Effects of Social Influence and System Characteristics on Traceable Agriculture Product Reuse Intention of Elderly People: Integrating Trust and Attitude Using the Technology Acceptance Model

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Abstract

Products such as vegetables and fruits in markets in Taiwan have small green labels denoting that they are traceable agricultural products. This study investigated the effect of social influence and system characteristics on perceived usefulness (PU) and perceived ease of use (PEOU) regarding the Taiwan Agricultural and Food Traceability (TAFT) system. This study also examined the effects of PU and PEOU on attitudes and reuse intention, and employed confirmatory factor analysis and structural equation modelling to test the hypotheses. Questionnaires were developed and the measurement items were based on an extensive review of related studies to ensure content validity in addition to items from an original scale. Four hundred questionnaires from older adults were collected through a quantitative survey. The respondents were all aged between 50 and 90 years, with an average age of 57.61 years. Almost one quarter (21.8%) of respondents had experiences of using traceability quick response (QR) codes in 2016. Regarding purchase experience, 59% of the respondents had experiences of purchasing agricultural products using traceability QR codes. The results revealed that whereas subjective norms, image, and visibility have a positive effect on PU, information quality and system quality affected the PEOU of the TAFT system. Moreover, trust has a

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positive influence on reuse intention. A healthy diet plays a crucial role in the health promotion activities of elderly people. The findings could help those involved in the TAFT system improve their understanding of the attendant factors of PU and PEOU and promote positive attitudes in elderly people about this system, thereby increasing their reuse intentions.

Keywords: elderly people, health, social influence, system characteristics, traceable agricultural products

Introduction

Since the second half of 2007, products such as vegetables, fruits, and fish in markets in Taiwan have been accompanied by small green labels denoting that they are traceable agricultural products (TAPs). Most agricultural and fishery products marked with these labels appear on TAP counters set up especially in supermarkets and have slightly higher prices than similar products not denoted as TAPs. By inputting the traceability number on the Taiwan Agricultural and Food Traceability (TAFT) website, people can access information on the products such as the production region, farmer, planting and feeding processes, harvest or slaughter periods, time of packaging and shipping, and most crucially, results of product pesticide or other drug residue detection. This information is similar to records of an individual's family, education, and work history, and thus is termed production and marketing traceability of agricultural products (Council of Agriculture, Executive Yuan, 2016, 2017a, 2017b).

Production and marketing traceability of agricultural products was introduced because of emerging concerns related to incidents of agricultural product safety in recent years and to implement sustainable agriculture. The agricultural product regulation system operating on an international scale mainly focuses on two practices: (a) the implementation and verification of adequate agricultural standards, which aims to reduce the risks of production processes and products (including risks related to food safety, agricultural environmental sustainability, and practitioner health); and (b) the establishment of the agricultural product traceability system, which provides all participants in the production and marketing processes with a clear sense of responsibility and can be used for rapidly clarifying such responsibility and timely removing problematic products from the market in cases of food safety incidents, thereby reducing the damage to consumers and preventing losses to compliant producers due to consumer anxiety (Council of Agriculture, Executive Yuan, 2017a, 2017b).

The continual development of information technology (IT) in the contemporary world has enabled the agricultural product traceability system to be integrated into information systems. Consumers can scan an product's QR code with their mobile phones to connect to the TAFT website and access relevant information on the product in question. Consumers can access information on the TAFT website anywhere and at any time and the website contains an IT and information website interface. Therefore, this study focused on whether consumer usage of this information system helps to enhance awareness of and trust in agricultural products. Davis (1986) investigated the relationship

between cognitive and emotional factors related to science and technology usage based on the theory of reasoned action and developed the Technology Acceptance Model (TAM) with the expectation that it could be universally used to explain or predict the effects of IT usage. The TAM analyzes perceived usefulness (PU) and perceived ease of use (PEOU) to predict users' habitual usage. The ease of understanding and ease of search of a website technology system enable users to anticipate whether the system is easy to use. The quality of information provided by the system enables users to anticipate whether the system is useful, and thus determines the likelihood of a user revisiting the website (Lederer, Maupin, Sena, & Zhuang, 2000). Moreover, information system quality often influences reuse or reconsumption among consumers (DeLone & McLean, 2003, 2004), as well as their attitudes toward products.

From the perspective of social psychology, social influence affects acceptance of personal technology (Wang & Chou, 2014). Consumers are usually influenced by friends and family members when using a target product, often feeling concerned about how their peers will act toward them, which in turn affects technology acceptance. Numerous scholars have explored the topic of customers' repurchase behaviors on shopping websites, some using trust as a research basis and others exploring technology. Trust focuses on interactions between buyers and sellers. Trust is more crucial in online environments than in physical stores because customers can gain more benefits in online environments (Jarvenpaa & Todd, 1996; Jarvenpaa, Tractinsky, & Saarinen, 1999).

Internet users in Taiwan are mostly young adults and middle-aged people. Older adults are statistically less likely to use the Internet or information media. However, because of the continuous development of IT, Internet usage among older adults is gradually increasing and becoming more mainstream. Older adults are more likely to search health information, make purchases, and obtain religious information, but less likely to watch videos, download music, play games, and read blogs online (Chung, Park, Wang, Fulk, & McLaughlin, 2010; Jones & Fox, 2009). Certain characteristics of shopping websites in Taiwan have previously indicated that trust in online stores affects consumers' purchase or reuse intentions. This study hypothesized that despite the gradual increase in Internet usage, older adults are not as technically proficient as young adults or middle-aged people and sometimes cannot find relevant websites or information to clarify doubts over information. Thus, older adults often encounter problems such as browsing difficulties when seeking information. Therefore, this study initially investigated social influence and IT by using the TAM as the main model combined with trust as an extension of the model. Older adults' trust in the TAFT website and feelings toward the system interface were explored to determine the factors affecting continual website use among such people.

