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Determinants of self-service technology adoption

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With the tremendous growth of self-service technologies (SSTs) in many industries, SSTs in the context of service provision are recognized as more effective and important technologies to minimize investment costs and maximizes service quality. By means of reviewing and integrating literature in several fields, the present paper attempted to provide an understanding of this relationship in terms of the links between SST characteristics (perceived risk, perceived ease of use, and perceived usefulness), consumer technology readiness, social pressures (coercive, normative, and mimetic), and SST adoption. Eight hypotheses from a conceptual model developed to predict and explain consumer intentions towards SST usage were tested through data collection from senior undergraduate and graduate students majoring business as respondents. Through structural equation modeling (SEM), findings indicated that SST characteristics, consumer technology readiness, social pressures were crucial determinants of SST adoption. Besides the empirical confirmation of the hypotheses given, finally, there were several practical implications for service marketers and future research directions for scholars.

Key words: Self-service technologies (SSTs), self-service technologies characteristics, technology readiness, social pressures, self-service technologies adoption.

INTRODUCTION

Self-service technologies (SSTs) have been prevalently applied in many industries, including airline, banking, travel, hotel, financial, and retailing since the automated teller machines (ATMs) were introduced several decades ago. Today, not only can these SSTs provide a variety of self-services, including automated hotel checkout, flight ticket checkouts at kiosks or online, internet shopping, paying bills online, banking via ATMs, and self-scanning checkouts at grocery or discount stores, to consumers (Bitner et al., 2002; Elliott et al., 2008), but can also produce the tremendous economic value (Burrows, 2001). For example, the dollar value of self-checkout transactions in North America was from \$525 billion in 2007 to around \$1.3 trillion in 2011 (Lee and Greg, 2011).

Self-service technologies (SSTs) refer to technological

interfaces enabling consumers to become service co-producers rather than only service receivers (Meuter et al., 2005). Not only do SSTs shift a traditional service pattern that completely separates production and consumption, but also change the role and the behavior of consumers. For companies, not only can SSTs enhance competitiveness of organizations (Bitner, 2001; Cunningham et al., 2009; Meuter et al., 2000; Messinger et al., 2009), but can also more effectively and importantly minimize costs, and provide better, more efficient, customized services (Burrows, 2001; Cheng et al., 2006; Weijters et al., 2007).

Like companies, consumers can also obtain benefits from SSTs, including employee mood avoidance, service demand fluctuation, time and money savings, reduction in dependency on time and location, quick responses to complaints, a more consistent service, and without human employee contact (Cheng et al., 2006; Weijters et al., 2007).

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As previously described, SSTs can provide benefits to companies and consumers, but there is a great challenge of overcoming the resistance to SST adoption in handling transactions between service providers and consumers (Cunningham et al., 2009; Gerrard et al., 2006), because shifting existing habits and a traditional service pattern of consumers results in the most prominent obstacle getting consumers to adopt SSTs for the first time (Elliott et al., 2008; Meuter et al., 2005).

Based on the technology acceptance model (TAM) by Davis (1989), perceived ease of use and perceived usefulness are identified as significantly influencing intentions of technology users. This is because the easier and the more useful a technology, the higher the degree to which this technology is accepted (Davis, 1989; Davis et al., 1989). However, the two determinants insufficiently lead consumers to adopt SSTs, because of involving in information privacy and security of consumers (Featherman et al., 2010; Meuter et al., 2005).

During the process of self-checkout transactions, for example, consumers need to list individual sensitive information (for example, credit card number, social security number, telephone number, and addresses) on the Websites or at kiosks. Therefore, SST adoption involves in safety issues (Featherman et al., 2010; Laukkanen et al., 2008).

Research on SSTs indicates that Asian consumers are less likely to use internet banking, due to lack of adequate security and privacy (Elliott et al., 2008). Therefore, a deeper understanding of the possible relationship between SST characteristics and SST adoption is needed.

In the technology context, TAM was originally developed to predict and explain the technology-adopting behavior of individuals at work environment, but TAM is unable to fully predict the intended technology-usage of individuals in marketing settings (Lin et al., 2007). This is because individuals in marketing settings are not mandated to use a technology by organizational objectives and may be freer to select numerous available alternatives. That is, only functional and technical issues cannot explicitly explain consumer SST acceptance (Laukkanen et al., 2008).

