4c) have a positive affect on older people's acceptance of online shopping.

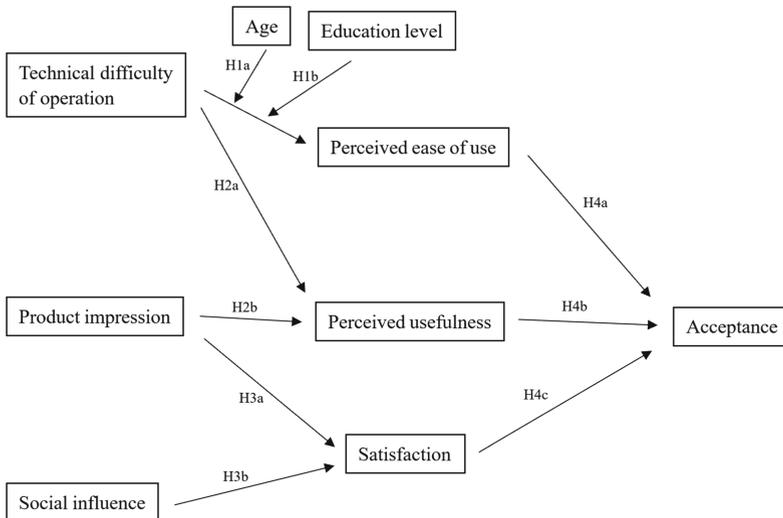


Fig. 1. A Research model of Online Shopping Acceptance of the Elderly based on TAM model [Owner-draw]

H1a: The relationship between technology perceived ease of use (ease of operation) and age.

H1b: The relationship between technology perceived ease of use (ease of operation) and educational attainment.

H2a: The relationship between satisfaction and technology perceived ease of use.

H2b: The relationship between satisfaction and product impression.

H3a: The relationship between perceived usefulness and product impression.

H3b: The relationship between perceived usefulness and social impact.

H4a: The relationship between online shopping acceptance and technology perceived ease of use in elderly people.

H4b: The relationship between online shopping acceptance and satisfaction among the elderly.

H4c: The relationship between online shopping acceptance and perceived usefulness in elderly people.

4 Methodology

The quantitative analysis was started with a questionnaire survey in March 2023, which was conducted among elderly people over the age of 50, with a wide age range chosen to provide more types of data support. The survey included questions on participants' educational background and online shopping experience, with a final sample of 176 elderly people from different countries. Structural validity of the scale was tested using statistical confirmatory factor analysis, including correlation analysis and independent T test, with a statistical criterion of $p < 0.05$ used to measure correlation and significance.

The questionnaire design assessed perceived ease of use, product satisfaction, and online shopping satisfaction through questions on ease of operation, online shopping product impression, and overall online shopping impression. The usefulness of the product was reflected through questions on whether participants would buy back products purchased online and their product impressions. The social impact was also considered through questions on whether participants would recommend online shopping or online products to others.

5 Results

Through the analysis of the data, we have verified the above assumptions. The following is an analysis of the results of the above assumptions. In terms of technical perceived ease of use, that is, ease of operation, we mainly divided the age groups into those aged over 70 and under 70, as well as those aged 60 to 70 and under 60 for comparison. We found that there was no significant difference in perceived ease of use of technology among elderly people under the age of 70 ($t(40) = 1.918, p = 0.062$). However, there is a significant difference between those over 70 and those under 70. In the other set of data, there was no significant difference between the ages of 60 to 70 and those under 60 ($t(164) = 1.653, p = 0.10$). That is to say, there is a significant difference between the ages above 70 and under 70. Indirect proof of H1a.

From the data, it can be seen that there is no significant difference between education level and technical perceived ease of use and ease of operation. ($t(171) = -1.609$, $p = 0.109$). Therefore, there is no significant correlation between the level of education and the difficulty of operating online shopping technology. H1b is not valid.

