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INVESTIGATING CONSUMERS' ADOPTION OF INTERACTIVE IN-STORE MOBILE SHOPPING ASSISTANT

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Abstract

With smart phones being deployed widely, interactive in-store Mobile Shopping Assistant (MSA) systems can be considered as an effective way for assisting in-store shopping and can become potentially the pervasive personalized services that both consumers and merchant can trust. However, few studies have focused on investigating the adoption of in-store MSA. Therefore, this study examined the consumers' attitude and acceptance toward in-store MSA services under the framework of the technology acceptance model (TAM). The findings imply that attitude, perceived ease of use, perceived usefulness, environmental variables, perceived quality of the MSA system, social influence, and user satisfaction are some determinant factors. In addition, significant differences exist between female and male consumers.

Keywords: Mobile Shopping Assistant, TAM, Acceptance.

1 INTRODUCTION

Have you ever found yourself in a supermarket staring at a shelf full of different food products, wishing someone could just point out the most suitable product for your preferences, such as the lowest sugar content, and/or the highest nutrition? Mobile Shopping Assistant (MSA) systems are the solution to give consumers the same type of information they can get when online searching – delivered inside the store when they shop (Kowatsch & Maass, 2010). A Mobile Shopping Assistant (MSA) is an application that runs in a consumer mobile phone to let consumers get information on products at the store that they are in. A MSA is considered as a platform to deliver real-time, in-store, and personalized services, such as personalized product offerings and in-store customer advisory support, to improve the shopping experiences of in-store customers (Fang et al., 2012; Li, Ari, Jain, Karp, & Dekhil, 2009; Tellis & Gaeth, 1990).

Several MSA systems have been developed for both the research and the business purposes. For example, EasiShop (Keegan & Hare, 2002), ShopBot (Gross et al., 2008), MyMobiHalal (Junaini & Abdullah, 2008) and Ezbuy (E.Y. Daraghmi, Lin, & Yuan, 2011) have been proposed for improving the performance of the MSA systems in the case of physical in-store shopping and thus improving the consumers' satisfaction. Despite the frequent use of MSA to provide various services, including information on products, products/stores recommending, and products offerings, few studies have focused on the adoption of in-store MSA. Although previous studies on technology-based services adoption have explored the adoption of various technology-based services, such as e-learning, online banking, and online shopping, these findings have reference value that cannot be directly used in the context of MSA services. As such, knowledge on the adoption of in-store MSA is limited. Various studies have investigated the influence of gender differences in the adoption and the acceptance of new technology (Okazaki & Mendez, 2013; Wang, Y.-S., Wu, M.-C., & Wang, 2009). Researchers (Terzis, V., & Economides, 2011) inferred that there is difference between female consumers and male consumers regarding their perceptions to adopt and accept new technology. Thus, the current study develops a theoretical MSA attitude and acceptance model, as well as attempts to illustrate gender differences in the acceptance of MSA services under the TAM. The findings propose implications for mobile applications services industry that develop mobile technology-based services.

2 CONCEPTUAL FRAMEWORK AND HYPOTHESES

2.1 Conceptual framework

Since a MSA can only improve the performance of shopping through consumer acceptance or adoption, this paper explores the consumers' attitude and acceptance toward MSA under the technology acceptance model (TAM) that was introduced by Davis in 1986 (F.D. Davis, 1986). Currently, researchers consider TAM as one the most useful models in investigating the adoption of an information technology (Shang Gao, John Krogstie, 2014).

As stated in TRA, individual attitudes and other subjective norms determine the behavioral intentions and conclude the performance of a person in a specific behavior (Ajzen & Fishbein, 1980). According to Ajzen, the person attitude is defined as the individual feelings toward a specific behavior which in turn is influenced by the person beliefs (Ajzen, 1985). In 1986, Davis (F.D. Davis, 1986) proposed the model of technology acceptance to illustrate the adoption and the acceptance of an information system (IS) or an information technology (IT). According to Davis, two elements determine the system usage: Perceived Usefulness (PU) and Perceived Ease Of Use (PEOU). Perceived Usefulness (PU) is defined as the level to which an individual admits that using an information system will enhance his/her job performance, whereas Perceived Ease Of Use (PEOU) is defined as the level to which an individual thinks that using an information system will be easy and free of efforts. Davis indicated that there was

a positive, indirect influence of PEOU on the system usage via PU. Empirical studies found that the user behavioural intention, which is defined by the user PU and attitude, determine the usage of an information system. Moreover, the user attitude is determined by the user PU and the PEOU (Adams, Nelson, & Todd, 1992; Szajna, 1996). In this paper, we extend the Technology Acceptance Model (TAM) to examine the consumers' acceptance of in-store MSA. Our research model adopts the perceived usefulness (PU), perceived ease of use (PEOU), the environmental variables, user satisfaction, social influence and the perceived quality constructs. To summarize, Figure.1 illustrates our research model.