To fully explain SST adoption of consumers in marketing settings, consumer propensity to use SSTs should be addressed (Lin et al., 2007; Matthing et al., 2006; Parasuraman, 2000; Parasuraman and Colby, 2001; Xu, 2007). Among many models, technology readiness (TR) by Parasuraman (2000) appears to be the most widely cited to explain consumer propensity to accept technology-based products or services. Consequently, the present study attempts to explain consumer intentions towards SST adoption through TR.

Finally, the social contagion theory addresses the important role of social pressures in influencing innovation usage. This is because individuals exposing to their social environment more likely develop their beliefs,

attitudes, and behaviors consistent with those of their social environment (Shi et al., 2008).

The institutional theory also indicates that individuals in a social network consciously or unconsciously take an action due to social pressures. Therefore, social pressures playing an essential role in influencing SST adoption should be addressed. However, relatively few studies have contributed to social pressures in SST adoption (Shi et al., 2008). To fill this gap, therefore, the study applies the institutional theory to posit that coercive, normative and mimetic social forces are also significant determinants of SST adoption.

As discussed previously, the purpose of this study is to empirically test and validate the model (Figure 1) of consumer SST adoption for based on the combination of SST characteristics (perceived risk, perceived ease of use, and perceived usefulness), consumer TR, and three social pressures (coercive, normative, and mimetic forces). Subsequently, the study reviews the integrated model and develops hypotheses from it. The structure equation modeling (SEM) is used to test the model, and then empirical findings are explained. Implications for research and practice are also discussed and further expected to lead service providers to strategy formulation and marketing policy decisions for SST design and introduction. Finally, limitations and future research in this study are provided.

LITERATURE REVIEW

Self-service technologies (SSTs) characteristics

Technology acceptance of an individual is hypothetically determined by his or her voluntary intentions towards adopting a technology (Davis, 1989; Davis et al., 1989). Failure to provide motivating factors of adoption to users will result in technology resistance (Davis et al., 1989; Ellen et al., 1991; Ram and Sheth, 1989). Evidence evinces that consumer resistance to an innovation is caused by functional and psychological barriers (Ram and Sheth, 1989). Not only are functional barriers linked to innovation characteristics, but are also categorized into the risk barrier, the value barrier, and the usage barrier (Laukkanen et al., 2008; Ram and Sheth, 1989). Moreover, the risk barrier is related to consumer perceived risk, while the value barrier and the usage barrier are related to perceived usefulness and perceived ease of use, respectively (Ram and Sheth, 1989).

Perceived risk

In order to avoid identity theft and the selling of transmitting personal confidential information (for example, credit card number), personal awareness of risk discourages an individual from SST acceptance (Chiu et