Through a questionnaire, we investigated elderly people over the age of 50 and asked them to rate their overall impression of online shopping. Through data analysis, we found that there was a significant difference between their overall satisfaction with online shopping and their technology perceived ease of use ($t(15,518) = -3.567$, $p = 0.003$), indicating that technology perceived ease of use significantly affected the satisfaction of elderly consumer groups with online shopping. This result echoes the H2a.

Participants scored their overall impression of online shopping and their product impression in this survey, and we found a significant positive correlation between participants' satisfaction with online shopping and their product impression ($r = 0.801$, $p < 0.001$). That is, the better consumers' impression of the product, the higher their satisfaction with online shopping. Conversely, the worse their impression of the product, the lower their satisfaction with online shopping. And this result can prove that H2b.

Through investigation, we found that there is a significant correlation between perceived usefulness and participants' impression of the product ($r = -0.394$, $p < 0.001$), that is, the better the participants' impression of the product, the greater the likelihood of repurchasing the product, and the higher the perceived usefulness; On the contrary, the poorer the impression of the product, the lower the likelihood of repurchase of the product, and the lower the perceived usefulness. And this result can prove that H3a.

From the statistical data, we can see that there is a significant difference between perceived usefulness and social impact ($t(164) = -3.745$, $p < 0.001$). In other words, participants will have an impact in society due to the perceived usefulness of online shopping. After consumers have purchased products online, their impression of the product determines their perceived usefulness, which has an impact on society. For example, recommend online shopping products to friends. In the survey, we found that participants who gain perceived usefulness are more likely to recommend online shopping products to friends around them, which has a social impact. Word of mouth is generated through trusted people around them, which is also one of the most important factors affecting acceptance. This result echoes the H3b.

From the results, we can see that over 90% of participants believe that the technical experience of online shopping is good and the operation is simple. Still, 9% of participants believe that technology perceived ease of use is low. And this result can prove that H4a.

Among the participants, all participants have experience in online shopping, and 8–10 points account for more than 50% of the satisfaction scores for online shopping. It can be seen that most elderly people who have experienced online shopping have a high degree of satisfaction with online shopping. And this result can prove that H4b.

In this survey, we used the question "For those things that you have purchased online, would you plan to purchase them later?" to determine the perceived usefulness of online shopping for elderly people. Through the results, we found that 98% of participants believe that online shopping is useful and have a high acceptance of online shopping.

Another two percent of people believe they have no perceived usefulness, although they also choose to shop online. And this result can prove that H4c.

Based on these results, it is recommended that designers and developers of online shopping systems should focus on enhancing the perceived ease of use, perceived usefulness, and social influence of the system for elderly users. In addition, designing the online shopping system to be enjoyable and age-friendly may also improve elderly users' satisfaction with it.

6 Conclusion

Nowadays, more and more people choose to shop online, and the elderly are no exception. As time goes by, a new generation of adults will gradually age and join the ranks of the elderly. Therefore, more and more elderly people will choose and accept online shopping. Perhaps this will no longer be a new shopping mode, but gradually become a traditional one. Our research is to conduct an online shopping acceptance survey of elderly people in the current society using different dimensions. Based on the TAM model, we have established five different variables to hypothesize and explore the survey. Finally, it was found that perceived ease of use, perceived usefulness, and satisfaction were significantly correlated with online shopping acceptance. Among them, age is significantly correlated with perceived ease of use, while education level is not significantly correlated with perceived ease of use. In addition, both product impression and social impact are significantly related to perceived usefulness. At the same time, product impression and ease of operation are significantly related to satisfaction. In the conclusion, it is not difficult to find that there are multiple aspects to the judgment of online shopping acceptance of elderly people, which are affected by more than one variable. However, age is not the most significant correlation variable, so age is not the dominant factor in the evaluation of acceptance, and is more influenced by the difficulty of operating techniques. Therefore, in future research, the impact of age on online shopping acceptance will become smaller and smaller, and researchers need to re grasp and judge the importance of age as a variable.

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