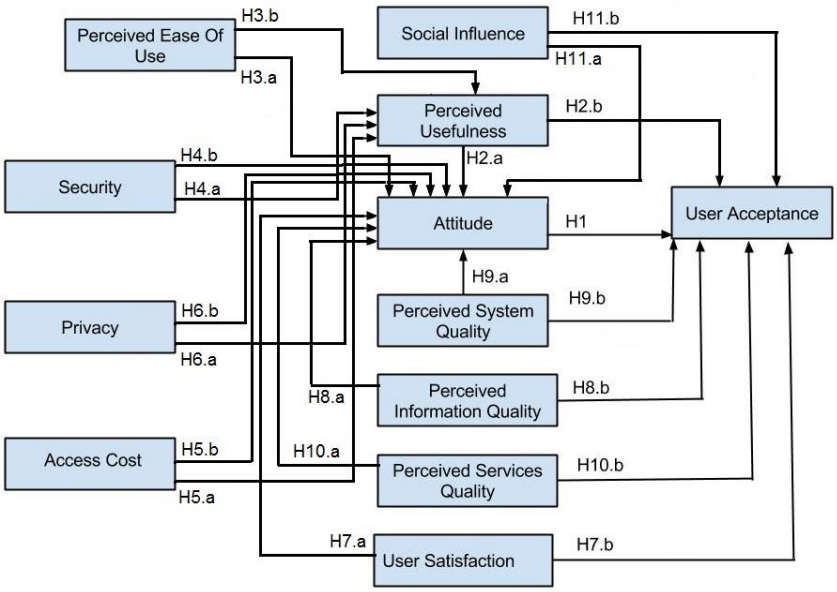

Figure 1. Research Model

2.2 Hypotheses

2.2.1 User acceptance of in-store MSA

In regard to TRA introduced by Corney (Corney, 1987), the current study adopts the consumers acceptance to represent a consumer intention towards the in-store MSA services. The consumers' acceptance is defined as the degree to which a user come to accept and use a technology. Based on the correlation between the consumers' intention and their behaviour founded by TRA (Corney, 1987), we believe that finer user acceptance indicates increased willingness to in-store MSA.

2.2.2 Attitude toward in-store MSA

According to the TRA, an individual attitude toward a behavior is determined by the individual affective beliefs about behavioral consequences and the evaluations of them. Fishbein and Ajzen (Ajzen & Fishbein, 1980; Ajzen, 1985) defined an individual attitude toward a behavior as the feelings (positive or negative) toward performing the target behavior. According to TAM, there is a significant positive influence on an individual attitude toward behavior on the individual's acceptance behavioral (F.D. Davis, 1986). Researchers have concluded that attitude toward an information technology positively affects the users' acceptance of the technology (Chang, Y. P., & Zhu, 2011). In other words, when consumers' attitude toward in-store MSA services is positive, their acceptance of the MSA should be strong.

In the current study, as proposed by TRA and TAM, attitude influences the users' behavioral intention and acceptance of an Information System (IS). Thus, this study assumes that consumers' attitudes toward in-store MSA affect the consumers' acceptance of MSA. We test the following hypotheses about attitude as shown in Figure.1:

H1. A consumer attitude toward in-store MSA services positively affects the user acceptance of in-store MSA.

2.2.3 Perceived Usefulness (PU)

Perceived usefulness refers to the level to which an individual believes that using an information technology system would improve his/her job performance (F.D. Davis, 1986). The empirical results of TAM proposed by Mathieson in 1991 (Mathieson, 1991) stated that there is positively significant effect of PU on the consumer attitude toward an information system. A MSA can be viewed as an information system since it provides information to its users. In our study, we define perceived usefulness as the level of consumers' feelings that using in-store MSA would enhance their performance to acquire relevant information for in-store shopping. Thus, we hypothesize the following relationships:

H2.a. A consumer PU positively affects attitudes toward in-store MSA services.

H2.b. A consumer PU positively affects in-store MSA.

2.2.4 Perceived Ease of Use (PEOU)

Perceived ease of use refers to the degree to which an individual feels that using a particular system is easy and free of efforts (F.D. Davis, 1986). In 1989, Davis (F.D. Davis, 1986; Fred D. Davis, 1989) concluded that there is a positive correlation between PEOU and the system usage. Davis found that when PU is under control, the PEOU will not influence the system usage. Venkatesh and Davis suggested that PEOU positively affects the system usage and the acceptance of an information technology (Venkatesh, V., & Morris, 2000). In addition, Hung-Pin Shih (Shih, 2004) found that PEOU significantly and positively affects PU. Therefore, this study defines perceived ease of use as the degree to which a consumer believes that in-store MSA system would be easy and free of efforts. We hypothesize the following relationships:

H3.a. A consumer PEOU positively affects attitudes toward in-store MSA services.

H3.b. A consumer PEOU positively affects PU.

2.2.5 Environmental constructs

In 2000, Triandis' model (J. Lee, 2000) found that facilitating conditions determine the information systems usage behavior. Similarly, the environmental constructs, such as security, privacy and access costs are three essential facilitating factors of in-store MSA. Therefore, we study the influence of the environmental constructs on the consumers' acceptance of MSA.

- Security (S)

Security is referred to the degree to which a consumer feels that using a particular system or technology is secure (Shin, D., & Kim, 2008), and it is determined by the users' feeling of control of the information system. In 2006, Pousttchi concluded that there is a positive correlation between security and the users' attitude toward using a particular information system (Linck, K., Pousttchi, K., & Wiedemann, 2006). This research explores the effect of security on the consumers' attitude toward a MSA. We test the following hypotheses:

H4.a. There is a positive significant effect of security on PU.

H4.b There is a positive significant effect of security on consumers' attitude toward in-store MSA services.

- *Access costs (AC)*

Access cost is defined as the cost of downloading a mobile application in a consumer mobile phone, the network speed, and it also defined as the cost of using GPRS, Bluetooth, or Wi-Fi connections. According to Strader, access costs are important parts of accepting a new technology (T.J. Strader, 1997). In the current study, we explore the effect of AC on the consumers' attitude to use in-store MSA. The following hypotheses are therefore tested:

H5.a. There is a negative significant effect of access costs on PU.

H5.b There is a negative significant effect of access costs on consumers' attitude toward in-store MSA services.

