EXAMINING A THEORY OF PLANNED BEHAVIOR (TPB) AND TECHNOLOGY ACCEPTANCE MODEL (TAM) IN INTERNETPURCHASING USING STRUCTURAL EQUATION MODELING

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ABSTRACT

Internet purchasing has been predicted to escalate with the increase of internet users around the globe. In line with the increase of users, it has been estimated that e-commerce spending would also amplify. In spite of the world internet potential, actual number of internet users who purchased online has declined. Thus, our study intends to investigate the drivers of internet purchasing based on the integration of theory of planned behavior (TPB) and technology acceptance model (TAM). By integrating TPB and TAM, this study examines the relationships between attitude, subjective norm, perceived behavior control, perceived usefulness and perceived ease of use toward intention and internet purchasing behavior. Data were collected from 304 university students via questionnaires. The analysis produced four structural models: hypothesized, re-specified, TPB competing and TAM competing models. It shows that hypothesized model created four significant direct impacts, re-specified model found three significant direct impacts, TPB competing model supported three direct impacts and TAM competing model supported four direct impacts. It seems that the direct impact of subjective norms on intention was consistently significant across three models namely, hypothesized, re-specified and TPB competing models. Conversely, the path from attitude to intention was consistently insignificant across the same three models. Other direct paths reveal inconsistent relationships between differing structural models. For mediating effects of intention on each hypothesized paths, we found two partial mediating effects of intention. The first effect was the partial mediating effects of intention on the relationship between attitude and behavior in TPB competing model. The second was the partial mediating effect of intention on the relationship between perceived usefulness and behavior in TAM. Mediating effects were not substantiated in hypothesized and revised model. Lastly, among the four structural models, revised model achieved the highest SMC (R^2), explaining 62.9% variance in internet purchasing behavior, followed by Theory of Planned Behavior (TPB) and Technology Acceptance model (TAM). According, hypothesized model obtained the lowest R^2 of 55% variance in internet purchasing behavior. The findings are discussed in the context of the internet purchasing behavior and intention in Malaysia.

Keywords: Structural Equation Modeling, TPB, TAM, Internet Purchasing Behavior

1. INTRODUCTION:

Internet purchasing has been predicted to escalate with the increase of internet users around the globe. For example internet users worldwide has escalated from 655 million in 2002 to 941 million users in 2005 (Dholakia and Uusitalo, 2002). In Asia Pacific, it is predicted that there could be 242 million internet users in 2005 (Taylor, 2002). In line with the increase of users, it has been estimated that e-commerce spending could increase from USD 118 billion worldwide in 2001 to USD707 billion in 2005 (Wolverton, 2001). In spite of the world internet potential, actual number of internet users who purchased online has declined. Reasons cited were reluctance to shop on-line, mistrust and security issues (Taylor, 2002). However, there is limited empirical investigation to verify the causal antecedents of internet purchase behavior in Malaysia. The commonly used theories to explain internet purchase behavior are the Theory of Planned Behavior (TPB) and Technology acceptance model (TAM). Conversely, past studies have examined the predictors of internet purchasing using these theories separately, mostly conducted in Western countries and typically descriptive research in nature. Thus, our study intends to investigate the drivers of internet purchasing based on the integration of theory of planned behavior and technology acceptance model. This integration is plausible to increase the body of knowledge in this area as well as applying structural equation modeling (SEM) method of analysis.

2. THEORETICAL UNDERPINNING OF STUDY:

This study integrates two infamous behavior theories, namely, theory of planned behavior (Azjen, 1991) and technology acceptance model (Davies, 1989). The objective is to examine the antecedent of internet purchasing behavior and intention amongst Malaysian consumers. The theoretical underpinning of the two theories is discussed next.

THEORY OF PLANNED BEHAVIOR (TPB):

Theory of Planned Behavior (TPB) (Azjen, 1985, 1991)) is an extension of the theory of reasoned action (TRA) (Azjen and Fishbein, 1980), made necessary by the latter model's inability to deal with behaviors over which individuals have incomplete volitional control. According to TPB, an individual's performance of a certain behavior is determined by his or her intent to perform that behavior (see Figure1). For TPB, attitude towards the target behavior, subjective norms about engaging in the behavior, and perceived behavior control are thought to influence intention and internet purchasing behavior. An attitude toward a behavior is a positive or negative evaluation of performing that behavior. As a general theory, TPB does not specify the particular beliefs that are associated with any particular behavior, so determining those beliefs is left to the researcher's preference. TPB provides a robust theoretical basis for testing such a premise, along with a framework for testing whether attitudes are indeed related to intent to engage in a particular behavior, which itself should be related to the actual behavior. Based on the theory, beliefs about how important referent others feel about Internet purchasing the views of important others, should also influence intent to make Internet purchases. Finally, perceived behavioral control is informed by beliefs about the individual's possession of the opportunities and resources needed to engage in the behavior (Azjen, 1991)