Because of the aging population in Taiwan, older adults are increasingly concerned about health, which is directly related to the products they eat. Production and marketing traceability maintains the safety of agricultural products eaten by consumers. Through the traceability system, older consumers can inquire about the production information of agricultural product processes anywhere and at any time. This capability enhances consumer awareness and trust in the traceability system of agricultural products, thereby promoting transparency and openness of applied information for the production and marketing of agricultural products. In addition, the system enhances older adults' understanding of agricultural product safety, thereby reducing harm and health risks caused by agricultural products. However, most of the consumers analyzed in previous studies were young or middle-aged consumers with experience of using the traceability system; few studies have investigated system usage among elderly people. The present study focused on elderly people and analyzed social capital-related studies on elderly people to verify that such people can strengthen their social capital through healthy active aging activities.

In addition, previous studies such as Gefen, Karahanna, and Straub (2003a, 2003b) have attempted to incorporate trust into the TAM to explore the antecedents to trust in online shopping and the relationship between these antecedents and the TAM. However, because of the aging population, Internet usage is becoming more common in a wider range of age groups in Taiwan, and thus analyzing older adults' behaviors when using the TAFT website is necessary. Moreover, their behaviors and evaluations were influenced by friends, families, or others, thus, this study explored the social influence in the TAM is necessary. The main purpose of this study was to develop an integrated extensibility model combining the TAM, social influence, and trust to detect antecedents to trust in traceability information websites among older adults in Taiwan and explore the impact of social influence on older adults' acceptance of technology. The major contribution of this study is the incorporation of social influence and trust into the TAM, neither of which had been explored in previous studies.

Literature Review and Hypothesis Development

TAM

Davis (1986) modified the TAM to develop a powerful and parsimonious model (Yousafzai, Foxall, & Pallister, 2007a, 2007b, 2010). The TAM has been used extensively to investigate various issues related to IT such as e-commerce (Bigné-Alcañiz, Ruiz-Mafé, Aldás-Manzano, & Sanz-Blas, 2008; McKechnie, Winklhofer, & Ennew, 2006; Tong, 2010), e-books (Read, Robertson, &

McQuilken, 2011), e-healthcare (Lanseng & Andreassen, 2007), mobile devices (Huang, Lin, & Chuang, 2007; Kim & Garrison, 2009), Web 2.0 (Shin & Kim, 2008), Internet banking (Yousafzai et al., 2010), and online group buying (Wang & Chou, 2014). Technology acceptance is referred to a person's willingness to employ technology for the tasks it is designed to support (Byun, Chiu, & Bae, 2018; Dillon, 2001). The prior studies have widely applied the TAM investigate consumers' acceptance of innovative technology (products and services) (Davis, 1986) such as online shopping (Ha & Stoel, 2009; Smith et al., 2013), IT systems (Legris, Ingham, & Collerette, 2003), mobile usage (Park, Nam, & Cha, 2012), e-learning (Roca, Chiu, & Martínez, 2006), and Sports Brand Apps (Byun et al., 2018). The TAM consists of three key variables: PEOU, PU, and potential users' behavioral intention (BI) to adopt the technology in question (Chung et al., 2010). The meta-analysis results indicate the robustness of the paths from PEOU to PU and PU to BI (Chung et al., 2010; Sun & Zhang, 2006). In addition, the model includes external and antecedent factors that affect the two key variables: PEOU and PU (Chung et al., 2010).

Hypothesis Development

Effects of Social Influence on PU and PEOU

Several theories indicate that social influence is crucial in shaping people's behavior (Hsu & Lu, 2004). Opinions of others influence consumers' purchasing intent (Lee, Shi, Cheung, Lim, & Sia, 2011), and social influence is related to external pressure from influential people in a person's life such as family members, friends, and work supervisors, which affects a person's decision to use or not use a system. Social influence has been explored extensively in TAM-related studies (Shen, 2012; Wang & Chou, 2014). Individuals are influenced through messages related to social expectations and observed behaviors of others (Herath & Rao, 2009; Wang & Chou, 2014). In addition, Moore and Benbasat (1991) illustrated that image influences people's behavior, and thus the present examined image.

Regarding social expectations, subjective norms refer to perceived pressures on a person to perform a given behavior and said person's motivation to comply with those pressures (Fishbein & Ajzen, 1975; Kim, Kim, & Shin, 2009). People tend to perform a specific behavior when they strongly believe that others who they deem significant expect them to perform that behavior (Kim & Garrison, 2009). Subjective norms reflect how people's behaviors are affected by their reference groups (e.g., family members, friends, and colleagues) (Kim & Garrison, 2009; Schofield, 1975). Psychological studies have indicated that subjective norms are crucial determinants of PU (Mun, Jackson, Park, & Probst, 2006) and BI (Crespo & Rodríguez, 2008; Lin, 2007; Mun et al., 2006;

Taylor & Todd, 1995). Hence, this study proposed the following hypothesis:

H1: Subjective norms positively affect the PU of the agricultural traceability system.