- *Privacy (P)*

Since consumers feel worry about whether the information system technology that they use and the service-providers properly collect, store and use their personal information, privacy is referred to the degree of an individual concern regarding information disclosure (Caroline Lancelot Miltgen, Aleš Popovič, 2013). Previous studies concluded that information privacy includes errors, improper access and unauthorized secondary use (Caroline Lancelot Miltgen, Aleš Popovič, 2013). Several studies have examined the effect of privacy concern on consumer behavior in the contexts of information technology, such as online shopping (Zhou & Li, n.d.), online health information disclosure (G Bansal, F Zahedi, 2010), social network sites (Xu, Liao, & Li, 2008), and mobile service contexts (HW Kim, HC Chan, 2007). The following hypotheses are therefore tested:

H.a. There is a positive significant effect of privacy on PU.

H6.b There is a positive significant effect of privacy on consumers' attitude toward in-store MSA services.

2.2.6 User Satisfaction (US)

User satisfaction refers to the degree to which a consumer feels satisfy after using particular products or services supplied by a company satisfy or a consumer feels that particular products or services meet his/her expectation (Gelderman, 1998). Previous studies concluded that a user satisfaction influences the effectiveness of information systems usage, as well as, affects the performance of the information systems directly or indirectly (Gelderman, 1998). Several studies extend the TAM to include user satisfaction as one construct although Davis did not include it as a construct in his model. Thus, this study tests the following hypotheses:

H7.a. US positively affects attitudes toward in-store MSA services.

H7.b. US positively affects user acceptance of in-store MSA.

2.2.7 Perceived quality of in-store MSA

- Perceived information quality (PIQ)

Information quality is defined as the quality of the information system outputs. It is usually used to measure the performance of the information systems. Several studies (Nik Adzrieman Abd Rahman, Bahtiar Mohamad, 2014; YiMing Zheng, Kexin Zhao, 2013) have evaluated the effect of PIQ on consumer behavior intention to use the information technology, such as online shopping, online health information disclosure, and mobile service contexts. Therefore, PIQ is expected to influence the consumer attitude and acceptance toward MSA:

H8.a. PIQ affects individual attitudes toward in-store MSA services.

H8.b. PIQ affects individual acceptance of in-store MSA.

- Perceived system quality (PSQ)

System quality refers to the information system performance, the properties of the system, and the quality of the functions supported by the system. Several studies thus adopted PSQ to evaluate the performance of an information system (S. Hamilton, 1981). In the current study, we assume that the PSQ of MSA affects attitudes toward MSA and user acceptance of MSA:

H9.a. PSQ affects individual attitudes toward in-store MSA services.

H9.b. PSQ affects individual acceptance of in-store MSA.

- Perceived service quality (PSvQ)

In 1988, Parasuraman et al. (Parasuraman, Zeithaml A., & Berry, 1988) have concluded that service quality determines the success of IS, and the consumer acceptance of IS. When a consumer initially uses his/her mobile phone to search for products or services, the quality of the service may motivate the consumer to make a purchase discussion. Thus, we assume that perceived service quality affect attitudes toward MSA and user acceptance of MSA:

H10.a. PSvQ affects a consumer attitude toward in-store MSA services.

H10.b. PSvQ affects a consumer acceptance of in-store MSA.

2.2.8 Social Influence (SI)

The change in behavior that one consumer causes in another, intentionally or unintentionally is defined as Social Influence (SI). According to Venkatesh et al. (Venkatesh, V., & Morris, 2000) social influence refers to the degree of consumers' feeling that other important people think that he/she should use the technology. The results of investigating the effect of SI in the adoption of new technologies were mixed. (Talukder, M., & Quazi, 2011) concluded that there is a negative correlation between attitude toward the acceptance of new technology and social influence, whereas (Kulviwat, S., Bruner, G. C., II, & Al-Shuridah, 2009) found that social influence positively affects the consumer attitude toward adoption of new technology. In addition, Krisanic believes that because of social media, such as Facebook, twitter, etc., it become more easy for consumers to be affected by other people (Krisanic, 2008). Thus, the following hypotheses are proposed:

H11.a. Social influence affects consumers' attitudes toward in-store MSA services.

H11.b. Social influence affects a consumer acceptance of in-store MSA.

2.2.9 Moderator variable: Males vs. Females

Mixed results were obtained on the influence of gender (male and female) differences in the acceptance of new information system. For example, several studies concluded that women are influenced by perceived ease of use and social influence, whereas males are affected by perceived usefulness (Terzis, V., & Economides, 2011; Wang, Y.-S., Wu, M.-C., & Wang, 2009). Because of the mixed results obtained on the influence of gender differences on different contexts (Terzis, V., & Economides, 2011), our study employs gender differences as a moderator variable. The following hypothesis is developed:

H12: There is a significant difference between males and females in the adoption of in-store MSA.

3 DATA COLLECTION AND MEASUREMENT

Research subjects included 256 undergraduate and graduate international students with ages ranging from 18 to 34 years from a large university in Taiwan. We provided an extra prize to ensure the active involvement of participants in the survey. An in-store MSA application that provides several English services to assist consumers, such as English information on products, products/stores recommending, and products offerings was selected as research tool. Since in Taiwan all the products details, such as ingredients, expiry date, nutrition facts, how to use instruction, etc., are written in Chinese (i.e. Mandarin), and the majority of workers, in stores, shops, bakeries and restaurants, are non-English speakers, the undergraduate and graduate international students are potential consumers of the selected in-store MSA. Before taking the surveys, the participants read an informed consent document notifying them that their participation was voluntary and they could stop participating at anytime without penalty. After giving their permission, an in-store Mobile Shopping Assistant (MSA) was installed on their mobile phones for six months. The participants were then asked to fill out measures regarding their age, gender, prior experience with in-store MSA services, and their beliefs, attitude, and acceptance. The sample consisted of 122 (47.66%) female and 134 (52.34%) male respondents. Their age ranged from 18 to 24 (n= 86) and from 25 to 34 (n = 170). Table 1 presents the respondents' demographics.

