

Application of Structural Equation Modeling (SEM) to Explain Online Purchasing Intention - An Extension of Theory of Planed Behaviour (TPB)

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Abstract

The purpose of this study is extension of the well established factors of Theory of Planed Behaviour (TPB) includes, Attitude (A), Subjective norm (N), Perceived behavior control (P) and relation of Perceived reliability (U), Trust and faithfulness (T), on Online Purchasing intention (OP). These factors are identified through previous research and each one measured based on 7-point interval Likert scale. Using primary data collection method, 200 questionnaires were distributed to target respondents of customers online purchasing. The responses collected were 147 completed questionnaires representing 73.5 percent response rate. The data were analyzed using Structural Equation Modeling (SEM) using AMOS 20 and SPSS 19. Confirmatory factor analysis of measurement models indicate adequate goodness of fit after a few items was eliminated through modification indices verifications. Goodness of fit for the revised structural model shows requirement in terms of Ratio: 1,238; P-Value: 0.98; GFI: 0.932; and RMSEA; 0.040. The findings showed that perceived behavior control ($\beta=.111$, CR=6.656 $p<0.001$), Attitude ($\beta=-.072$, CR=-2.781, $p<0.005$) and Trust and faithfulness ($\beta=.183$, CR=4.454, $p<0.001$) have significant relationship on online purchasing behavior while subjective norm and Perceived reliability have insignificantly relationship on online purchasing intention.

Keywords: online purchasing intention, Structural Equation Modeling (SEM) , AMOS grafic , Theory of Planed Behaviour (TPB)

1. Introduction

The fact showed that, the online transaction is growing rapidly and more studies are needed to give a better understanding of the influencing factors. According to the survey of online Purchasing habit and what their motivation of e- Commerce Consumer Monitor 2010 that was performed to 3156 people from six areas namely, China, India, Malaysia, Taiwan and Thailand, and Indonesian people spend 24% expenditures for online Purchasing . This portion indicates that online Purchasing intention has transpired to social life style for most of the people in the world. Online purchasing with its unique features obviously is different from the traditional purchasing process, particularly in regard to social context (Weisberg et al, 2011). Regardless of, current trends, little is known about how particular variables influence consumers spending habits online. In general, a user which is using online transaction is to purchase goods, services and information (De Boer et al., 2002). therefore this study grounded to understanding a model of online purchasing intention , which determines influencing factors such as Attitude, Perceived reliability, Trust and faithfulness, Subjective norm, and perceived behavior control. In order to justify the model, this study compares five alternative models for predicting online purchasing intention. These alternative models have been utilized in better understanding relationships among our proposed constructs (Ferrer and McArdle, 2003).Therefore, the aim of this study is to develop and test alternative models, which can assist in the comprehensive understanding of online purchasing intention from theoretical perspective. Although it is evident that many studies have investigated multiple direct links among incentive or wavering factors but there has limited or no

reported investigation carried out on these variables' level of influence on online purchasing intention and its effects of all five alternative models. Thus, this study proposes to ascertain if the five alternative constructs could address their true relationships in selecting the best model for online purchasing intention model.

As a final point, the remainder of this paper is as follows. The first two sections provide the underpinning theoretical background for five alternative models that examine the effect of key of determinants on online purchasing intention. The third section describes the methodological approach and provides the justification to authenticate the proposed conceptual model. Results from Structural Equation Models (SEM) are presented, followed by discussion of empirical findings which guide to online Purchasing and academic implications. Finally, limitations for this study and area for future research are discussed.

2. Literature Review

This section reviews related research on online purchasing intention that will examine Management and IT students as academic members with required knowledge about IT and telecommunication skills. To support the background for this topic, related literature is very important for gaining insight into the real situation of online purchasing intention among literate members.