TPB has been used in many different studies in the information systems literature (Mathieson, 1991; Taylor and Todd, 1995a, b; Harrison et al., 1997). TRA and TPB have also been the basis for several studies of Internet purchasing behavior (Celik, 2008; George, 2002; Jarvenpaa and Todd, 1997a, b; Khalifa and Limayen, 2003; Limayem et al., 2000; Pavlou, 2002; Suh and Han, 2003; Song and Zahedi, 2001; Tan and Teo, 2000).

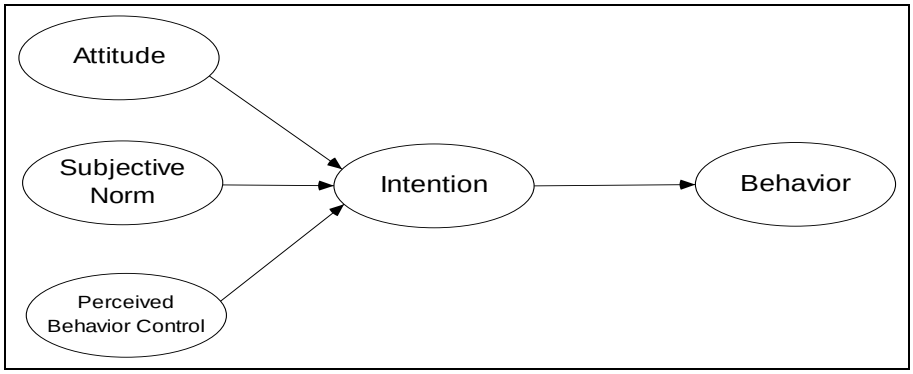

Figure 1: Theory of Planned Behavior (TPB)

Source: Azjen (1991)

ATTITUDE AND INTENTION/ BEHAVIOR:

Attitudes are informed by beliefs needed to engage in the behavior (Azjen, 1991), It is define as individual's positive or negative feeling associated with performing a specific behavior. An individual will hold a favorable attitude toward a given behavior if he/she believes that the performance of the behavior will lead to mostly positive outcomes. Several past studies had found significant direct relationship between attitude and internet purchasing (Celik, 2008; George, 2002, 2004; Chai and Pavlou, 2004). Celik (2008) found that attitude is significantly related to internet banking intention while Chai and Pavlou (2004) establish that attitude is a significant predictor of electronic commerce intention in two countries, Greece and USA.

SUBJECTIVE NORMS AND INTENTION:

Subjective norm is the perceived social pressure to engage or not to engage in a behavior. It is assumed that subjective norm is determined by the total set of accessible normative belief concerning the expectations of important referents (Ajzen, 1991). Chai and Pavlou (2002) found subjective norms to be significantly related to intention in both countries US and Greece. However, subjective norm was not related to internet purchasing (George, 2002).

PERCEIVED BEHAVIOR CONTROL AND INTENTION/BEHAVIOR:

Perceived behavioral control refers to people's perceptions of their ability to perform a given behavior. Azjen compares perceived behavioral control to Bandura's concept of perceived self-efficacy (Bandura, 1997). TPB also includes a direct link between perceived behavioral control and behavioral achievement. Drawing an analogy to the expectancy- value model of attitude, it is assumed that perceived behavioral control is determined by the total set of accessible control belief, i.e., beliefs about the presence of factors that may facilitate or impede performance of the behavior. To the extent that it is an accurate reflection that perceived behavioral control can, together with intention, be used to predict behavior. Past studies have found inconsistent findings as regards to the relationship of perceived behavior control and intention (Chai and Pavlou, 2004; George, 2004). In most occasion perceived behavior control is not a significant predictor of intention or behavior.