	Number	%
Age		
18-24	86	33.59%
25- 34	170	66.41%
User experience on using smart phones and their applications		
Less than one year	111	43.36%
More than one year	145	56.64 %
Education		
Undergraduate	157	61.33%
Master	59	23.05%
Doctorate	40	15.62%
Gender		
Male	134	52.34%
Female	122	47.66%
User ability to read/ write Chinese-Mandarin		
Able to read only	15	5.86%
Able to write only	15	5.86%
Not able to read or write	178	69.53%
Not able to read only	19	7.42%
Not able to write only	29	11.33%

Table 1. Characteristics of respondents (total = 256).

As shown in Table 2, the current study measures the following twelve constructs: Attitude (A), security (S), Access Costs (AC), Privacy (P), Perceived Usefulness (PU), Perceived Ease of Use (PEOU), User Satisfaction (US), Perceived Information Quality (PIQ), Perceived System Quality (PSQ), Perceived Services Quality (PSvQ), Social Influence (SI), and User Acceptance (UA). All items used six-point (0–5) Likert scales ranging from ''strongly disagree'' to ''strongly agree''.

	α	CR	AVE
1. Attitude (A)	0.79	0.79	0.59
A1 I feel that in-store shopping via MSA is appealing.			
A2 I like to shop using a MSA.			

2. Security (S)	0.89	0.90	0.76
S1 I feel that shopping via MSA is trustworthy			
S2 I believe that MSA is secure.			
3. Access costs (AC)	0.90	0.94	0.83
AC1 I feel that the current cost of accessing the MSA via my mobile is not expensive.			
AC2 I feel that the current cost of accessing the Internet via MSA is not expensive.			
4. Privacy (P)	0.89	0.78	0.59
I worry about the disclosure of my personal information			
I believe that the service provided by MSA will really be performed as it is supposed to.			
5. Perceived ease of use (PEOU)	0.86	0.98	0.83
PEOU I feel that MSA let information to be easily accessed via my mobile.			
PEOU I feel that MSA obtained product/service information easily.			
6. Perceived usefulness (PU)	0.80	0.91	0.66
PU1 Shopping via MSA will save my time.			
PU2 Shopping via MSA is useful.			
7. User satisfaction (US)	0.80	0.87	0.66
US1 Shopping via MSA enhances my quality of life.			
US2 I feel satisfied when using MSA.			
8. Social Influence (SI)	0.86	0.90	0.59
SI 1 A number of people around me support this application			
SI 2 People who are important to me think that this application is important for me			
9. Perceived information quality (PIQ)	0.79	0.88	0.72
PIQ1 I admit that the accuracy of information will influence my behavior in making decisions during shopping.			
PIQ2 Timeliness of information will influence my behavior in making decisions during shopping.			
10. Perceived system quality (PSQ)	0.90	0.77	0.59
PSQ1 The quality of MSA services will influence my behavior in making decisions during shopping.			
PSQ2 The proceeding speed of MSA will influence my behavior in making decisions during shopping.			
11. Perceived service quality (PSvQ)	0.86	0.86	0.67
PSvQ1 Delivery time will influence my behavior in making decisions during shopping.			
PSvQ2 The quality of MSA services will influence my behavior in making decisions during shopping.			
12. User acceptance (UA)	0.93	0.93	0.81
UA1 I am willing to accept MSA for physical in-door shopping UA2 This system makes my life convenient.			

Table 2. Questions included in the questionnaire and the Latent variables statistics.

4 RESULTS

4.1 Measurement Model

In this paper, we analyzed the reliability and the validity of all measurement instrument using the reliability and the convergent validity criteria. To measure the internal consistency, we established the reliability of the survey by calculating the Cronbach's alpha value (Cronbach, 1971). The results show that the Cronbach's Alpha value of the A, S, AC, P, PEOU, PU, US,

SI, PIQ, PSQ, PSvQ, and UA are 0.79, 0.89, 0.90, 0.89, 0.86, 0.80, 0.80, 0.86, 0.79, 0.90, 0.86, and 0.93 respectively. In other words, as shown in table 2, the Cronbach's Alpha values of all constructs are above 0.79, that is, above the acceptance level 0.7 suggested by Nunnally (Nunnally, 1967). Moreover, we examined the values of composite reliability (CR) that is a more rigorous estimate of reliability according to Chin and Gopal (Chin, W. W., & Gopal, 1995). As shown in Table 2, the results show that the minimum value of CR among all constructs is 0.77. In other words, the CR values of all constructs are more than 0.76 which indicates strong reliability. As conclusion, the high values of Cronbach's Alpha and CR illustrated the reliability of the measurement model. To measure the validity, we calculated the average variance extracted (AVE). As shown in Table 2, the results showed that the values of AVE are more than 0.58 supporting the convergent validity of the measures suggested by Fornell and Larcker (Fornell, C., & Larcker, 1981).

In addition, as concluded in (Hair, J. F., Black, B., Babin, B., Anderson, R. E., & Tatham, 2006), discriminant validity is the extent to which a construct truly differs from neighboring constructs. This was evaluated from the latent constructs correlations matrix, where the square roots of the AVE along the diagonal are reported. The correlations between the constructs are reported in the lower left off diagonal elements in the matrix. Hair et al. (Hair, J. F., Black, B., Babin, B., Anderson, R. E., & Tatham, 2006) suggest that average variance shared between construct and its measures should be greater than the variance shared between the constructs and other constructs in the model. Thus, discriminant validity is satisfied when the diagonal elements (square root AVE) are greater than the off-diagonal elements in the same row and column. As shown in Table 3, the results show that the square roots of AVE values of all constructs are significantly higher than the corresponding correlations among the latent constructs. Overall, all the criteria demonstrated the construct validity of the measurement model.

