

# USER ACCEPTANCE OF SELF-SERVICE TECHNOLOGIES

## *An Integration of the Technology Acceptance Model and the Theory of Planned Behavior*

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**Abstract:** This study examines what may affect consumers' intention to use a self-service technology (SST). The objective of this study is to advance our understanding on the intention to use SSTs by comparing and integrating the theory of planned behaviour (TPB) and the technology acceptance model (TAM) as they relate to this issue. Data was collected from 280 adult consumers, and a structural equation modelling approach was employed to test the hypotheses. Although attitude, subjective norm, perceived usefulness have direct positive relationships to behavioural intention to use a SST, perceived behavioural control plays the most important role in explaining the intention to use SSTs. We conclude with managerial implications and directions for future research.

## 1 INTRODUCTION

With the growth of online services, consumers are replacing traditional face-to-face communications with e-services. The development of technology-based self-service formats (Dabholkar, 1994) allows consumers to perform services themselves quickly and conveniently. Self-service technologies (SSTs), such as online banking transactions, checking out of hotel rooms through interactive television screens, and using self-scanning systems at retail stores (Bobbitt and Dabholkar, 2001) are increasingly widespread and becoming an important component of marketing. From the perspective of customers, SSTs are extremely flexible and provide various benefits for consumers including increased consumer convenience, saving of money and time, increased perceived consumer control, and customization. On the other hand, encouraging the SST intention can save companies a lot of money in human resources and can free human resources for other kinds of services. Given these benefits, practitioners and researchers have attempted to

understand what may lead to more intentions of using SSTs.

Although past research has discussed SST usage (van Dijk, Minoch and Laing, 2007), less work has been done on applying a strong unifying theory to this form of service. This study first reviews well known theories and empirically tests three models: the theory of planned behavior (TPB) (Ajzen, 1985, 1991), the technology acceptance model (TAM) (Davis, 1986) and an integrated TPB/TAM model to explain consumers' acceptance of SST.

## 2 LITERATURE REVIEW

### 2.1 Self-Service Technology (SST)

Past consumer research has focused on discussing how the internet is used as a SST, and the adoption of e-commerce, or e-services, has been investigated in the context of the adoption of other SSTs, such as cash machines, voice-mail systems and airline

ticketing machines (van Dijk, Minoch and Laing, 2007). The literature on this topic explains that people are willing to use a SST if it matches their attitudes toward technology in general and towards technology-based self-service options in particular (Bobbitt and Dabholkar, 2001).

## 2.2 The Theory of Planned Behaviour (TPB)

According to the TPB, an individual's behaviour can be explained by his or her behavioural intention, which is influenced by attitude, the subjective norm and perceived behavioural control (Ajzen, 1991). In our context, the TPB states that a consumer's intention to use a SST is simultaneously determined by such factors as a positive or negative evaluative effect about using the technology.

## 2.3 The Technology Acceptance Model (TAM)

Based on Fishbein and Ajzen's (1975) theory of reasoned action (TRA), the TAM focuses on the role of ease of use and usefulness in predicting the attitude toward using a new technology (Davis, 1986). Following prior research findings and using the TPB as a basic structure, attitude is decomposed by incorporating perceived usefulness and perceived ease of use. The integrated model proposed here combines the TPB and the TAM and explains the adoption of SSTs for online services.

We then infer that the casual factors of the TPB, the TAM, and an integrated TPB/TAM model will have positive relationships with the behavioural intention. H1, H2 and H3 are initiated underlying TPB, while H4, H5, H6, and H7 are proposed based on the TAM. These hypotheses were further verified for their validity by empirical data.

H1: Attitude toward using a SST will have a positive impact on behavioural intention.

H2: The subjective norm will have a positive impact on behavioural intention.

H3: Perceived behavioural control will have a positive impact on behavioural intention.

H4: The perceived usefulness of SSTs will have a positive impact on attitude toward using a SST.

H5: The perceived usefulness of SSTs will have a positive impact on behavioural intention.

H6: The perceived ease of use of SSTs will have a positive impact on attitude toward using a SST.

H7: The perceived ease of use of SST will have a positive impact on perceived usefulness of a SST.

## 3 METHODS

### 3.1 Sample and Procedure

Questionnaires were distributed to a sample of 280 adult consumers in Taiwan. Participation in the survey was completely voluntary and anonymous. The definition and classification of SSTs used in this survey were based on the typology of Meuter, et al. (2000), which is one of the few comprehensive and empirically based SST classification schemes. Respondents were asked to evaluate their experiences with SSTs that they had used most frequently, as well as their resulting behavioural intentions. Respondents' evaluations covered a wide range of SST providers, including post offices, banks, stock exchanges, cinemas, railways, airlines, bookstores, and internet services.

The sample was comprised of 48.2% males and 51.8% females, and the age range of the participants was 18-45. Most respondents were university-educated with a monthly personal income level of less than NT \$ 20,000.