Image is defined as the degree to which use of an innovation is perceived as enhancing an individual's image or status in his or her social system. Venkatesh and Davis (2000) indicated that an individual may perceive that using a system will lead to improvements in his or her social system (which is the definition of perceived usefulness) indirectly due to image enhancement, over and above any performance benefits directly attributable to system use. Therefore, this study proposed the following hypothesis:

H2: Image positively affects the PU of the agricultural traceability system.

Regarding the observed behavior of others, social influence affects BI and reflects that people's decisions are influenced by the manner in which they perceive technology usage among others as a cue to adopt said technology (Gonzalez, Sharma, & Galletta, 2012; Wang & Chou, 2014). Visibility refers to the degree to which use of a technological system is apparent in an individual's social surroundings (Ilie, Van Slyke, Green, & Lou, 2005) and is related to the ability to communicate with others by using said system (Lee & Panteli, 2010). Yang, Moon, and Rowley (2009) found that visibility directly affects PU when individuals adopt IT systems. Thus, this study proposed the following hypothesis:

H3: Visibility positively affect the PU of the agricultural traceability system.

Influence of System Characteristics on PEOU

Lin (2007) indicated that online features serve as a quality measure of web-based information systems or services provided by websites. Of the many previous studies on online quality factors, DeLone and McLean (2003, 2004) have received the most attention for introducing the dimensions of information quality, system quality, and service quality as vital constructs for producing a successful information system. Ahn, Ryu, and Han (2004) illustrated that online quality factors have the potential to directly affect the PEOU and PU of websites in e-commerce contexts. Studies that have employed online quality factors as external variables of the TAM have detected significant relationships between these factors and belief constructs in the TAM (Cao, Zhang, & Seydel, 2005; Cheong & Park, 2005; Lin, 2007; Thong, Hong, & Tam, 2002). However, the agricultural

traceability system provides agricultural product information to consumers as opposed to online services. Thus, this study did not consider service quality.

Information quality refers to the quality of information provided by online services (Lin, 2007). Measuring information quality involves dimensions such as information accuracy, completeness, information currency, and information presentation format (Lin, 2007; Nelson, Todd, & Wixom, 2005). The agricultural traceability system involves online interactions and the receipt of comprehensive information related to specific agricultural products. Lin (2007) proposed that because of the absence of cues provided by face-to-face contact, online interactions may require accuracy, completeness, and information currency to facilitate information sharing and exchange. Furthermore, information must be presented in a manner that effectively facilitates accurate interpretation and understanding, thereby aiding the completion of a task.

The prior studies have indicated that the success of a specific technology is often closely related to the quality of information and services it provides (DeLone & McLean, 1992; Lin, 2008), and also influence both PEOU and PU in virtual communities (Chung et al., 2010; Lin, 2008) and Internet search engines (Liaw & Huang, 2003). In addition, the previous studies also indicated that elderly people usually take longer to learn the technology savvy in online communities, and they serve their participants and not easily recognize the overall quality of online community sites, furthermore, elderly people often have a relatively shorter time of Internet use and need more time in learning new technologies (Chung et al., 2010; Morris & Venkatesh, 2000; Morris, Venkatesh, & Ackerman, 2005). Thus, this study proposes the following hypothesis:

H4: Information quality positively affects the PEOU of the agricultural traceability system.

In a web-based information system, system quality measures the functionality of a web site (Lin, 2007). Its measurement involves dimensions such as system reliability, convenience of access, response time, and system flexibility (DeLone & McLean, 2003; Nelson et al., 2005). Previous studies on e-commerce have shown that a website's usability can significantly influence users' search strategies and performance (Flavián, Guinalíu, & Gurrea, 2006; Lin, 2007; Liu & Arnett, 2000; Teo, Chan, Wei, & Zhang, 2003) and a high-quality website can generate a comfortable virtual environment where users can easily identify functional groups and navigation aids to ensure efficient information exchange. Thus, this study proposed the following hypothesis:

H5: System quality positively affects the PEOU of the agricultural traceability system.

PU, PEOU, Attitudes, and Reuse Intention

According to the TAM, PEOU influences PU (Wang & Chou, 2014). Attitude refers to the desirability to use IT (Shin, 2010; Wang & Chou, 2014). Realizing the usefulness of e-business applications in improving performance or efficiency positively affects users' attitudes toward such applications (Aboelmaged, 2010). Wang and Chou (2014) indicated that these factors enable users to perceive applications favorably because users are concerned about the effort required to use an application. Chung et al. (2010) indicated that even when the level of computer and Internet experience is controlled for, elderly people experience significantly more usability issues on the Internet than young people (Chadwick-Dias, McNulty, & Tullis, 2003), and such usability issues are also more critical to elderly people than young people in the evaluations of the perceived usefulness of a new technology. Hence, this study proposed the following hypotheses:

H6: PEOU positively affects PU.
H7: PU positively affects attitude.
H8: PEOU positively affects attitude.

Reuse intention refers to the likelihood of a person continuing to use an online system. This paper argues that when people realize the usefulness of an online system, they continue to use it. Thus, PU positively influences attitude. Kim and Park (2005) illustrated that a consumer who favors a specific retailer is more willing to gather product information from that retailer. In addition, the researchers confirmed that attitude positively affects search intention. Accordingly, the present study proposed the following hypotheses:

H9: PU positively affects reuse intention.
H10: Attitude positively affects reuse intention.