TECHNOLOGY ACCEPTANCE MODEL:

Technology acceptance model (Davies 1989) or TAM as it is commonly known, was adapted from the theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) and theory of planned behavior (Ajzen, 1985; Ajzen, 1991). TAM proposes specifically to explain the determinants of information technology end-user's behavior towards information technology (Saade, Nebebe & Tan, 2007). In TAM, Davis (1989) proposes that the influence of external variables on intention is mediated by perceived ease of use (PEU) and perceived usefulness (PU). TAM also suggests that intention is directly related to actual usage behavior (Davis, Bagozzi & Warshaw, 1989). Findings that support the tam model n are numerous (Fusilier and Durlabhji, 2005).

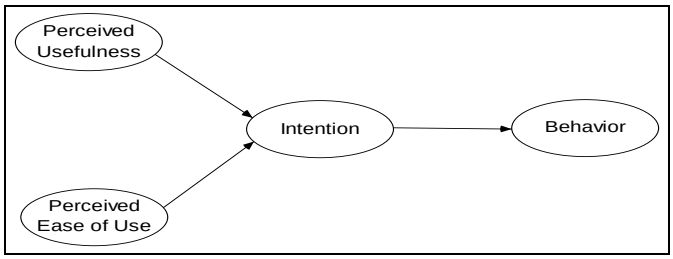

Figure 2: Technology Acceptance Model

Source: Davis (1989)

PERCEIVED USEFULNESS AND INTENTION:

Perceived usefulness is defined as the extent to which a person believes that using a particular system will enhance his or her job performance. The ultimate reason people exploit internet purchasing is that they find the systems useful to their banking transactions. There has been extensive research in the information systems (IS) community that provides evidence of the significant effect of perceived usefulness on usage intention (Celik, 2008; Petty, Cacioppo & Schumann, 1983; Taylor & Todd, 1995; Venkatesh & Davis, 2000). Celik (2008) establishes that perceived usefulness has significant impact on internet banking intention while Davis (1989)

found that perceived usefulness has a stronger influence on usage. Davis's study shows that users are driven to adopt a technology primarily because of the functions it provides them, and secondarily because of the easiness of benefiting from those functions. Customers are often willing to overlook some difficulties of usage if the service provides critically needed functions. Perceived behavioral control was not significantly related in previous study by George (2002).

PERCEIVED EASE OF USE AND INTENTION:

Extensive research over the past decade provides evidence of the significant effect of perceived ease of use on usage intention, either directly or indirectly through its effect on perceived usefulness (Agarwal and Prasad, 1999; Davis et al., 1989; Jackson et al., 2004; Venkatesh, 1999, 2000; Venkatesh and Davis, 1996, 2000; Venkatesh and Morris, 2000). In order to prevent the "under-used" useful system problem, Internet purchasing need to be both easy to learn and easy to use. If the system was easy to use, it will be less threatening to the individual (Moon and Kim, 2001). This implies that perceived ease of use is expected to have a positive influence on user intention on internet purchasing.

INTENTION AND BEHAVIOR:

Theory of planned behavior (TPB) and Technology acceptance model (TAM) both suggest that a person's behavior is determined by his/her intention to perform the behavior and that this intention is, in turn, a function of his/her attitude toward the behavior and his/her subjective norm. The best predictor of behavior is intention. Intention is the cognitive representation of a person's readiness to perform a given behavior, and it is considered to be the immediate antecedent of behavior (Ajzen, 1985; Ajzen, 1991). Recent past studies that has found significant relationship between intention and behavior are numerous (George 2002; Venkatesh, Morris, Davis, & Davis, 2003; Venkatesh, 2000; Ajzen, 1985; Ajzen, 1991; Eagly, & Chaiken, 1993).

3. METHODOLOGY:

Figure 3 proposes the final hypothesized structural model for the study. It consists of five exogenous variables (attitudes, subjective norms, perceived behavior control, perceived usefulness and perceived ease of use) and two endogenous variables (intention and behavior). Intention is hypothesized to act as a mediator between all relationships of exogenous and behavior.