	A	S	AC	P	PEOU	PU	US	SI	PIQ	PSQ	PSvQ	UA
A	0.74											
S	0.71	0.87										
AC	0.53	0.75	0.76									
P	0.55	0.63	0.70	0.90								
PEOU	0.59	0.55	0.69	0.39	0.71							
PU	0.67`	0.42	0.62	0.45	0.25	0.54						
US	0.41	0.55	0.32	0.51	0.23	0.18	0.61					
SI	0.35	0.43	0.59	0.55	0.61	0.22	0.57	0.62				
PIQ	0.24	0.14	0.28	0.41	0.17	0.23	0.25	0.31	0.42			
PSQ	0.19	0.14	0.24	0.57	0.06	0.65	0.14	0.29	0.39	0.68		
PSvQ	0.17	0.19	0.18	0.45	0.35	0.14	0.10	0.29	0.28	0.67	0.75	
UA	0.06	0.18	0.13	0.14	0.41	0.15	0.18	0.14	0.24	0.67	0.74	0.82

Table 3. Discriminant validity

4.2 Structural Model

This study use the structural model to examine the hypotheses, and the Partial Least Squares (PLS) test was used for the data analysis. In general, PLS allows analyzing (1) the structural model for assessing the relationships among our theoretical constructs and (2) the measurement model for assessing the validity and reliability of our questionnaire items. The results of the PLS analysis can be seen Figure.2.

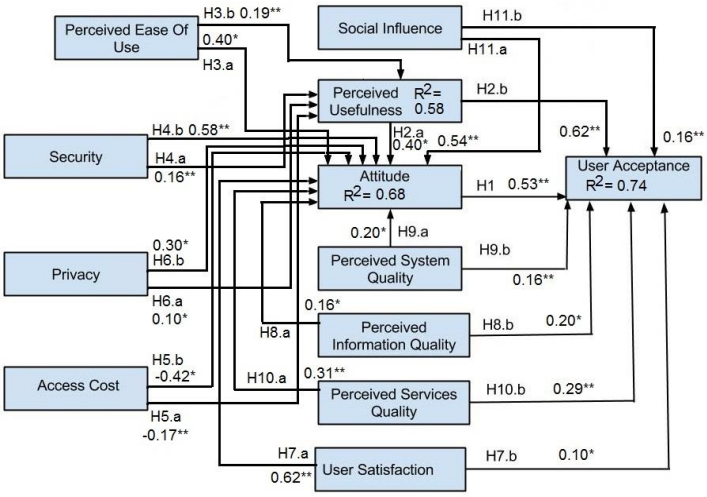

*Figure 2. The results of PLS research model analysis * = p < 0.05, (* 0.05 significance level); ** = p < 0.01, (** 0.01 significance level).*

Results show that Attitude toward in-store MSA and Perceived Usefulness are strong factors of the consumers' acceptance of in-store MSA (i.e. β <0.20 is considered as weak effect, 0.20< β <0.5 is considered as moderate effect, β >0.5 is considered as strong effect (Acock, 2008), while Perceived Service Quality is a moderate factor of consumers' acceptance of in-store MSA. Moreover, Perceived Information Quality, Perceived Service Quality, Social Influence, and User Satisfaction are weak factors of consumers' acceptance of in-store MSA. These factors accounting for 74.0 percent of variance explained (β = 0.74). Since we hypothesized that attitude (H1), PU (H2.b), PSQ (H9.b), PIQ (H8.b), PSvQ (H10.b), US (H7.b) and SI (H11.b) would significantly affect the consumers' acceptance of MSA, hypotheses H1, H2.b, H9.b, H8.b, H10.b, H7.b, , and H11.b, are supported.

PU, PEOU, S, AC, P, US, PIQ, PSQ, PSvQ, and SI, and have significant influence on consumers' attitude toward in-store MSA, accounting for 68.0% of variance explained (R^2 = 0.68). Since we hypothesized that perceived usefulness (H2.a), perceived ease of use (H3.a), Security (H4), Access Costs (H5), Privacy (H6), US (H7.a) PIQ (H8.a), PSQ (H9.a), PSvQ (H10.a) and social influence (H11.a) would significantly affect consumers' attitude toward MSA, hypotheses H2.a, H3.a, H4, H5, H6, H7.a, H8.a, H9.a, H10.a and H11.a are supported.

Meanwhile, perceived ease of use, S, AC, and P have significant effect on consumers' perceived usefulness. Since we hypothesized that perceived ease of use, S, Ac, and P would significantly influence perceived usefulness (H2, H4, H5, H6), hypothesis H2, H4, H5, H6 are supported.

4.3 Analysis of Gender Differences Moderating Variable

We examined the influence of the differences in gender (male and female) as moderating variable. We divided the 256 participants into two groups: the female group that contains 122 participants (47.66%) of females; and the male group which consisted of 134 participants (52.34%) of males. We also use the PLS analysis to examine the structural model of the two group. As shown in Figure.3, the results of the analysis show that there is a positive significant difference between the two groups in the paths from attitude toward in-store MSA to in-store MSA acceptance (Female: β = 0.15, p<0.05; Male:β=0.04). We also examined the path strength coefficients differences in the other constructs between the two groups. Results concluded that there are no significant differences in the paths strength coefficients from PU, PSQ, PIQ, PSvQ, US, and SI to the acceptance of in-store MSA. Moreover, there are no significant differences in the paths strength coefficients from PU, PEOU, S, P, AC, SI, PSQ, PIQ, PSvQ, and US to attitude toward in-store MSA. Finally, there are no significant differences in the paths strength coefficients S, P, AC, and PEOU to PU between the two groups.