Trust and Attitude

An e-commerce is more than its IT interface. It is also a business entity with whom the customers are economically engaged. Trust is crucial in many such transactional, buyer-seller relationships, especially those containing an element of risk, including interacting with an e-commerce (Gefen et al., 2003a, 2003b; Reichheld & Schefter, 2000). Accordingly, trust is vital in many business relationships, and even affects consumers' subsequent behaviors (Blau, 1964; Dasgupta, 1988; Fukuyama, 1995; Gambetta, 1988; Gefen et al., 2003a, 2003b; Gulati, 1995; Kumar, Scheer, & Steenkamp, 1995; Luhmann, 1979; Moorman, Zaltman, & Deshpande, 1992; Williamson, 1985).

Similarly, in social psychology, trust refers to the belief that other people will react in predictable manners. Trust is a belief that one may rely on promises made by others (Kim et al., 2009; Pavlou, 2003). In e-commerce, eTrust refers to "a general belief in an online seller that results in BI" (Gefen, 2000), combining trustworthiness, integrity, and benevolence, all of which increase BI through reduced risk among inexperienced consumers (Jarvenpaa et al., 1999; Kim et al., 2009). Thus, this study argued that trust exists e-commerce and social psychology simultaneously, and it affects consumers' subsequent behaviors and attitudes. Accordingly, trust positively affects attitude. Accordingly, this study proposed the following hypothesis:

H11: Trust positively affects attitude.

The above hypotheses lead to the research model. Figure 1 demonstrates the proposed model. The study used questionnaires in this study and based the measurement items on an extensive review of relevant literature to ensure their content validity, and items from the original scale. The study employed the paper survey because the elderly study participants all had experience of using traceability QR codes and a paper survey was more suitable for targeting those respondents.

Figure 1. Research Framework

Research Method

Sampling and Data Collection

This study was conducted in Taiwan. According to a survey, nearly one quarter (21.8%) of elderly respondents had prior experience of using traceability QR codes in 2016. In addition, 78.1% of the respondents used the traceability QR codes when this study was investigating. This study employed a paper survey because the elderly study participants all had experience of using traceability QR codes and a paper survey w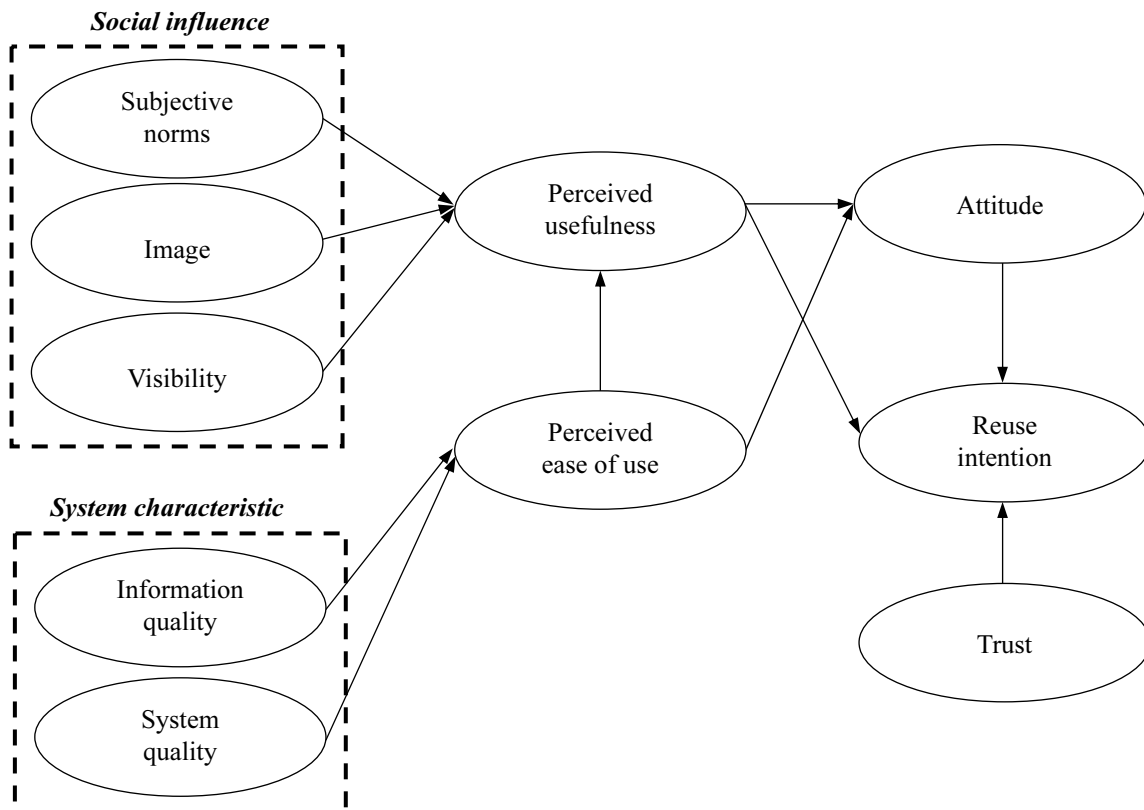as more suitable for targeting those respondents. The paper questionnaires were distributed on a market survey from March 15 to May 5, 2016, and recruited volunteers to join this survey from senior citizens learning camp and community college in Taipei City. This study recruited the respondents who are voluntary or have prior experience of using traceability QR codes. If respondents do not have prior experience of using traceability QR codes, this study provided the traceability QR codes of product, and they attempt and learn the traceability QR codes before they respond the paper questionnaires.