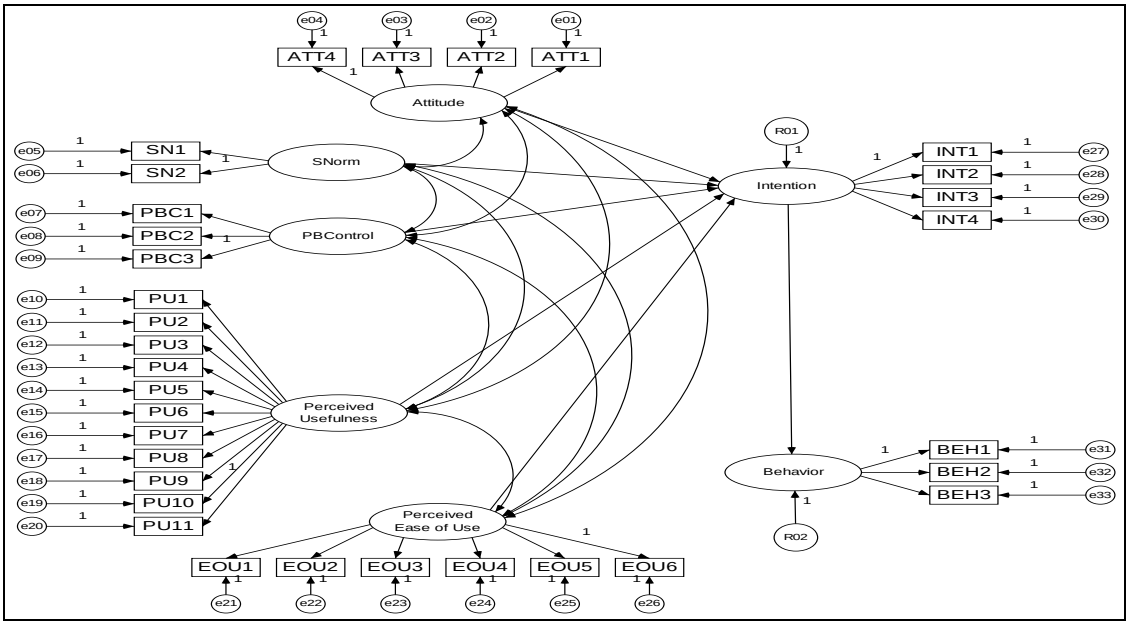

Figure 3: Hypothesized Model

Table 1 summarizes the operation definition of final latent variables used in this study. Afterwards, eleven hypotheses are derived from the structural model for the study.

TABLE 1: OPERATIONAL DEFINITION OF VARIABLES

Attitude	An individual's positive or negative feeling associated with performing a specific behavior. An individual will hold a favorable attitude toward a given behavior if he/she believes that the performance of the behavior will lead to mostly positive outcomes.	Ajzen and Fishbein (1980)
Subjective Norm	Subjective norm is the perceived social pressure to engage or not to engage in a behavior.	Ajzen and Fishbein (1980)
Perceived Behavior Control	Perceived behavioral control refers to people's perceptions of their ability to perform a given behavior.	Ajzen and Fishbein (1980)
Perceived Usefulness	Perceived usefulness is defined as the extent to which a person believes that using a particular system will enhance his or her job performance.	Davis et al 1989.
Perceived Ease of Use	Perceived ease of use is defined as to which a person believes that using a particular system will be free of effort. Among the beliefs, perceived ease of use is hypothesized to be a predictor of intention.	Davis et al 1989.
Intention	Intention is an indication of a person's readiness to perform a given behavior, and it is considered to be the immediate antecedent of behavior.	(Bagozzi, Baumgartner and Yi 1998)
Behavior	Behavior is the manifest, observable response in a given situation with respect to a given target. Single behavioral observations can be aggregated across contexts and times to produce a more broadly representative measure of behavior.	(Ajzen and Fishbein 1980)

TABLE 2: HYPOTHESES FORMULATION

H1	Attitude toward the behavior is positively related to intention
H2	Subjective norm is positively related to intention
H3	Perceived behavior control is positively related to intention
H4	Perceived usefulness is positively related to intention
H5	Perceived ease of use is positively related to intention
H6	Intention is positively related to behavior
H7	Intention mediates the relationship between attitude toward the behavior and behavior
H8	Intention mediates the relationship between subjective norm and behavior
H9	Intention mediates the relationship between perceived behavior control and behavior
H10	Intention mediates the relationship between perceived usefulness and behavior
H11	Intention mediates the relationship between perceived ease of use and behavior

Sampling and instrument

A total of 350 out-campus University students from various levels such as diploma, degree and master students were requested to complete a questionnaire that contained measures of the constructs of concern. The questionnaires were distributed to the respondents in the classroom by using purposive sampling method. A response rate of about 90% was collected back corresponding to 310 responses. The approach to testing the TPB model was based on that used by Taylor and Todd (1995a). Measures of attitude (four items), subjective norms (two items), perceived behavioral control (three items), intention (5 items) and actual purchasing (3 items) were utilized based on past studies (Taylor and Todd, 1995a). The TAM target questions focus on the independent varibles such as perceived usefulness (11 items), perceived ease of use (6 items) based on Wang et al's (2003) instrument. All the questions use 7-Likert interval scales measurement (7 – strongly agree and 1-strongly disagree). There are also eight demographic questions included in the instrument which use ordinal and nominal scale such as age, gender, education, race, internet usage, internet access, internet purchase frequency and product types.