2.1. Online Purchasing Intention and theory of planned behavior (TPB)

theory of reasoned action (TRA), an individual's performance of a certain behavior is determined by his or her intent to perform that behavior, followed by theory of planned behavior (TPB) (Ajzen, 1991) which is an extension of the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980). Recently, TRA and TPB have also been the basis for several studies of Internet purchasing behavior (George, 2002; Khalifa and Limayem, 2003). Internet purchasing behavior is the process of purchasing products, services and information via the Internet. Goerge (2004) stated that many consumers resist making purchases via the Internet because of their concerns about the privacy of the personal information.

In related study, (Susskind & Stefanone, 2010) found that the transaction on internet is negatively related to consumers' on-line purchasing of goods and services. This result is opposite with previous study which is declared that online purchasing intention is a part of internet's transaction. In these cases, there is still a gap of researchers finding about this particular area.

2.2. Perceived behavior control

Based on theory of planned behavior (TPB), perceived behavior control is defined as an individual's confidence that he or she is capable of performing the behavior (Ajzen, 1991). It has two aspects of perceived behavioral control; first, how much a person has control over behavior and the second, how confident a person feels about being able to perform or not perform the behavior. The more the control an individual feels about making online purchase, the more likely he or she will be to do so. However, Kwong and Park (2008) found different results. They found the insignificant effect of perceived behavioral control on behavior. The inconsistent results needed to test again, for getting the comprehensive approaches. In this study, perceived behavioral control is the ability to purchase by online.

H1: There is a positive relationship between perceived behavior control and online Purchasing intention

2.3. Trust and faithfulness

Trust and faithfulness has been identified as an important issue from the time of the very first e-commerce studies (Ratnasingham, 1998 ; Tang et al, 2008). It has been demonstrated that trusting beliefs positively influence online consumers purchase intentions (Verhagen et al 2006; Jayawardhena, 2004) Jarvenpaa et al., 2000). The definition of trust proposed by Mayer et al. (1995, p. 712) is the most widely accepted. It runs as “. . . the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trust or, irrespective of the ability to monitor or control that other party.”

H2: There is a positive relationship between Trust and faithfulness and online Purchasing intention

2.4. Subjective Norms

Subjective norm is the beliefs about what important others think about the behavior in question, should directly influence people subjective norms, or perceptions of the social pressure to comply with expectations about appealing behavior. The previous study argued that subjective norm have direct relationship with online purchasing behavior (Goerge,2004; Zahedi,2001; Battacherjee,2000).

H3: There is a positive relationship between Subjective Norms and online Purchasing intention

2.5. Attitude

Generally, it is difficult to find the comprehensive definition of the attitude but most of the researchers agree that attitude is considered to be a property of an individual personality. Attitude is reinforced by beliefs or perceptions and these feelings will lead to particular type of behavior that forms the action. the theory of planned behavior (TPB) Ajzen (1980) which is properly explain the consumer decision-making process postulated that behavioral intention is the function of two components: attitude toward a behavior and subjective norm. These two components are direct determinants of intention to perform a behavior.

In concern to this study, attitude found a basic contribution in the process of online purchasing behavior, since found intensive studies of online shopping, attitudes and behavior in recent years. However previous study showed that attitude toward a behavior is a positive or negative evaluation of performing that behavior (Ajzen, 1985). Blackwell et al., (2006) stated that attitude is the evaluation of performing a particular behavior involving the attitude object, such as buying the product. These statement is clear stated that attitude have a relationship with behavior; while Hasan (2010), stated that attitudes develop over time as people gain experience with the behavior or receive knowledge about the object from other sources

Therefore, there is still a lack of consistent understanding of the impact of relevant factors of online purchasing behavior such as attitude which is still an inconsistent identification of relevant independent and dependent variables. This makes comparisons of research findings limited and the empirical literature in this area elusive. Past studies have investigated the positively relationship between attitude and online purchasing behavior (George, 2002), while online shopping attitude refers to consumers' psychological state in terms of making purchases on the Internet. These previous studies have all made important contributions to our understanding of the dynamics of online Purchasing behavior.