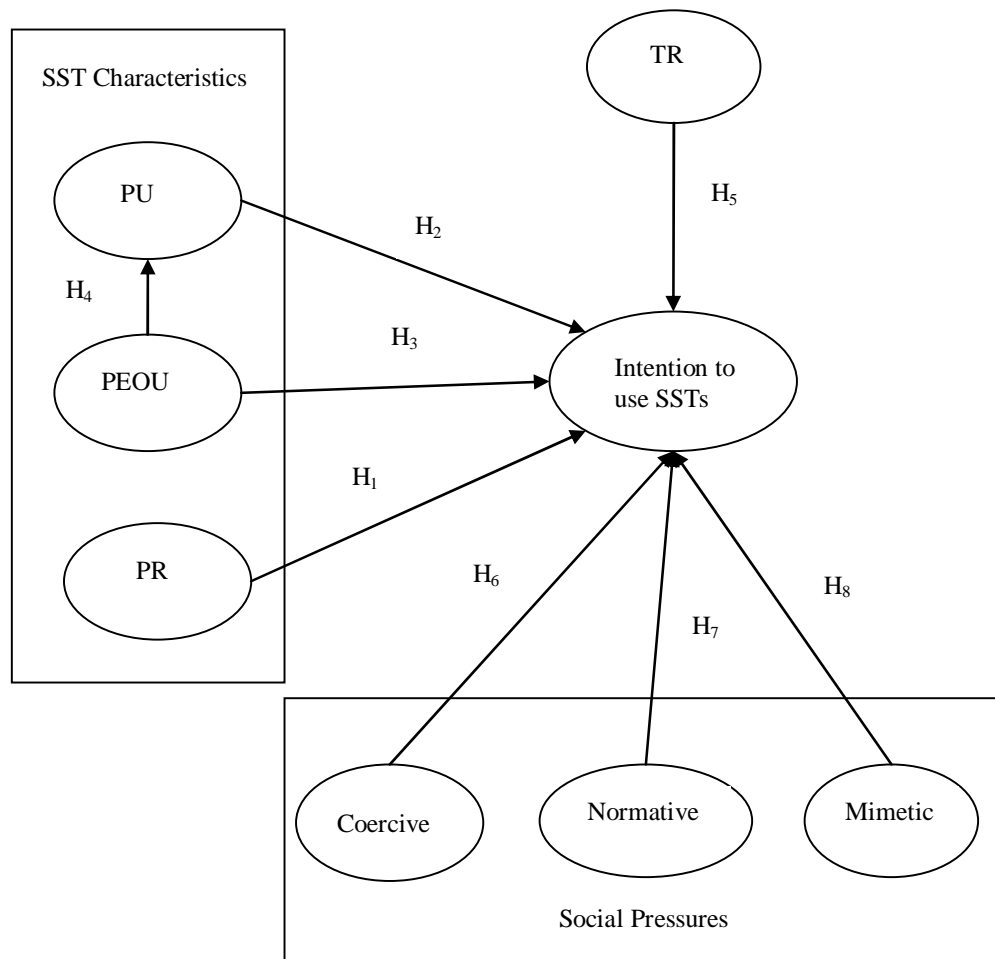


Figure 1. The conceptual model.

al., 2005; Elliott et al., 2008; Janda et al., 2002; Laukkanen et al., 2008; McKechnie et al., 2006; Roy et al., 2001; Salisbury et al., 2001). Therefore, individual perception of risk is one of key determinants in SST adoption (Laukkanen et al., 2008; Meuter et al., 2005; Mitchell, 1999).

Perceived risk (PR) is defined as the overall amount of uncertainty perceived by a consumer in a particular purchase situation (Pavlou, 2003). Under uncertain or ambiguous circumstances, PR will evoke psychological anxiety and may negatively affect consumer decision-making process (Featherman et al., 2010; Ranaweera et al., 2008; Taylor, 1974). Substantial evidence also illustrates that PR leads consumers to create an unwillingness to adopt online service transactions (Featherman et al., 2010; Laukkanen et al., 2008), because of threatened feelings and anxiety, and an increase in psychological and learning costs (Ellen et al., 1991; Stone and Grønhaug, 1993).

In the context of SST adoption, lacking face-to-face interactions or unfamiliarity with characteristics of a SST

leads consumers to increase risk perceptions and further reduce motivation and the likelihood of SST trial (Elliott et al., 2008; Ram and Sheth, 1989). Therefore, we hypothesize:

H₁: Perceived risk will negatively impact consumer intention towards SST adoption.

Perceived usefulness

In the context of SST adoption, perceived usefulness (PU) refers to an individual's subjective awareness of using a technology will not only increase job related productivity, performance, effectiveness, or profitability, but also reach time and money savings and eventually enhance living quality (Davis, 1989; Davis et al., 1989; Lu et al., 2003; Wu and Wang, 2005).

Previous empirical studies indicate that a considerable increase in job performance from technology usage leads an individual at the workplace to lean towards accepting

a technology. Similarly, if a SST in market settings offers superior performance-to-price compared to alternative, it is worthwhile for consumers to change their ways performing tasks (Laukkanen et al., 2008). However, the impact of PU on SST usage must be replicated and reconfirmed in this model. Therefore, the hypothesis is framed as follows:

H₂: Perceived usefulness will positively impact consumer intention towards SST adoption.

Perceived ease of use

Perceived ease of use (PEOU) refers to an individual's subjective awareness of using a technology or system will be free from effort (Davis, 1989). Earlier research on technology acceptance suggests that PEOU is commonly identified as a key determinant in the successful introduction of a technology (Davis et al., 1989; Lin et al., 2007; Lu et al., 2003; Moore and Benbasat, 1991; Wu and Wang, 2005). Lacking ease-of-use of an innovation or increasing the complexity of usage interface results in individual resistance to this innovation (Moore and Benbasat, 1991; Ram and Sheth, 1989; Wu and Wang, 2005).

In the context of SST usage, PEOU is also a potential catalyst to increasing the likelihood of SST usage (Wang et al., 2003). However, a complicated, inconvenient, and difficult SST is perceived to discourage consumers from adopting the SST (Gerrard et al., 2006; Laukkanen et al., 2008; Meuter et al., 2005). Therefore, we hypothesize:

H₃: Perceived ease of use will positively influence consumer intention towards SST adoption.