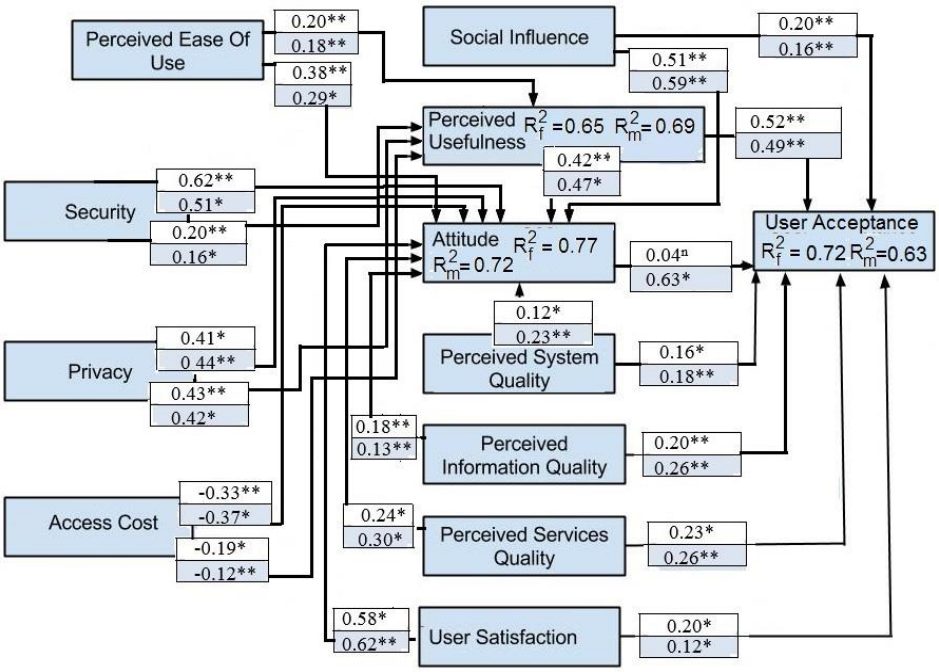

*Figure 3. Results of the gender differences analysis; coefficients for females are in the shaded boxes. * = $p < 0.05$, ** = $p < 0.01$, n = not significant.*

5 DISCUSSION

Our study indicates that attitude toward in-store MSAs has a significant positive influence on the acceptance of in-store MSAs among female consumers, but not among male consumers. This conclusion is consist with previous research that concluded attitude plays a key role in the acceptance of an information system among female consumers than in male consumers (Sanchez-Franco, 2006). In addition, results imply that perceived the quality of the system, such as perceived information quality, perceived services quality, and perceived system quality produce a significant influence on consumers' acceptance and attitude toward in-store MSAs, and there is no significant difference between males and females regarding the strength of path coefficients. The results are consistent with the finding of (Shih, 2004), who found that PIQ, PSvQ, and PSQ were an important constructs of consumer attitude and acceptance toward information systems services. One possible conclusion is that consumers usually expect smart mobile phones to support their personal activities, such as shopping, sports, reading, etc. In-door shopping can be viewed as an activity since it consumes effort and time. The current study shows that in addition to perceived usefulness, perceived the quality of the system, social influence has a significant effect on consumers' attitude and acceptance toward in-store MSAs, and there is no significant difference between males and females regarding the strength of path coefficients. The findings are consistent with the results of (Yu, 2012) who found that the social influence construct significantly affect the user attitude to adopt a new mobile service, and there is no significant difference between male and female users.

User satisfaction exerted a significant influence on the adoption of MSA (i.e. consumers' attitude and acceptance toward in-store MSAs), and there is no significant difference between males and females regarding the strength of path coefficients The result is consistent with the finding of (Gelderman, 1998; Shih, 2004), who found that the effectiveness of the information system, the system usage, and the system performance is influenced by the user satisfaction. Based on prior studies, Gelderman revised the TAM proposed by Davis although Davis did not include US as a construct in his model.

Previous research on the influence of perceived usefulness on users' attitude and acceptance of new technology concluded that PU is a primary key of users' attitude and acceptance (Yousafzai, S. Y., Foxall, G. R., & Pallister, 2007). This conclusion is consistent with our research results since perceived usefulness significantly and positively affect the consumers' attitude and acceptance toward in-store MSAs, and there is no significant difference between males and females.

Moreover, previous results on gender effect on the attitude and acceptance of new technology were mixed (Ong, C.-S., & Lai, 2006; Pan, S., & Jordan-Marsh, 2010). This study shows that the influence of gender difference is not significant in the relationships from perceived usefulness to consumer attitude and acceptance toward in-store MSAs. A consumer can benefit from the services provided by MSA. Thus, the usefulness of a MSA service is an important factor in the attitude and the acceptance toward in-store MSAs for both male and female consumers.

In addition, the current study infers that environmental constructs, such as security, and privacy have a significant positive effect on attitude toward in-store MSAs of male and female consumers. These results are consistent with previous research, which found that security and privacy were an important determinant of consumer attitude toward new technologies (B. C. Y. Lee, 2012). As expected, high access costs would decrease a consumer attitude toward in-store MSAs for both male and female consumers, thus reducing their willingness to use MSAs.

Finally, results show that there is a positive correlation between perceived ease of use and perceived usefulness among male and female consumers. In other words, the current study indicates that the gender effect was not significant in the relationship of perceived ease of use to perceived usefulness. Additionally, perceived ease of use has a significant positive effect on attitude toward in-store MSAs of both male and female consumers. This conclusion went against the view of (F.D. Davis, 1986; Fred D. Davis, 1989) that perceived ease of use has a significant effect on perceived usefulness as male consumers are more confident with new technology than female consumers. We conclude that perceived ease of use has a significant positive effect on perceived usefulness, and there is no significant difference between males and female.