To control for product effects across the product categories of traceability QR codes, this study selected agricultural products because most traceability QR codes are connected with agricultural products. For target respondents with no prior experience of using traceability QR codes, this study offered a code and product image for use on the survey questionnaire. A total of 400 usable responses were obtained. The statistical results show that 234 of the respondents were women (58.5%) and 166 were men (41.5%). The respondents were all aged 50-90 years and the average age was 57.61 years. Regarding purchase experience, 59% of the respondents had prior experience of purchasing agricultural products by using traceability QR codes.

Measurements

This study used questionnaires and based the measurement items on an extensive review of related studies to ensure content validity, as well as using items from the original scale. Subjective norms were adopted from the 3-item scale in Kim et al. (2009). Image and visibility were measured using the 5-item scale in Moore and Benbasat (1991). System quality and information quality were measured using two 4-item scales developed by Lin (2007). PU, PEOU, attitude, and reuse intention were measured using the four 3-item scales in Wang and Chou (2014). Trust was measured using the 7-item scale in Gefen et al. (2003b). All items were measured using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree).

Data Analysis and Results

This study investigated the influence of social influence and system characteristics on PU and PEOU of TAFT system. This study also examined the effects of PU and PEOU on attitudes and reuse intention, and employed CFA and SEM to test the hypotheses. Before performing structural equation modeling (SEM), the samples were assumed to follow a multivariate normal distribution without multicollinearity. Kurtosis and skewness values were checked to ascertain whether the data were distributed normally and avoid influencing the model estimation and test results. Hair, Black, Babin, Anderson, and Tatham (2006) proposed that a significant departure from normal distribution occurs when the skewness and kurtosis values fall outside the range of -1 to +1. In this study, skewness was between -0.95 and 0.13 and kurtosis was between -0.91 and 0.97, both within the acceptable ranges of the skewness and kurtosis indices, thereby signifying that the samples were normally distributed.

Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was conducted on the 39 items to determine whether the measurement variables accurately reflected the hypothesized latent variables (Table 1 and Table 2). An advantage of CFA is its ability to evaluate the construct validity of a proposed measurement theory (Hair et al., 2006). Construct validity is an experimental demonstration to show that measurement items are measuring the theoretical constructs they claim to be measuring. Construct validity includes convergent and discriminant validity. Hair et al. (2006) indicated that convergent validity also includes "individual item reliability," "composite reliability (CR)," and "average variance extracted (AVE)."

Table 1

Internal Reliability and Convergent Validity Test Results

Constructs and measurement items	Cronbach's α	λ	CR	AVE
Subjective norms				
1. People who are important to you think you should use the production and marketing traceability system	0.97	0.90		
2. People who influence your behavior think you should use the production and marketing traceability system	0.97	0.92	0.93	0.82
3. People whose opinions you value approve of your usage of the production and marketing traceability system	0.97	0.90		
Image				
4. Using the production and marketing traceability system improves your image in your social circle	0.97	0.85		
5. Because you use the production and marketing traceability system, others in your social circle view you as a more valuable member	0.97	0.89		
6. No one else in your social circle is reputable for using the production and marketing traceability system like you are	0.97	0.83	0.93	0.74
7. People who use the production and marketing traceability system have a higher image in your social circle	0.97	0.87		
8. Using of the production and marketing traceability system is a symbol of your status in your social circle	0.97	0.86		
Visibility				
9. You see many people around you using the production and marketing traceability system	0.97	0.91		
10. You see many people in your social circle using the production and marketing traceability system	0.97	0.93		
11. You see people outside your social circle using the production and marketing traceability system	0.97	0.77	0.89	0.68
12. It is easy for you to observe that people around you are using the production and marketing traceability system	0.97	0.67		
System quality				
13. You believe that the production and marketing traceability system is trustworthy	0.97	0.78		
14. You believe that the production and marketing traceability system enables you to easily access information	0.97	0.86		
15. You believe that the production and marketing traceability system can rapidly respond to your needs	0.97	0.90	0.91	0.72
16. You believe that the production and marketing traceability system meets a variety of your needs	0.97	0.86		

(continued)

Table 1

Internal Reliability and Convergent Validity Test Results (continued)

Constructs and measurement items	Cronbach's α	λ	CR	AVE
Information quality				
17. You believe that the information in the production and marketing traceability system is accurate	0.97	0.84		
18. You believe that the production and marketing traceability system provides you with complete information	0.97	0.87		
19. You believe that the information in the production and marketing traceability system is always delivered in a timely manner	0.97	0.81	0.90	0.70
20. You believe that the information in the production and marketing traceability system is presented satisfactorily	0.97	0.82		
PU				
21. You believe that the production and marketing traceability system increases your shopping performance	0.97	0.92		
22. You believe that the production and marketing traceability system is useful to you	0.97	0.87	0.92	0.80
23. You believe that using the production and marketing traceability system enhances your shopping effectiveness	0.97	0.89		
PEOU				
24. You believe that learning how to use the production and marketing traceability system is easy	0.97	0.82		
25. You believe that the production and marketing traceability system provides a friendly human–computer interaction interface	0.97	0.85	0.86	0.67
26. You can easily find the information you need by using the production and marketing traceability system	0.97	0.78		

(continued)

Table 1

Internal Reliability and Convergent Validity Test Results (continued)