Prior studies also suggest that PEOU have an indirect effect on intention via PU (Davis et al., 1989; Lin et al., 2007; Lu et al., 2003; Moore and Benbasat, 1991; Wu and Wang, 2005). This is because the easier a technology is to use, the more useful it can be and the higher the degree of adopting it (Davis et al., 1989). Based on the ease-of-use of a SST probably leading the benefits (usefulness and value of the SST) to consumers, the hypothesis is framed as follows:

H₄: Perceived ease of use will have a positive impact on perceived usefulness.

Consumer propensity towards SST usage

Technology readiness

The technology readiness index (TRI) by Parasurman (2000) is a multifaceted framework adopted to describe differences in consumer beliefs about technology in

general (Parasurman and Colby, 2001). Different personal traits will lead to different individuals' beliefs about various aspects of technology acceptance (Matthing et al., 2006; Walczuch et al., 2007; Xu, 2007). Not only is technology readiness (TR) defined as "people's propensity to embrace and use new technologies for accomplishing goals in home life and at work" (Parasuraman, 2000: 308), but is also viewed as an overall state of mind resulting from a gestalt of mental enablers and inhibitors that collectively determine a person's predisposition to use new technologies.

Based on personal openness to technology, TR construct comprises four sub-dimensions, including optimism, innovativeness, discomfort, and insecurity. Optimism refers to a positive view of technology and a belief in increased control, flexibility, and efficiency in home life and at work due to technology, whereas innovativeness is a tendency to be a technology leader.

Discomfort is a perception of lacking control over technology and a feeling of being overwhelmed by it, whereas insecurity involves in distrusting technology and skepticism about its ability to work properly. In the context of technology usage, therefore, optimism and innovativeness are drivers, while discomfort and insecurity are inhibitors (Lin et al., 2007; Parasurman, 2000; Parasurman and Colby, 2001; Walczuch et al., 2007).

Prior empirical studies on technology-based services suggest that individuals with higher TRI are more likely to accept and adopt SSTs, while ones with lower TRI are less likely to do so (Elliott et al., 2008; Lin et al., 2007; Ranaweera et al., 2008; Parasurman, 2000; Theotokis et al., 2008; Sophonthummapharn and Tesar, 2007; Walczuch et al., 2007). However, results of the study by Lin et al. (2007) reveal that TR has no direct impact on intentions towards using a specific e-service. To bridge this gap, therefore, the next hypothesis is framed as follows:

H₅: Consumers' technology readiness propensities will have a positive impact on their intentions towards SST adoption.

Social pressures

Based on the social contagion theory, beliefs, attitudes, and behaviors of social actors (for example, individuals, groups, and organizations) are consistent with those of other actors (for example, family and peers for individuals, customers, suppliers, partners, and competitors for companies). This is because social actors always incline to share similar notions with other actors surrounding them and further develop direct social networks (Burt, 1987).

When facing pressures, especially, social actors will conform whether their shared notions, attitudes, and

behaviors are compatible with those of other actors (Burt, 1987). Three social pressures (coercive, normative, and mimetic) originated from the institutional theory attending to the deeper and more resilient aspects of social structure (DiMaggio and Powell, 1983). Not only can the institutional theory posit that various networks and interactions built up in institutions shape beliefs, attitudes, and behaviors of social actors, but can also address that social ties (for example, networks and interactions) play a pivotal role in explaining social actors' attitudes and behaviors toward innovation adoption (Scott, 2005).

A number of studies have addressed the institutional theory at the organizational level, but relatively little research has contributed to the individual level (Shi et al., 2008). In essence, Cooley (1909) argues that early institutional theory and analyses in economics field were applied at the individual level. This is because "the individual is always cause as well as effect of the institution" and "in the individual the institutions exist as habit of mind and of action" (Cooley, 1909: 314). Research on the technology acceptance also suggests that the institutional theory can explain and predict consumer intentions towards technology usage (Shi et al., 2008).

Coercive pressures

Coercive pressures are defined as formal or informal pressures to make social actors comply with the requested attitudes, behaviors, and practices, due to feeling pressured to do so by other more powerful actors in their social environment (DiMaggio and Powell, 1983).

On one hand, coercive pressures at the organizational level stemming from resource-dominant organizations, regulatory bodies, and parent corporations, are categorized into competition and regulation (Shi et al., 2008). Competitive pressures result from the threat of losing competitive advantage, whereas regulatory pressures arise from government agencies and professional regulatory bodies (Shi et al., 2008). Evidence illustrates the positive impact of coercive pressures from organizations on technology adoption (Mohamad and Ismail, 2009).