6 IMPLICATION

The findings of the current study contain several implications for researchers as well as for the mobile services providers. We believe that developing in-store MSA will be an effective solution to assist consumers during in-door shopping. The current study suggests that in-store MSA can help consumers overcome their difficulties during in-door shopping. In addition, since the consumers' acceptance of MSA is affected by social influence, this study recommends that social websites, such as Facebook, Twitter, etc. could be used in order to broadcast a new system (Eman Yasser Daraghmi & Yuan, 2014). The empirical findings indicate that including environmental constructs, such as perceived security, privacy and access cost is a valuable extension of the TAM in the field of MSA, as they play a key role in evaluating the adoption of in-store MSA. Findings of our study also suggest that companies have to illustrate the usefulness and explain the operation of their new MSA services to their male and female consumers since PU, PIQ, PSQ, and PSvQ positively affect the consumer attitude and acceptance toward in-store MSA. Additionally, PEOU significantly influence the consumers' acceptance through their attitude toward in-store MSA services.

7 CONCLUSION, LIMITATIONS AND FUTURE RESEARCH

Mobile Shopping Assistant (MSA) systems can be considered as an effective way for assisting in-store shopping and can become potentially the pervasive personalized services that both consumers and merchant can trust. This study examined the consumer attitude and acceptance toward in-store MSA services by extending the TAM model. We found that individual attitudes, PU, SI, US, PIQ, PSQ, and PSvQ significantly affect user acceptance of MSA, meeting the results of TAM. In fact, consumers'

attitudes toward in-store MSA services strongly affect their willingness to use the MSA for in-store shopping. We also confirmed that PU, PEOU, S, P, AC, PSQ, PIQ, PSvQ, SI, and US determine consumers' attitudes toward in-store MSA. The results indicate that consumers' understanding of the ease and the usefulness of MSA has the potential to indirectly influence the consumers' acceptance of in-store MSA via their attitudes. The significant positive effect of PEOU on the revised PU is also confirmed; this is consistent with TAM. As assumed, consistent with the proposition of TAM, this study found that the revised PU significantly affected user acceptance of in-store MSA. The empirical results also showed high security improve a consumer attitude toward in-store MSA. As expected, high access costs would decrease a consumer attitude toward MSA, thus reducing their acceptance toward MSA services. In the extended model, US determines PEOU, and the attitudes toward in-store MSA. As a result, greater user satisfaction with the mobile application would increase consumer acceptance in-store MSA for in-store shopping. A number of limitations to this study should be noted. First, one of the main aims of the current study is to test the gender effect on consumer attitude and acceptance toward in-store MSA, and thus, and thus, other moderating and mediating factors were not tested. Future studies could consider other moderating (such as age, and consumer innovation) and mediators (such as trust and emotion). Second, the current participants are undergraduate and graduate students in Taiwan. Consumers outside of school and in different countries should be considered in future studies.

References

Adams, D. A., Nelson, R. R., & Todd, P. A. (1992). Perceived usefulness, ease of use, and usage of information technology: a replication. *MIS Quarterly*, *16*(2), 227–247.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action-control: From cognition to behavior* (pp. 11–39). J. Kuhl, J. Beckmann (Eds.).

Ajzen, I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Englewood Clifts NJ: Prentice-Hall.

Caroline Lancelot Miltgen, Aleš Popovič, T. O. (2013). Determinants of end-user acceptance of biometrics: Integrating the "Big 3" of technology acceptance with privacy context. *Decision Support Systems*, *56*, 103–114.

Chang, Y. P., & Zhu, D. H. (2011). social networking sites adoption in China: A comparison of pre-adoption and post-adoption. *Computers in Human Behavior*, *27*(5), 1840–1848.

Corney, W. T. C. W. (1987). A conceptual model of gambling behavior: Fishbein's Theory of Reasoned Action. *Journal of Gambling Behavior*, *3*(3), 190–201.

Daraghmi, E. Y., Lin, C.-F., & Yuan, S. M. (2011). Mobile Phone Enabled Barcode Recognition for Preferences Monitoring. In *IEEE Computational Science and Engineering* (pp. 297–302). Chaina.

Daraghmi, E. Y., & Yuan, S.-M. (2014). We are so close, less than 4 degrees separating you and me! *Computers in Human Behavior*, *30*, 273–285.

Davis, F. D. (1986). *A technology acceptance model for empirically testing new end-user information systems: theory and results*. Sloan School of Management, Massachusett.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340.

Fang, B., Liao, S., Xu, K., Cheng, H., Zhu, C., & Chen, H. (2012). A novel mobile recommender system for indoor shopping. *Expert Systems with Applications*, *39*(15), 11992–12000.

G Bansal, F Zahedi, D. G. (2010). The impact of personal dispositions on information sensitivity, privacy concern and trust in disclosing health information online. *Decision Support Systems*, *49*(2), 138–150.

Gelderman, M. (1998). The relation between user satisfaction, usage of information systems and performance. *Information and Management*, *34*(1), 11–18.

Gross, H., Boehme, H., Schroeter, C., Mueller, S., Koenig, A., Martin, C., … Bley, A. (2008).