H4: There is a positive relationship between attitude and online Purchasing intention

2.6. Perceived Reliability

Perceived reliability is a part of consumer's privacy concern to get the personal information (Stewart and Segars, 2002). Van Slyke et al (2006) mention that Perceived reliability is an individual's concerns about whether data collected for one purpose may be used for another purpose. Goerge (2004) stated that Perceived reliability have insignificant relationship with online purchasing intention. However, Carter et al (2010) argued that Perceived reliability have significant impact on getting information. Therefore we still have lack in our knowledge about sensation of this factor on individual behaviour.

H5: There is a positive relationship between Perceived Reliability and online Purchasing intention

3. Methodology

3.1. Research Framework

The following is the diagram of the research design to be used in this study:

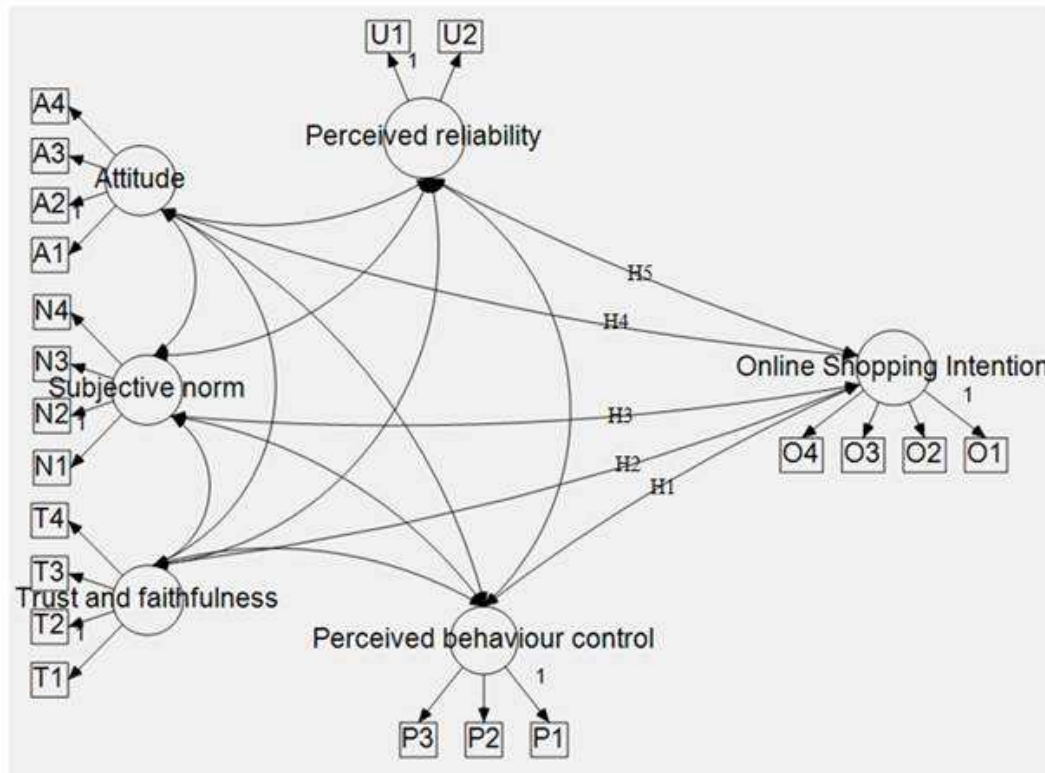


Figure 1. Research framework

This study attempts to determine the online purchasing intention predictors as elaborate in figure 1. The research framework reveals that online purchasing intention have a direct effect on attitude, Perceived reliability, Trust and faithfulness, subjective norm and perceived behavior control.