On the other hand, the impact of coercive pressures at the individual level on individual technology usage is unobvious. This is because individuals in marketing settings are not forced to use a technology by competitors, suppliers, government agencies, or professional regulatory bodies. However, consumers in marketing settings may still face coercive pressures from service provision and operating strategies (for example, minimizing costs and maximizing service quality) of companies to adopt SSTs. For example, banks ask their customers to fulfill some financial transactions (for example, mortgage and loan) through internet service (Shi et al., 2008).

Based on previous studies, therefore, we hypothesize:

H₆: Greater coercive pressures will positively influence consumers' intentions towards SST adoption.

Normative pressures

Unlike coercive pressures, normative pressures are defined as pressures to make social actors voluntarily, but not consciously, copy or imitate attitudes, behaviors, and practices representing the only way to do things (DiMaggio and Powell, 1983; Scott, 2005). Previous studies also suggests that social actors always unconsciously copy a certain action taken by a large number of other actors, because the action taken by most actors for a long time is taken for granted and legitimized (Liao et al., 2007; Shi et al., 2008). To be identified, individuals in the same social context come to believe that the action represents the only way to do so. This imitation is not coercive by any powerful actors (Shi et al., 2008).

In the context of SST adoption, empirical studies suggest that greater normative pressures lead to greater intended usage of a SST (Liao et al., 2007; Shi et al., 2008). To avoid dissonance and to comply expectations, normative pressures may lead individuals without SST usage to accept SSTs, when most people important to them think they should do so (Shi et al., 2008). Therefore, we hypothesize:

H₇: Greater normative pressures will positively influence consumers' intentions towards SST adoption.

Mimetic pressures

Mimetic pressures occur when social actors believe that only following or imitating actions taken by successful and high-status actors (for example, celebrities, politicians, and entrepreneurs) will yield positive outcomes (for example, reduction in research costs and experimentation costs, and avoidance of risks inherent from being the first-movers) (Shi et al., 2008). Moreover, individuals in an institutional environment are apt to seek behavioral patterns of successful and high-status people and then voluntarily, consciously copy or adopt the same actions taken by them, because individuals think this imitation will lead to their better performance (DiMaggio and Powell, 1983; Shi et al., 2008).

In the SST adoption context, however, findings of an empirical study by Shi et al. (2008) indicate that mimetic pressures have no impact on internet bank adoption. However, evidence of mimetic change in many studies examining adoption of new technology-based products and services illustrates that most consumers, especially for teenagers, adopt products or services endorsed by

Table 1. The β weight of multiple regression for the conception model.

Parameter	Model 1-1	Model 1-2
	Dependent variable	
	PU	Intention to use SSTs
PEOU	0.87***(13.642)	0.03* (0.205)
PU	--	0.45***(3.425)
PR	--	-0.13*(-2.038)
TR	--	0.11*(1.949)
Coercive	--	0.28***(5.078)
Normative	--	0.14*(2.413)
Mimetic	--	0.14*(2.512)

t-value in parentheses; * and *** significant at $p < 0.05$ and 0.001 , respectively.

celebrities (Hawkins et al., 2007). This is because individuals may imitate attitudes and behaviors of actors whom they adore. Based on previous discusses, therefore, we hypothesize:

H₈: Greater mimetic pressures will positively influence consumers' intentions towards SST adoption.

METHODOLOGY

Based on previous studies, SSTs involve a variety of self-services. As a consequence, the study narrows down self-services, including internet shopping, online transaction, and self-scanning checkouts at grocery or discount stores in order to validate the conceptual model (Figure 1). A 62-item questionnaire is employed to measure the constructs. Of the 62 items, eight items by David (1989) and Davis et al. (1989) are slightly reworded to measure perceived ease of use and perceived usefulness, whereas four items by Broekhuizen and Huizingh (2009) are slightly adapted to measure perceived risk. The full 36-item TRI scales by Parasuraman (2000) are employed to measure the four sub-dimensions of TR (that is, 10 items for optimism, 7 items for innovativeness, 10 items for discomfort, and 9 items for insecurity).

Nine items by Shi et al. (2008) are adapted to measure the three social pressures (that is, 3 items for normative, 3 items for coercive, and 3 items for mimetic). Five items for intention to use SST are adapted from David (1989). Furthermore, the 36 items for TRI are measured on 5-point Likert scales, while the other 26 items are measured on 7-point Likert scales. All items originally in English are translated into Chinese and back-translated into English to ensure equivalent meaning (Brislin, 1980). The questionnaire is also pilot-tested using undergraduate business students with SST experiences. The feedback from the pilot test is used to improve the readability and the questionnaire.