Constructs and measurement items	Cronbach's α	λ	CR	AVE
Trust				
27. Based on your experience of using the production and marketing traceability system, you know that the system is trustworthy	0.97	0.77		
28. Based on your experience of using the production and marketing traceability system, you know that the system was designed out of concern for customers	0.97	0.76		
29. Based on your experience of using the production and marketing traceability system, you know that the system is not designed for opportunistic behavior	0.97	0.79		
30. Based on your experience of using the production and marketing traceability system, you know that the system provides a satisfactory service	0.97	0.88	0.94	0.69
31. Based on your experience of using the production and marketing traceability system, you know that the system is stable	0.97	0.89		
32. Based on your experience of using the production and marketing traceability system, you know that the system is reliable	0.97	0.90		
33. Based on your experience of using the production and marketing traceability system, you know that the system adjusts information according to market demand	0.97	0.79		
Attitude				
34. You believe that using the production and marketing traceability system is a good idea	0.97	0.88		
35. You believe that using the production and marketing traceability system is beneficial for you	0.97	0.91	0.93	0.81
36. You are positive about using the production and marketing traceability system	0.97	0.91		
Reuse intention				
37. You intend to continue using the production and marketing traceability system to search for product information in the future	0.97	0.91		
38. You want to continue using the production and marketing traceability system to search for product information in the future	0.97	0.98	0.96	0.88
39. You plan to continue using the production and marketing traceability system to search for product information in the future	0.97	0.92		

Table 2

Correlations Among Latent Variables

	RI	AT	TR	PEOU	PU	IQ	SQ	VI	IM	SN
Reuse intention	1.00									
Attitude	0.84	1.00								
Trust	0.77	0.81	1.00							
Perceived ease of use	0.74	0.76	0.80	1.00						
Perceived usefulness	0.68	0.69	0.68	0.73	1.00					
Information quality	0.65	0.72	0.85	0.82	0.80	1.00				
System quality	0.67	0.74	0.77	0.84	0.78	0.89	1.00			
Visibility	0.45	0.34	0.49	0.49	0.44	0.43	0.38	1.00		
Image	0.55	0.44	0.49	0.50	0.53	0.49	0.46	0.59	1.00	
Subject norm	0.62	0.59	0.56	0.57	0.52	0.51	0.55	0.54	0.72	1.00

Note. RI = Reuse intention; AT = Attitude; TR = Trust; PEOU = Perceived ease of use; PU = Perceived usefulness; IQ = Information quality; SQ = System quality; VI = Visibility; IM = Image; SN = Subject norm.

Model Fit Assessment and Results

This study employed SEM to test the hypothesized model. The fit indices indicated that the hypothesized model fit the data well (Tsai, Cheng, & Chen, 2011). The present study adopted the absolute-fit measure to assess how closely the theory in Hair et al. (2006) fit the sample data. The chi-square to degrees of freedom ratio, goodness of fit index (GFI), adjusted GFI (AGFI), and root mean square error of approximation (RMSEA) were used to test the model. The results obtained using the conceptual model indicated that the model fit the data well with chi-square (2138.412) to degrees of freedom ratio = 764, GFI = 0.79, AGFI = 0.76, and RMSEA = 0.07. All fit measures and indices in this study were above the acceptable benchmarks, thereby indicating excellent model fit. Table 1 shows the results of internal reliability and convergent validity test, and Table 2 shows correlations among latent variables.

Table 3 shows the results of hypothesis testing. Subjective norms ($p < .001$), image ($p < .001$), visibility, and PEOU ($p < .001$) significantly affect PU, indicating that H1, H2, H3, and H6 were supported. Information quality ($p < .001$) and system quality ($p < .001$) significantly affect PEOU, indicating that H4 and H5 were supported. PU ($p < .001$), PEOU ($p < .001$), and trust ($p < .001$) significantly affect attitude, indicating that H7, H8, and H11 were supported. Finally, PU ($p < .001$) and attitude ($p < .001$) significantly affect reuse intention, indicating that H9 and H10 were supported. The figure 2 shows the path analysis of this study.

Table 3

Research Findings

Hypothesis	Path coefficients	*t*
H1: SN→PU	0.48	10.96***
H2: IM→PU	0.49	11.26***
H3: VI→PU	0.41	9.07***
H4: IQ→PEOU	0.73	21.01***
H5: SQ→PEOU	0.74	22.22***
H6: PEOU→PU	0.65	17.12***
H7: PU→AT	0.64	16.59***
H8: PEOU→AT	0.68	18.23***
H9: PU→RI	0.64	16.60***
H10: AT→RI	0.80	26.24***
H11: TR→AT	0.76	23.26***