The instrument used in this study is questionnaire. It was distributed to the 200 respondents and 147 was completed and returned. The responses rate was 73.5%, which means it was considered as a high response rate adding to value to study. The respondents were the students of management and IT college with basic requirements in IT and telecommunication skills. We used convenience sampling method for distributed the questionnaire. Each participants was given self-administrative questionnaire containing socio demographic information, including age, gender, duration used internet, own PC, and frequency purchase online. The rest of the questionnaire focused on items that could be used to construct the latent variables. These were generated from previous research papers and were modified to fit the context of online purchasing intention. Furthermore, the questionnaire contains 21 items that are categorized into 6 variables, specifically 1 dependent variable (online purchasing intention-4 items) and 5 independent variables (attitude-4 items; Perceived reliability-2 items; Trust and faithfulness-4 items; subjective norm-4 items; and perceived behavior control-3 items) after that the data was analyzed using Structural Equation Modeling (SEM), AMOS graphic 16.0 . Exploratory factor analysis (EFA) and Confirmatory Factor Analysis (CFA) were conducted for all variables individually to make sure that all items are free from high correlation relationship with an ultimate aim to achieve the model fit. SEM allows for multiple simultaneous directions of causality, and distinguishes the direct effect and the indirect effect as well as the total effect of an explanatory variable on each dependent variable (Cao and Mokhtarian, 2005).

4. Findings

4.1. Socio demography

Participants as shown in table 1 , consisted of 67 (46.9%) male and 78 (53.1%) female. Their ages ranged from 17 to 25. All participants had internet access and the large of numbers used this at least one hour per week. Almost all of the participants have their own PC (89.1%) and (80.0%) have used the internet during 7 years and above.

	Frequency	%
Gender		
• Male	67	46.9
• Female	78	53.1
Ages		
• 17-19	37	25.7
• 20-22	90	61.2
• 23-25	20	13.6
Duration use internet		
• At least One hour per day	117	79.5
• One hour per week	30	20.4
Own PC		
• Have own PC	131	89.1
• Don't Have own PC	16	10.8
Duration used internet		
• 1-3 years	22	14.9
• 4-6 years	45	30.6
• 7 years and above	80	54.4

Table 1. Demographic analysis

4.2. Hypothesis results

As a final point, revised model was achieved and gathering all requirements and possessed adequate goodness of fit with values for ratio as 1.238, P-Value as .098, GFI as .932 and RMSEA as .040. Based on those results, we found that three of hypothesis are accepted, for instance Perceived behavior control (H1) at $\beta=.111$, CR= 6.656, $p<0.001$; Attitude (H4) at $\beta=-.072$, CR=-2.781 $p<0.005$ and also Trust and faithfulness (H2) at $\beta=.183$, CR=4.454 $p<0.001$. It was showed that H1, H2 and H4 have a significant relationship with online Purchasing intention. While subjective norm (H3) at $\beta=.013$, CR= .546 $p=.585$; and Perceived reliability (H5) at $\beta=-.102$, CR= -1.148 $p=.251$; have insignificant relationship with online purchasing intention.