Data collection and sample characteristics

In this study, senior undergraduate and graduate students majoring in business are chosen as survey subjects according to several reasons. First, Im et al. (2003) point out that younger people are more receptive to new technologies. Second, the respondents are students, but they are considered as reasonable representatives of online shoppers, because of having business knowledge and being regular Web users (Gefen et al., 2003). Third, the use of a student-based sample has been proven useful, due to greater homogeneity leading to greater control over extraneous variables (Peterson,

2001).

Data collection is via a paper-based methodology. Before mailing 1000 questionnaires to the business colleges in the universities in the middle part of Taiwan, invitation letters are mailed to faculty and students in business colleges to explain the purpose of the study as well as solicit their cooperation. After one and half months of data collection, 300 questionnaires are returned. However, due to having 78 incomplete questionnaires, the final number of usable questionnaires is 218, for a response rate of 21.8%. Of the 218 participants, 129 (59.2%) are female and 89 (40.8%) are male. The average age and income of the 218 participants is 28.9 years and about NT 24,037.

DATA ANALYSIS AND RESULTS

Reliability of the instrument was assessed with Cronbach alpha. Results illustrated an alpha coefficient of 0.86 for PEOU, 0.89 for PU, 0.74 for PS, 0.84 for optimism, 0.70 for innovativeness, 0.74 for discomfort, 0.82 for insecurity, 0.70 for coercive, 0.86 for normative, 0.78 for mimetic, and 0.92 for intention to use. That is, the internal consistency and stability of the instrument was accepted (Nunnally, 1978). All subsequent data analyses were conducted through AMOS version 18.

To establish construct validity, convergent validity and discriminant validity were assessed through the confirmatory factor analysis (CFA) before examining the conceptual model. Results indicated an adequate model fit ($\chi^2 / df = 2.003$, $p = 0.85$, GFI = 0.98, AGFI = 0.92, RMSEA = 0.032). Convergent validity assesses the extent to which items designed to measure the same construct are related, while discriminant validity assesses the degree to which items designed to measure different constructs are related (Hair et al., 2006). It was found that standardized factor loadings of all items measuring the same constructs were over 0.70 and significantly related ($p < 0.001$). However, correlation values of all items measuring different constructs were significantly low and from 0.00 to 0.62. Therefore, convergent validity and discriminant validity were established (Hair et al., 2006).

Next, the conceptual model was assessed by examining the path coefficients (the β weight values in Table 1) and R^2 values. Path coefficients or the β weight