Note. SN = Subjective norms; IM = Image; VI = Visibility; SQ = System quality; IQ = Information quality; PU = Perceived usefulness; PEOU = Perceived ease of use; TR = Trust; AT = Attitude; RI = Reuse intention.
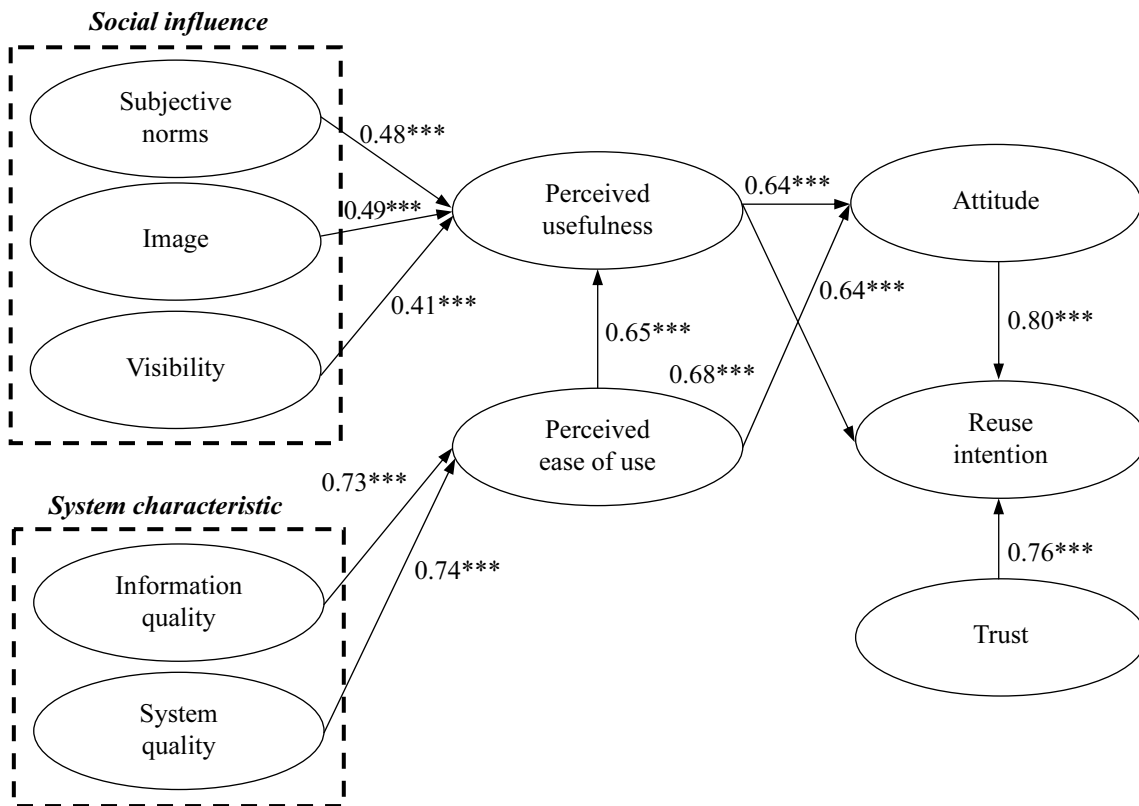***$p < .001$.

Figure 2. The Path Analysis of This Study
***$p < .001$.

Discussion

Because of Taiwan's implementation of the production and marketing traceability system for agricultural products, numerous producers have used the system to disclose overall processes from production to harvest. Today, in the information age, people and information are inseparable, which is a crucial indicator for assisting decision-making. Information is essential for the monitoring, recording, and tracking of food production processes and consumers can make decisions in advance based on information.

Davis (1986) modified the TAM to develop a powerful and parsimonious model (Yousafzai et al., 2007a, 2007b, 2010). The TAM has been used extensively to investigate various issues related to IT (Bigné-Alcañiz et al., 2008; Huang et al., 2007; Kim & Garrison, 2009; Lanseng & Andreassen, 2007; McKechnie et al., 2006; Read et al., 2011; Shin & Kim, 2008; Tong, 2010; Wang & Chou, 2014; Yousafzai et al., 2010). However, the previous have not taken the social influence and system characteristic into the TAM. In addition, most of the previous studies have employed the young or middle-aged consumers with experience of using the system in the TAM. Furthermore, trust refers to the belief that other people will react in predictable manners. Trust is a belief that one may rely on promises made by others (Kim et al., 2009; Pavlou, 2003). In e-commerce, eTrust refers to "a general belief in an online seller that results in BI" (Gefen, 2000), combining trustworthiness, integrity, and benevolence, all of which increase BI through reduced risk among inexperienced consumers (Jarvenpaa et al., 1999; Kim et al., 2009). However, the prior studies have not explored the trust of elderly consumers in e-commerce, thus, the study took trust into the TAM and explored the trust in the TAM.

This study explored whether social influence and system characteristics affect consumer perceptions of the agricultural traceability system or trust, attitude, or reuse intention among elderly people. In addition, this study investigated the effects of social influence factors (subjective norms, image, and visibility) and system factors (system quality and information quality) on the PU and PEOU of and trust in the system, as well as the consequences of consumer attitudes and reuse intention. The results confirm the effects of PEOU on PU; PU and PEOU on trust and attitude; and trust, PU, and attitude on reuse intention, all of which are considered in the TAM and mentioned in previous studies. Furthermore, the results show that subjective influence and information quality positively affect PU. These results are supported by previous studies.

The results presented in this paper have academic and practical implications. Regarding

academic implications, the major contribution of this study is the incorporation of social influence and trust into the TAM, neither of which had been explored in previous studies. The present study hypothesized that the degree of trust in a website among consumers is usually affected by society; in particular, friends and family members affect users' trust in websites. Thus, the present study included trust in the discussion. In addition, previous studies on the production and marketing traceability system have focused mainly on farmers' ability to use the production and marketing traceability system without difficulty, the effect of the interface design on producers' usage behavior, and various behavioral aspects. In the past, internet users in Taiwan are mostly young adults and middle-aged people. Older adults are statistically less likely to use the Internet or information media. However, because of the continuous development of IT, Internet usage among older adults is gradually increasing and becoming more mainstream. In addition, because of the aging population in Taiwan, older adults are increasingly, and they concerned about health. Health is directly related to the products they eat. Production and marketing traceability maintains the safety of agricultural products eaten by consumers. Accordingly, it is necessary to explore elderly's behavior on the internet use.