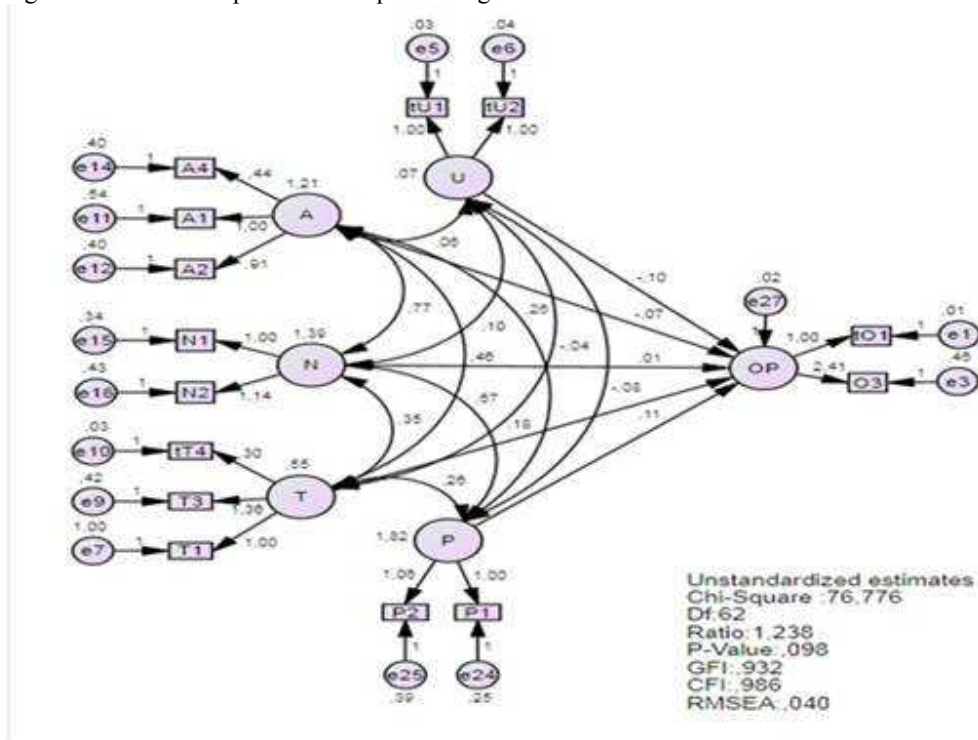


Figure 2. Revised model:

construct	estimate	S.E	C.R	P	HYPOTHESIS RESULTS
• Attitude → online Purchasing intention	-.072	.026	-2.781	.005	Supported
• Perceived reliability → online Purchasing intention	-.102	.089	-1.148	.251	Not Supported
• Trust and faithfulness → online Purchasing intention	.083	.041	4.454	***	Supported
• Subjective norm → online Purchasing intention	.013	.025	.546	.585	Not Supported
• perceived intention control → online Purchasing intention	.111	.017	6.656	***	Supported

Table 2. Regression Analysis and hypothesis results

4.2.1. Descriptive Analysis of Variables

The research framework consists of five exogenous and one endogenous variable. Each construct shows Cronbach alpha readings of acceptable values of above 0.8, according to Nunnally, (1970) recommendation of 0.60 limits. Composite reliability shows similar high readings, however, some variable is included in subsequent analysis because it is anticipated that the spurious items will be self-deleted during confirmatory factor analysis (CFA) process.

4.2.2. Convergent Validity (Confirmatory Factor Analysis - CFA)

From the confirmatory factor analysis (CFA), we observed that the regression estimates or factor loadings of all manifesting observed variables or items are adequate ranging from 0.501 to 0.973. The factor loadings of latent to observed variable should be above 0.50 (Hair et al., 2006). This indicates that all the constructs conform to the construct convergent validity test.

4.2.3. Composite Reliability

The calculations of composite reliability based on the standardized factor loadings obtained from the final revised structural model. The equation for composite reliability is as follows:

$$\text{Composite reliability} = \frac{\sum (\text{S standardized loading})^2}{\sum (\text{S Standardized loading})^2 + eS_j}$$

The readings of composite reliability of all exogenous latent constructs are well above 0.60 based on (Nunnally, 1970).

	O	U	T	A	N	P	Item Reliabilities	delta
tO1	0.91						0.829	0.17
O3	0.67						0.449	1.278
tU1		0.84					0.706	0.29
tU2		0.80					0.640	1.346
T1			0.59				0.349	0.65
T3			0.84				0.706	0.29
tT4			0.79				0.625	1.680
A1				0.83			0.689	0.31
A2				0.84			0.706	0.29
A4				0.61			0.373	1.768
N1					0.89		0.793	0.20
N2					0.89		0.793	1.586
P1						0.93	0.865	0.13
P2						0.91	0.829	1.694
Construct Reliability	0.77	0.81	0.80	0.81	0.89	0.92		

Table 3. Composite Reliability results

4.2.4. Discriminant Validity

To substantiate discriminant validity, average variance extracted (AVE) is compared to correlation squared of the interrelated variables of concerned (Fornell and Larcker, 1981). The AVE is derived from the calculation of variance extracted using the following equation:

$$\text{Variance Extracted (VE)} = \frac{S (\text{standardized SMC}^2)}{S (\text{standardized SMC}^2) + eS_j}$$

From the variance extracted, AVE is then calculated by averaging the two variances extracted of the variables. For discriminant validity to be upheld the value of AVE must be more than correlation squared as all constructs used for this study support discriminant validity.