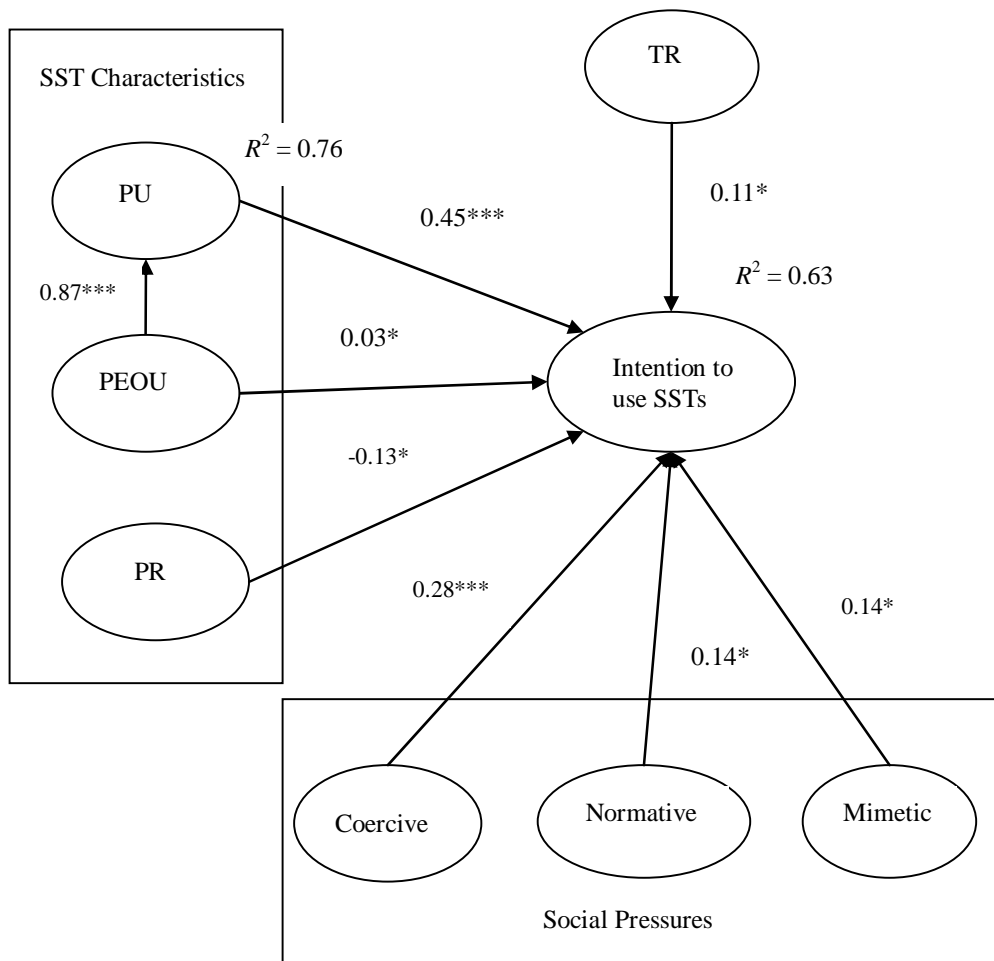


Figure 2. The β weight and R^2 values of multiple regression for the conceptual model (* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$).

values illustrate the strength of the relationships between independent variables and dependent variables, whereas the R^2 value indicate the amount of the variance predicted from the combination of the exogenous variables (Hair et al., 2006). All path coefficients and t -statistics for hypothesized relationships were calculated through maximum likelihood in AMOS. Results of hypothesis testing were presented in Figure 2.

AMOS output produced the following two questions, and all path coefficients in Figure 2 were statistically significant. On further examining the path coefficients, it was found that the β weight from PR to intended usage of SSTs ($\beta = -0.13$, $p < 0.05$) provided support for H_1 . H_2 and H_4 were supported due to significant coefficients to intention via PEOU and PU ($\beta = 0.87$ and 0.45 , respectively; $p < 0.001$). H_3 was also supported because of significant coefficients from PEOU to intention ($\beta = 0.03$, $p < 0.05$). The total effect of PEOU on intention was 0.42.

As shown in Figure 2, TR and three social pressures

(coercive, normative, and mimetic) significantly positively impacted intention to use SSTs ($\beta = 0.11$, $p < 0.05$; $\beta = 0.28$, $p < 0.001$; $\beta = 0.14$, $p < 0.05$; and $\beta = 0.14$, $p < 0.05$, respectively). Therefore, findings provided support for H_5 to H_8 . Moreover, not only did the R^2 values of 0.76 and 0.63 indicate 76.0% of the variance in PU and 63.0% in intention to use SSTs explained by the model, but also provided evidence in support of the conceptual model.

DISCUSSION AND CONCLUSIONS

This study examines the impact of determinants (SST characteristics, consumer propensity, and social pressures) on SST adoption by applying TAM, perceive risk theory, TRI, and institutional theory. The analysis results draw some conclusions. First, due to H_1 statistically supported ($\beta = -0.13^*$), the result provides evidence for the hypothesized negative impact of PR on intended usage of SSTs. That is, high PR may affect consumer

evaluations and usage of a SST.

Consumers with more perceptions of risk on SSTs psychically resist SST acceptance and adoption. This is because consumer assessments of risk perceptions on SSTs are higher than those of risk perceptions on traditional services. This study is consistent with studies by Featherman et al. (2010) and Roy et al. (2001). Second, evidence that H_2 to H_4 are supported reconfirms PU as a critical determinant of intention to use SSTs and PEOU with both a direct effect ($\beta = 0.03^*$) and an indirect effect through PU ($\beta = 0.39^{***}$) on intention to use SSTs. Especially, an indirect effect of PEOU through PU on SST usage is much stronger than a direct of PEOU on SST usage. This may be because consumers not just focus on ease-of-use of a SST, but they also pay more attention on usefulness or values (potential benefits) of the SST. This finding also validates TAM as relevant research model in the content of SST adoption. This finding also confirms the study by Lin et al. (2007). Third, the result of H_5 statistically supported ($\beta = 0.11^*$) illustrates that consumers with higher TR more likely predispose to SST adoption than ones with lower TR do so.

In the study by Lin et al. (2007), however, TR has no direct impact on SST usage. However, TR has an indirect effect through PEOU and PU on SST adoption. Therefore, the impact of TR on SST usage is still identified. Based on the results of H_6 to H_8 supported, fourth, it is evident that three social pressures are key determinants of SST adoption, even though mimetic pressures in the results by Shi et al. (2008) have no impact on intended usage of online banking service. These findings further shed light on that individuals in a social environment are always influenced by other social actors (peers, friends, family, and successful and high-status person). Based on 63.0% of the variance in intended usage of SSTs, finally, these determinants in the model can take account into consumer assessments of SST adoption.