DATA SCREENING AND ANALYSIS:

The 310 dataset were coded and saved into SPSS version 20 and analyzed using AMOS version 20. During the process of data screening for outliers, six dataset were deleted due to Mahalanobis (D2) values more than the $\chi 2$ value (χ^2=63.87; n=33, p<.001) leaving a final 304 dataset to be analyzed. Several statistical validity tests and analysis were then conducted such as reliability test and composite reliability tests, validity tests using confirmatory factor analysis (CFA) for construct validity, discriminant validity for multicollinearity treatment,

descriptive analysis, correlation and structural equation modeling analysis using AMOS 20 (SEM). The step in SEM analysis are CFA analysis, measurement analysis, discriminant analysis, composite reliability analysis and direct indirect impact analysis (mediating effect), testing the fit for the hypothesized structural model, revised model, competing model, and comparison analysis (Sentosa et, al., 2012).

4. RESULTS:

DEMOGRAPHIC PROFILE OF THE RESPONDENTS:

The respondents' ages ranged from twenty-one to fifty-one years old. There are slightly more male (58.6%) than female respondents (41.4%). Most of those who do not own a PC used PC either at campus or Cyber Café (44.1%). Most of the respondents (42.8%) declare that they have been using the Internet for 6 to 10 years, while 28.9% used internet 2 to 5 years and 25% using Internet more than 10 years. As for question on "how often the respondents buy over the Internet", 44.1% of the respondents buy things through Internet twice in a year, while 35.2% respondents buy things monthly, 5.9% respondents both buy things "daily" and "weekly" 3.9%, respectively there are 10.9% respondents never buy things through internet. 27.6% respondents buy prepaid mobile phone reload over Internet in the last 6 months, 24% of the respondents preferred to buy air plane ticket, while 11.6% of the respondents buy nothing over the Internet in the last 6 months (refer table 2).

Table 3: The Profile of Respondents (N=304)

Demographics	Frequency	Valid Percent
Gender:		
Male	178	58.6
Female	126	41.4
Race:		
Malay	124	40.8
Chinese	64	21.1
Indian	57	18.8
Others	59	19.4
Education level:		
Bachelor degree	156	51.3
Master degree	78	25.7
PhD degree	70	23.0
Age:		
Below 20	-	-
21-30	134	44.1
31-40	137	45.1
41-50	32	10.5
51 and above	1	0.3
Internet Access:		
Home	101	33.2
Campus	134	44.1
Cyber Café	59	19.4
Shopping Center	10	3.30
Using Internet:		
Less than 1 year	10	3.30
2 to 5 years	88	28.9
6 to 10 years	130	42.8
More than 11 years	76	25.0
How often you buy over the internet:		
Never buy	33	10.9
Twice in a year	134	44.1
Monthly	107	35.2
Weekly	12	3.90
Daily	18	5.90
Buy goods over internet in the last 6 month:		
None	36	11.6
Prepaid mobile phone reload	84	27.6
Airplane ticket	73	24.0
Books/journals	11	3.60
Clothes/Sport Equipment	10	3.30
Software/DVD/Music CD's	83	27.3
Others	7	2.30

DESCRIPTIVE ANALYSIS OF VARIABLES:

The research framework consists of five exogenous and two endogenous variables (Table 3). Each construct shows Cronbach alpha readings of acceptable values of above 0.60 (Nunnally, 1970), except for subjective norms which obtained a Cronbach value of 0.482. However, this variable is included in subsequent analysis since composite reliability calculated for subjective norms is 0.779, thus conforming to Nunnally's standard.