### 3.2 Measures

Twenty-one measure variables were used to reflect the components of an integrated TPB/TAM model. Subjects responded using a five-point scale (1 = completely disagree; 5 = completely agree) to questions about the intention to use SSTs. The scales of behavioural intention (BI) to use a SST are borrowed from Venkatesh and Davis (1996, 2000). Attitude (ATT) was adapted from the measurement defined by Bhattacharjee (2000). For measuring subjective norm (SN) and perceived behavioural control (PBC), the items are adopted from Taylor and Todd (1995) and Bhattacharjee (2000). The perceived usefulness (PU) and the perceived ease of use (PEOU) scales are adopted from Venkatesh and Davis (1996, 2000). In addition, some demographic variables, such as sex, age and college year, were collected.

## 4 RESULTS

First, we performed empirical exploratory factor analysis (EFA) and conducted reliability analysis to confirm the reliability of the variables adopted in the study. The reliability of all instruments assessed by the Cronbach's reliability coefficients ranged from 0.71 to 0.87 and exceeded the .60 lower limit of acceptability (Hair, et al., 1998). Next, confirmatory

factor analysis (CFA) in the AMOS 17.0 statistical program was used to analyze latent variables. To ensure data validity, we examined content validity, convergent validity, and discriminant validity. We determined that the content validity should be acceptable since the parts of questionnaire were all adapted from the literature and had been reviewed by practitioners. The assessment of convergent validity requires assessing the loading of each observed indicator on its latent construct (Anderson and Gerbing, 1988) and the CFA results indicated that all loadings were significant ( $P < 0.001$ ), so the evidence revealed satisfactory convergent validity. Finally, discriminant validity was assessed by ensuring that the average variance extracted (AVE) of each construct was larger than its square correlation with other constructs (Fornell and Larcker, 1981), and the test of discriminant validity revealed good discriminant validity.

A structural model should be assessed for goodness-of-fit. Results show that the goodness-of-fit index (GFI) and the Bentler Bonnet Normed fit index (NFI) were above 0.90 in the TPB, the TAM and the integrated TPB/TAM model, the comparative fit index (CFI) was above the recommended value of 0.95 for both models, the standardized root mean square residual (RMR) was less than 0.05 and the root mean square error of approximation (RMSEA) was below 0.08 for both, indicating a good fit (Hair, et al., 1988; Jöreskog and Sörbom, 1993). For the integrated TPB/TAM model, the results of the CFA indicated that the structural

model provided a very good fit to the data:  $\chi^2 / df = 1.87, P < 0.001$ , GFI = 0.92, NFI = 0.93, CFI = 0.97, RMR = 0.01, and RMSEA = 0.04. All of the model-fit indices exceeded their common respective acceptance levels.

#### 4.1 Hypothesis Testing

An integrated TPB/TAM model appears to be superior to the TPB and the TAM in explaining behavioural intention because  $R^2_{BI} = 0.82$ ,  $R^2_{ATT} = 0.79$  and  $R^2_{PU} = 0.68$  for the integrated model, whereas  $R^2_{BI} = 0.66$  for the TPB, and  $R^2_{BI} = 0.80$ ,  $R^2_{ATT} = 0.78$  and  $R^2_{PU} = 0.67$  for the TAM. The path significance was consistent with all the investigated models under high statistical significance levels ( $P < 0.001$ ). In the integrated

model, ATT ( $\beta = 0.39, P < 0.001$ ) and SN ( $\beta = 0.26, P < 0.001$ ) are positively associated with the intention of using a SST, thereby supporting H1 and H2. Furthermore, among these three models, PBC ( $\beta = 0.63, P < 0.001$ ) has the strongest effect on the intention of using a SST, thus supporting H3.

The impact of PU ( $\beta = 0.49$ ) and PEOU ( $\beta = 0.45$ ) on ATT are significant at  $P < 0.001$ . Consequently, H4 and H6 can be supported. Meanwhile, PU ( $\beta = 0.51, P < 0.001$ ) has significant impact on the BI, so supporting H5. Moreover, PEOU has strong effect on PU ( $\beta = 0.82, P < 0.001$ ), validating H7 and allowing the inference that PEOU fosters a user's PU toward using a SST. As a result, all hypotheses were supported.

## 5 DISCUSSION AND IMPLICATIONS

The results of this study offer encouraging evidence that the TPB, the TAM and integrated models can help explain the intention to use a SST. The TPB explains approximately 66% of the variance in BI, the TAM explains approximately 80% of the variance in BI, and the integrated model explains approximately 82% in BI. Therefore, an integrated TPB/TAM model represents an improvement in explanatory powers over the other two models.

PBC appeared to be the most significant factor affecting the SST intention, so a service provider should develop a well established skill test to form a complete SST and reinforce the intention to use. A plausible explanation for the significant but modest effect is that the operations of SSTs in general may not be particularly complicated, especially when considering consumers' general competence, learning capability, and the staff support commonly available from customers and technologists.

Our study extends the existing literature on SST into the online context, and its findings can improve understanding about how to predict the intention to use a SST. Recognizing the underlying factors that affect the intention to use a SST has important managerial implications for customer-service provider relationships. Although self-service applications are well known for saving companies money, a few companies are finding out that, when done right, they can bring in revenue as well. Hence, service providers should make efforts to develop well constructed SSTs and promote their usage. For

example, practitioners can prepare a guide and a users' manual for SSTs and can present SSTs as useful and easy-to-use platforms that provide a rich variety of new applications and useful information.

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