Practical implications

SSTs recognized as one of technologies in service provision can not only provide cost reduction and service quality improvement for companies, but can also provide the afforded convenience and time savings for consumers. However, there is a great challenge of overcoming the resistance to SST adoption in handling transactions between service providers and consumers (Cunningham et al., 2009; Gerrard et al., 2006).

Analysis of the data in this study also provides practical implications for service providers. Featherman et al. (2010) further suggest that enhancing perceived corporate credibility and image of SST providers are able to lead consumers to reduce risk perceptions on SST usage. This is because consumers always believe that a good firm can make more efforts to deliver what

consumers need and want.

Second, TAM validated in this study identifies PEOU and PU as critical determinants of SST usage. Therefore, service providers have to simplify technological interfaces as well as provide a clearer and more readable manual for this SST usage to consumers. Moreover, SST providers should make more efforts to let consumers understand the potential benefits (perceived usefulness and values) from SST adoption because an indirect effect of PEOU through PU on intention to use SST is far stronger than a direct effect of PEOU on SST usage. For example, consumers can get in-depth understanding of benefits from SST usage through advertisement or training activities by SST providers.

As shown in Figure 2, third, TR can be considered as the critical psychological process of consumer assessments on SST adoption. It is recommended that SST providers should place more emphasis on individual indigenous differences by building "the psychographic profile" of their consumers (Lin et al., 2007: 652). Based on the combination of consumer readiness and system characteristics (PEOU and PU), SST providers can more effectively and efficiently segment their target consumers from markets and directly communicate with them.

Fourth, SST providers can take advantage of social pressures to make potential consumers jump onto the SST bandwagon (Shi et al., 2008). This can also shed light on why individuals with low TR always adopt an innovation due to social pressures. The significant impact of coercive on SST usage provides a suggestion that SST providers may offer services available or incentives (for example, promotion, coupon, and discount) only on the internet or the technological interfaces to their consumers.

Regarding normative pressures, SST providers can build a data base of SST users and then create normative expectations through the data (Shi et al., 2008). To be specific, research on subjective norm suggests that word-of-mouth among peers, family, and friends has the significant effect on consumer intentions towards SST adoption in the pre-consumption stage (Liao et al., 2007). SST providers also prompt loyalty of their consumers and further create new consumers through the word-of-mouth of old consumers. Due to the positive effect of mimetic pressures on SST adoption, it is recommended that the high profiles of SST users are able to influence SST usage of others with lower profiles. Through a mouthpiece of successful and high-status actors (e.g. celebrities, politicians, and entrepreneurs), therefore, not only can SST providers keep the current consumers, but can also entice potential consumers to jump onto the SST bandwagon.

As shown in Figure 2, finally, the findings illustrate that the effect of coercive on SST usage is stronger than the effect of normative and mimetic on SST usage. It is recommended that exerting coercive pressures are more efficient than exerting the two others.

LIMITATIONS AND DIRECTION OF FUTURE RESEARCH

The present study significantly contributes to rich insights of perceived risk, TAM and TR in service provision and the institutional theory at the individual level by proposing the combination of SST characteristics, consumer technology readiness, and the institutional theory to predict and explain consumer intentions towards SST adoption. However, there are several limitations in the study.

First, a lower response rate and the target sample involves only in university students, even though they are considered as accepted survey respondents in academic research. Therefore, findings and conclusions of the study may not be generalized for other user groups. That is, the external validity of the study is limited.

Second, due to having 62 items in the questionnaire and similarity in the content between items, respondents may be confused and lose their patience. Moreover, the fact that SSTs involve in a variety of technological interfaces (internet-based interfaces and non-internet-based interfaces) is unable to lead respondents to fully reflect their technology readiness.

Based on the identification of these limitations, this study also provides direction for future research. To validate generalization of the conceptual model, first, future studies may survey other users in different geographies and manage to increase a response rate. Because individuals have different TRI based on different technology-based products and services, second, future studies may focus on only one of SSTs in order to get in-depth understanding of consumer readiness.

Finally, prior studies illustrate that determinants leading consumers to adopt SSTs in the pre-consumption stage may not have the significant effect on consumer assessments of SST adoption in the post-consumption stage (Hawkins et al., 2007; Liao et al., 2007). To enhance robustness of the study, therefore, future studies may explore a richer set of variables to predict and explain consumer intended usage of SSTs in the post-consumption stage.

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