TABLE 4: DESCRIPTIVE STATISTICS OF VARIABLES

Variable Name		No of Items	Mean (Std. Dev)	Cronbach Alpha	Composite Reliability
Endo 1	Intention	4	4.098 (0.823)	0.746	0.929
Endo 2	Behavior	3	3.831 (0.795)	0.798	0.950
Exo 1	Attitude	4	3.954 (0.867)	0.758	0.923
Exo 2	Subjective Norm	2	4.190 (1.182)	0.482	0.791
Exo 3	Perceived Behavior Control	3	3.852 (0.843)	0.714	0.851
Exo 4	Perceived Usefulness	11	3.916 (0.747)	0.862	0.930
Exo 5	Perceived Ease of Use	6	3.872 (0.830)	0.830	0.959
Total items		33			

CONFIRMATORY FACTOR ANALYSIS (CFA) RESULTS:

From the confirmatory factor analysis result in Table 4, we observed that the factor loadings of all observed variables or items are adequate ranging from 0.498 to 0.834. The factor loadings or regression estimates of latent to observed variable should be above 0.50 (Hair et al., 2006).This indicates that all the constructs conform to the construct validity test. The remaining numbers of items for each construct are as follows: Attitude (3 items), Subjective norms (2 items), Perceived behavior control (2 items), perceived usefulness (5 items), perceived ease of use (5 items), intention (3 items), and purchase behavior (3 items).

TABLE 5: FINAL CONFIRMATORY FACTOR ANALYSIS RESULTS OF CONSTRUCT VARIABLES

Variable	Code	Attributes	Factor Loadings
Factor 1: Attitude (3 items)	ATT 1	I would be willing to purchase through internet	0.657
	ATT 3	Buying things over the internet is an idea I like	0.645
	ATT 4	I feel the internet purchasing give me inspiration and help me to live up to my best during my study period	0.672
Factor 2: Subjective Norm (2 items)	SN1	People who influence my behavior would think that I should buy things over the internet	0.638
	SN2	It is expected of me that I will purchase on internet in the forthcoming month	0.498
Factor 3: Perceived Behavior Control (2 items)	PBC 1	I am capable of buying things over the internet	0.720
	PBC 2	Buying things over internet is entirely within my control	0.580
Factor 4: Perceived Usefulness (5 items)	PU1	Using the internet purchasing improves my task	0.632
	PU2	Using the internet purchasing increases my productivity	0.681
	PU4	I find the internet purchasing to be useful	0.519
	PU5	Using the internet purchasing enhances my effectiveness in my task	0.594
	PU10	Using the internet purchasing improves my performance in my task.	0.546
Factor 5: Perceived Ease of Use (5 items)	EOU1	Internet purchasing makes the services effective way making.	0.653
	EOU2	Internet purchasing makes the transactions faster	0.755
	EOU3	Getting information from the internet purchasing is easy	0.587
	EOU5	Internet purchasing is comfort to use	0.672
	EOU6	Internet purchasing is easy to use	0.736
Factor 6: Intention (3 items)	INT1	Given that I had access to the internet purchasing, I predict that I would use it	0.753
	INT2		0.701
	INT4	I intend to use the internet purchasing in the future	0.560
		I intend to use the internet purchasing as much as possible	
Factor 7: Behavior (3 items)	BEH1	I would feel comfortable buying things over the internet on my own.	0.684
	BEH2	I would prefer internet payment systems that are anonymous to those that are user identified.	0.834
	BEH3	The internet is a reliable way for me to take care of my personal affairs.	0.754
TOTAL		**23 Items**	

DISCRIMINANT VALIDITY OF CONSTRUCTS:

Table 5 shows the result of the calculated variance extracted (VE) to support discriminant validity of constructs. Average variance extracted (AVE) is the average VE values of two constructs (Table 6). According to Fornell & Larcker (1981), average variance extracted (AVE) should be more than the correlation squared of the two constructs to support discriminant validity (compare table 6 and table 7). Each AVE value is found to be more than correlation square, thus discriminant validity is supported or multicollinearity is absent.