	O	U	T	A	N	P	Item Reliabilities	delta
TO1	0.91						0.829	0.17
O3	0.67						0.449	1.278
TU1		0.84					0.706	0.29
TU2		0.80					0.640	1.346
T1			0.59				0.349	0.65
T3			0.84				0.706	0.29
TF4			0.79				0.625	1.680
A1				0.83			0.689	0.31
A2				0.84			0.706	0.29
A4				0.61			0.373	1.768
N1					0.89		0.793	0.20
N2					0.89		0.793	1.586
P1						0.93	0.865	0.13
P2						0.91	0.829	1.694
Variance Extracted	63.90 %	67.30%	56.00%	58.93%	79.30%	84.70%		

Table 4. Variance Extracted results

4.2.5. Nomological Validity

Nomological validity examines whether the correlations between constructs in the measurement theory makes sense such that correlations must be positive or negative according to theory stipulated (Hair et al. 2006). It is observed that all directions of correlations are in the hypothesized direction as stipulated in the hypotheses in accordance to theory. Thus, it can be deduced that nomological validity is substantiated for all measures used in this study.

4.2.6. Goodness of Fit of Structural Model

To arrive to the structural model, confirmatory factor analysis (CFA) was conducted on every construct and measurement models. The goodness of fit is the decision to see the model fits into the variance-covariance matrix of the dataset. The CFA, measurement and structural model has a good fit with the data based on assessment criteria such as GFI, CFI, TLI, RMSEA (Bagozzi & Yi, 1988). All CFAs of constructs produced a relatively good fit as indicated by the goodness of fit indices such as CMIN/df ratio (<2); p-value (>0.05); Goodness of Fit Index (GFI) of >0.95; and root mean square error of approximation (RMSEA) of values less than 0.08 (<0.08) (Hair et al., 2006).

5. Finding and Overall Comparison between structural models

Overall comparison between two structural models (hypothesized and revised) derived from the study shows that hypothesized model produces five significant direct impacts while revised model produces three significant direct impacts. Even though there are more significant direct impacts in hypothesized model, the results could not be generalized due to non-achievement of p-value (p<0.05). It seems that three significant direct impacts of Attitude to online purchasing intention (H4) and Trust and faithfulness to online purchasing intention (H2) and perceived behavior control to online purchasing intention (H1) are consistently significant across the two structural models. Alternatively, two direct paths i.e. the paths from Perceived reliability to online purchasing intention (H5) and Subjective norm to online purchasing intention (H3) are consistently insignificant across the structural models.

In nutshell, generally, females are more interested on online purchasing than male. For most of the educated people, online Purchasing has become a behavior life style in University. Commonly, they used their own PC to do the online purchasing. The possibilities of doing through internet are influenced by the personals factors such as attitude, Trust and faithfulness, and perceived behavior control (Goerge, 2004; Tang et al, 2008; and Kwong and Park, 2008).

6. Future Research

The future research is better to include some factors such as satisfaction and information privacy as new variables for the next models and also doing the same things in the different way namely qualitative approaches to get a comprehensive understanding about online purchasing intention. Some limitations of the present study need to be acknowledged. First, the samples in this research were the students of university; however, the results are still useful since students belong to a large part of the online consumers, which makes them interesting to online shopping. Nevertheless, other populations should also be examined to confirm and expand the obtained results. Furthermore future research should be more precise in specifying the terms e - Purchasing and in- store shopping. There is an important difference in buying apparel online at a website that does not have a physical store in contrast with websites that also possess a building or store for operations.

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