Most of the consumers analyzed in previous studies were young or middle-aged consumers with experience of using the traceability system; few studies have investigated system usage among elderly people. The present study focused on elderly people and analyzed social capital-related studies on elderly people to verify that such people can strengthen their social capital through healthy active aging activities. Elderly people are further affected by partner groups that drive their social activity, from which they accept and strengthen their ability to search for information using the production and marketing traceability system through partnership trust. In addition, for elderly people, diet and nutrition facilitate the maintenance of physical and mental health, slow aging, treat and prevent chronic diseases, and improve quality of life. Therefore, compared with other groups, the information application and knowledge sharing made possible by the traceability system is essential for elderly people.

Regarding practical implications, the following suggestions are provided for policymakers and education practitioners. Training courses to teach older adults how to use technological innovations and applications are necessary because such knowledge can strengthen social networks and the learning behaviors of older adults' partner groups, thereby increasing their degree of acceptance for innovative technology and knowledge sharing (Blažun, Saranto, & Rissanen, 2012; Chen, 2014). Education about diet and agriculture related to production and marketing traceability is included in the relevant topics of health and consumption education for older adults and its depth and breadth are

enhanced by adequate curriculum planning, teaching designs, development of teaching materials, and information sharing (such as handbooks for older consumers) (Akudugu, Guo, & Dadzie, 2012). Information communication with older adults and operational strategies for social learning topics should focus on experiential learning, through which older adults' true perceptions are enhanced through practice and their acceptance of new knowledge and enhancement of life skills are further achieved through rational cognition, emotional integration, and behavioral changes in relation to new skills (Chen & Schulz, 2016). Most older adults still purchase agricultural products at physical stores or markets. Elderly people are advised to pay attention to health information and food safety as they age further. The production and marketing traceability system can assist elderly consumers in understanding information regarding the production processes and management of agricultural products, thereby increasing their trust in agricultural products through open and transparent information. Therefore, the agricultural industry and its distributors can enhance trust among older adults through the production and marketing traceability system, which not only offers more transparent health information for older adults but also increases agricultural product sales.

Limitations and Future Research

Although this study contributes to consumer research, it has several limitations. Therefore, this paper offers recommendations for future research based on these limitations. First, this study collected data from Taiwanese, and the results may not be sufficiently generalizable because of cultural differences. For example, form the perspective of social psychology, social influences may not have an identical effect between the Western and Easterners, because Westerners are typically more individualistic than Easterners. Thus, in the future research, this study suggests that sample selections could collect Western and Easterners, and compares whether cultural differences could affect the PU, PEOU, attitudes, and reuse intention. Second, the current production and marketing traceability system is not familiar to Taiwanese consumers because TAP prices are higher than those of general agricultural products. Therefore, consumers are inclined to choose cheaper agricultural products, and thus less customers are inclined to use the traceability system. Thus, they are not highly familiar with the traceability system. The future study may employed familiarity of production and marketing traceability system as covariates, and exploring whether different levels of familiarity will influence consumers' subsequent behaviors. Third, despite the samples being collected from Taiwanese consumers, the collected sample data cannot represent all consumers because of regional and cultural differences. Thus, future studies should consider cultural differences

from different regions, because Westerners are typically more individualistic than Easterners, and exists different thinking. Fourth, this study investigated behaviors among older adults toward using the TAFT website. Future studies should include consumers from other age groups to highlight age-related differences. Finally, this study explored reuse behavior as the targeted outcome variable, because this study expected to investigate whether consumers use traceability QR codes when they purchased the TAPs. However, it is difficult to investigate reuse behavior in a couple of months for each respondent. Future studies should explore actual reuse behavior of traceability QR codes when they purchase the TAPs in a couple of months for each respondent.

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社會影響與系統特性對高齡者再次使用產銷履歷系統意願的影響—— 信任、態度與科技接受模型之整合

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企業輔導部

摘要

　　本研究主要聚焦於當高齡者使用臺灣農產品安全追溯資訊網時，社會影響與系統特性對其知覺有用性與知覺易用性的影響；本研究更進一步探討消費者的知覺有用性與知覺易用性對消費態度與再次使用意願的影響。本研究針對高齡消費者發放紙本問卷，有效回收400份的問卷，並透過驗證式因素分析與結構方程式進行分析。研究結果顯示，樣本平均年齡為57.61歲，受測者有21.8%曾經使用過產銷履歷系統，有59%曾經購買過產銷履歷產品。研究結果發現高齡消費者的主觀規範、形象、能見度會影響其知覺有用性；而臺灣農產品安全追溯資訊網的資訊品質與系統品質會影響消費者的知覺易用性。另外，本研究也發現，對產銷履歷農產品制度的信任會正向影響消費者的再次使用意願。本研究提出實務建議，未來針對高齡者的科技創新及應用之接受度之培力訓練課程是必要的，因為高齡者可以藉此強化其友伴團體的社交網絡和學習行為，對其接受創新科技與新知分享會有增強作用；在高齡者健康教育與高齡消費者教育的相關議題中融入與產銷履歷的食農教育，在課程規劃、教學設計、教材研發，甚至資訊分享（如高齡消費者手冊）方面強化其深度與廣度；與高齡者的資訊溝通與社會學習議題之操作策略應該著重在體驗學習，藉由體驗學習，帶動高齡者在實作中的真實感受，藉由理性認知、情感融入及技能之行為改變，更進一步達成其接受新知與提升生活知能的效果。