ShopBot : Progress in Developing an Interactive Mobile Shopping Assistant for Everyday Use. In *IEEE International Conference on Systems, Man and Cybernetics (SMC)* (pp. 3471–3478).
HW Kim, HC Chan, S. G. (2007). Value-based adoption of mobile internet: an empirical investigation. *Decision Support Systems*, *43*(1), 111–126.
Junaini, S. N., & Abdullah, J. (2008). MyMobiHalal 2 . 0 : Malaysian Mobile Halal Product Verification using Camera Phone Barcode Scanning and MMS. In *International Conference on Computer and Communication Engineering* (pp. 528–532).
Keegan, S., & Hare, G. O. (2002). EasiShop. In *PIMRC* (pp. 1962–1966).
Kowatsch, T., & Maass, W. (2010). In-store consumer behavior: How mobile recommendation agents influence usage intentions, product purchases, and store preferences. *Computers in Human Behavior*, *26*(4), 697–704.
Krisanic, K. (2008). *Motivations and impression management: Predictors of social networking site use and user behavior*. Columbia: University of Missouri.University of Missouri.
Kulviwat, S., Bruner, G. C., II, & Al-Shuridah, O. (2009). The role of social influence on adoption of high tech innovations: The moderating effect of public/private consumption. *Journal of Business Research*, *62*(7), 706–712.
Lee, B. C. Y. (2012). The determinants of consumer attitude toward service innovation-the evidence of ETC. System in Taiwan. *Journal of Services Marketing*, *26*(1), 9–19.
Lee, J. (2000). Adapting Triandis's Model of Subjective Culture and Social Behavior Relations to Consumer Behavior. *Journal of Consumer Psychology*, *9*(2), 117–126.
Li, J., Ari, I., Jain, J., Karp, A. H., & Dekhil, M. (2009). Mobile In-store Personalized Services. In *IEEE International Conference on Web Services* (pp. 727–734).
Linck, K., Pousttchi, K., & Wiedemann, D. G. (2006). Security issues in mobile payment from the customer viewpoint. Gothenburg, Sweden. In *14th European conference on information systems*.
Mathieson, K. (1991). Predicting User Intentions: Comparing the Technology Acceptance Model with the Theory of Planned Behavior. *Information Research*, *2*(3), 173–191.
Nik Adzrieman Abd Rahman, Bahtiar Mohamad, N. A. A. R. (2014). Factors Influencing the Quality of e-Services on Hospital Information System (HIS). *Procedia - Social and Behavioral Sciences*, *155*, 507–512.
Okazaki, S., & Mendez, F. (2013). Exploring convenience in mobile commerce: Moderating effects of gender. *Computers in Human Behavior*, *29*(3), 1234–1242.
Ong, C.-S., & Lai, J.-Y. (2006). Gender differences in perceptions and relationships among dominants of e-learning acceptance. *Computers in Human Behavior*, *22*(5), 816–829.
Pan, S., & Jordan-Marsh, M. (2010). Internet use intention and adoption among Chinese older adults: From the expanded technology acceptance model perspective. *Computers in Human Behavior*, *26*(5), 1111–1119.
Parasuraman, A., Zeithaml A., V., & Berry, L. L. (1988). SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality. *Journal of Retailing*, *64*(1), 12–40.
S. Hamilton, N. C. (1981). Evaluating information system effectiveness. Part 1, Comparing evaluation approaches. *MIS Quarterly*, *5*(3), 55–69.
Sanchez-Franco, M. J. (2006). Exploring the influence of gender on the Web usage via partial least squares. *Behavior and Information Technology*, *25*(1), 19–36.
Shang Gao, John Krogstie, K. S. (2014). Adoption of Mobile Information Services: An Empirical Study. *Mobile Information Systems*, *10*(2), 147–171.
Shih, H.-P. (2004). An empirical study on predicting user acceptance of e-shopping on the Web. *Information & Management*, *41*, 351–368.
Shin, D., & Kim, W. (2008). Applying the technology acceptance model and flow theory to cyworld user behavior. *CyberPsychology and Behavior*, *11*(4), 11–20.
Szajna, B. (1996). Empirical evaluation of the revised technology acceptance model. *Management Science*, *42*(1), 85–92.
T.J. Strader, M. T. S. (1997). Characteristics of electronic markets. *Decision Support Systems*, *21*(3), 185–198.
Talukder, M., & Quazi, A. (2011). The impact of social influence on individuals' adoption of

innovation. *Journal of Organizational Computing and Electronic Commerce*, *21*(2), 111–135.
Tellis, G. J., & Gaeth, G. J. (1990). Best value, price-seeking, and price aversion: The impact of information and learning on consumer choices. *Journal of Marketing*, *54*(2), 34–45.
Terzis, V., & Economides, A. A. (2011). Computer based assessment: Gender differences in perceptions and acceptance. *Computers in Human Behavior*, *27*(6), 2108–2122.
Venkatesh, V., & Morris, M. G. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly*, *24*(1), 115–139.
Wang, Y.-S., Wu, M.-C., & Wang, H.-Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology*, *40*(1), 92–118.
Xu, D. J., Liao, S. S., & Li, Q. (2008). Combining empirical experimentation and modeling techniques: A design research approach for personalized mobile advertising applications. *Decision Support Systems*, *44*(3), 710–724.
YiMing Zheng, Kexin Zhao, A. S. (2013). The impacts of information quality and system quality on users' continuance intention in information-exchange virtual communities: An empirical investigation. *Decision Support Systems*, *56*, 513–524.
Yousafzai, S. Y., Foxall, G. R., & Pallister, J. G. (2007). Technology acceptance: A metaanalysis of the TAM. *Journal of Modelling in Management*, *2*(3), 251–280.
Yu, C. S. (2012). Factors affecting individuals to adopt mobile banking: Empirical evidence from the UTAUT model. *Journal of Electronic Commerce Research*, *13*(2), 104–121.
Zhou, T., & Li, H. (n.d.). Understanding mobile SNS continuance usage in China from the perspectives of social influence and privacy concern. *Computers in Human Behavior*, *37*, 283–289.