TABLE 6: VARIANCE EXTRACTED OF VARIABLES

Observed Variables	std loading	R^2	error εj	Variance Extracted
BEH3	0.754	0.569	0.071	0.917
BEH2	0.834	0.695	0.100	
BEH1	0.684	0.468	0.102	
Total	2.272	1.732	0.273	
INT4	0.560	0.314	0.106	0.858
INT2	0.701	0.492	0.113	
INT1	0.753	0.567	0.092	
Total	2.014	1.373	0.311	
EOU1	0.653	0.427	0.091	0.918
EOU2	0.755	0.570	0.085	
EOU3	0.587	0.345	0.086	
EOU5	0.672	0.451	0.094	
EOU6	0.736	0.542	0.133	
Total	3.403	2.335	0.489	
PU1	0.632	0.400	0.123	0.828
PU2	0.681	0.463	0.131	
PU4	0.519	0.270	0.129	
PU5	0.594	0.353	0.154	
PU10	0.546	0.298	0.125	
Total	2.972	1.784	0.662	
PBC1	0.720	0.519	0.171	0.712
PBC2	0.580	0.337	0.125	
Total	1.300	0.856	0.296	
SN1	0.639	0.406	0.123	0.556
SN2	0.498	0.248	0.219	
Total	1.137	0.654	0.342	
ATT1	0.657	0.431	0.107	0.838
ATT3	0.645	0.415	0.119	
ATT4	0.672	0.452	0.100	
Total	1.974	1.298	0.326	

TABLE 7: AVERAGE VARIANCE EXTRACTED (AVE) MATRIX OF EXOGENOUS VARIABLES

Variable Name	1	2	3	4	5
Attitude (1)	1.00				
Subjective Norm (2)	0.697	1.00			
Perceived Behavior Control (3)	0.775	0.634	1.00		
Perceived Usefulness (4)	0.833	0.692	0.770	1.00	
Perceived Ease of Use (5)	0.878	0.737	0.815	0.873	1.00

TABLE 8: CORRELATION & CORRELATION SQUARE MATRIX AMONG EXOGENOUS VARIABLES

Variable Name	1	2	3	4	5
Attitude (1)	1.00				
Subjective Norm (2)	0.564 (0.318)	1.00			
Perceived Behavior Control (3)	0.635 (0.403)	0.577 (0.332)	1.00		
Perceived Usefulness (4)	0.754 (0.568)	0.629 (0.396)	0.457 (0.208)	1.00	
Perceived Ease of Use (5)	0.658 (0.432)	0.457 (0.209)	0.578 (0.334)	0.516 (0.266)	1.00

*** Correlation is significant at 0.01 level (2-tailed), values in brackets indicate correlation squared.*

GOODNESS OF FIT INDICES:

Confirmatory factor analysis was conducted on every construct and measurement models (see Table 8). 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 >.95; and root mean square error of approximation (RMSEA) of values less than .08 (<.08).

The measurement model has a good fit with the data based on assessment criteria such as GFI, CFI, TLI, RMSEA (Bagozzi & Yi, 1988). Table 8 shows that the goodness of fit of generated or re-specified model is better compared to the hypothesized model.

TABLE 9: GOODNESS OF FIT ANALYSIS-CONFIRMATORY FACTOR ANALYSIS (CFA) OF MODELS (N=304)

Finals Models	Attitude	TPB measurement Attitude, Subjective Norm & Perceived Behavior Control	Perceived Usefulness	Perceived Ease of Use	TAM measurement: Perceived Usefulness & Perceived Ease of Use	Intention	Endogenous: Intention& Behavior	Measurement Model	Hypothesized Model	Respecified Model
Items remain	4	8	8	6	12	4	6	19	33	23
CMIN	4.242	19.990	25.908	10.308	70.327	3.850	14.520	162.617	743.462	238.465
Df	2	17	20	9	53	2	8	142	479	21
CMIN /df	2.121	1.176	1.295	1.145	1.327	1.925	1.815	1.145	1.552	1.130
p-value	0.120	0.275	0.169	0.326	0.056	0.146	0.069	0.114	0.000	0.094
GFI	0.993	0.983	0.961	0.989	0.962	0.993	0.984	0.948	0.865	0.937
CFI	0.992	0.994	0.990	0.998	0.983	0.993	0.988	0.986	0.921	0.986
TLI	0.976	0.989	0.986	0.996	0.978	0.979	0.978	0.984	0.913	0.984
RMSEA	0.061	0.024	0.031	0.022	0.033	0.055	0.052	0.022	0.043	0.021

Hypotheses Results:

Since the hypothesized model (Figure 4) did not achieve model fit (p<.000), hence, the explanation of hypotheses result is based on generated or re-specified model (Table 9 and Figure 5). Table 9 demonstrates that hypothesis H2 was asserted i.e. subjective norms has a positive and direct impact on intention (ß =.36; CR=2.052; p<.05). Similarly, intention has a direct significant impact on internet purchase behavior (ß=.42; CR=4.974; P<.05), hence, H6 was asserted. The re-specified model generates three new paths to be directly influencing behavior: attitude to behavior; perceived usefulness to behavior and perceived ease of use to behavior. We named the new paths H12, H13 and H14 respectively. Attitude has a direct significant and positive influence on internet purchasing behavior (ß=.36; CR=2.442; P<.05). Therefore, H12 was asserted while H13 and H14 were rejected

Alternatively, attitude, perceived behavior control, perceived usefulness and perceived ease of use did not have significant direct effects on intention (critical ratio (CR) <1.96; p>.05). Thus, H1, H3, H4, H5 were rejected. Subjective norms has a positive and direct impact on intention (ß =.36; CR=2.052; p<.05). While perceived usefulness and perceived ease of use did not have a direct significant impact on behavior (CR<1.96; p>0.50). This structural path model result is depicted diagrammatically in Figure 4. Table 10 indicates that the five exogenous variables (attitude, subjective norms, perceived behavior control, perceived usefulness and perceived ease of use) jointly explained 43.4% variance in intention. Subsequently, intention, attitude, subjective norm,

perceived behavior control, perceived usefulness and perceived ease of use collectively explained 62.9 percent variance in behavior.

TABLE 10: DIRECT IMPACT OF RESPECIFIED MODEL: STANDARDIZED REGRESSION WEIGHTS

H	Relationships between Exogenous and Endogenous			Std. Estimate	S.E.	C.R.	P-value
H12(New)	Behavior	<---	Attitude	0.362	0.130	2.442	0.015
H13(New)	Behavior	<---	Perceived Usefulness	0.074	0.110	0.645	0.519
H14(New)	Behavior	<---	Perceived Ease of Use	0.082	0.068	0.956	0.339
H1	Intention	<---	Attitude	0.190	0.192	0.969	0.332
H2	Intention	<---	Subjective Norm	0.359	0.171	2.052	0.040
H3	Intention	<---	Perceived Behavior Control	0.172	0.145	1.131	0.258
H4	Intention	<---	Perceived Usefulness	0.139	0.187	0.790	0.430
H5	Intention	<---	Perceived Ease of Use	-0.118	0.097	-1.082	0.279
H6	Behavior	<---	Intention	0.424	0.076	4.974	0.000

TABLE 11: SQUARED MULTIPLE CORRELATION RESULTS

Endogenous Variable	Squared multiple correlation (SMC) = R^2
Intention	0.434
Behavior	0.629

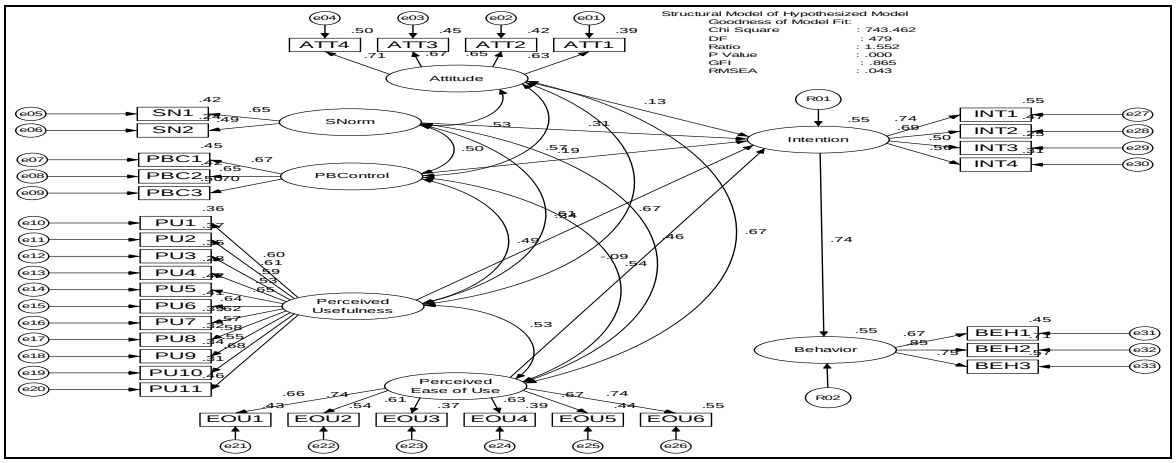

Figure 4: Hypothesized Model

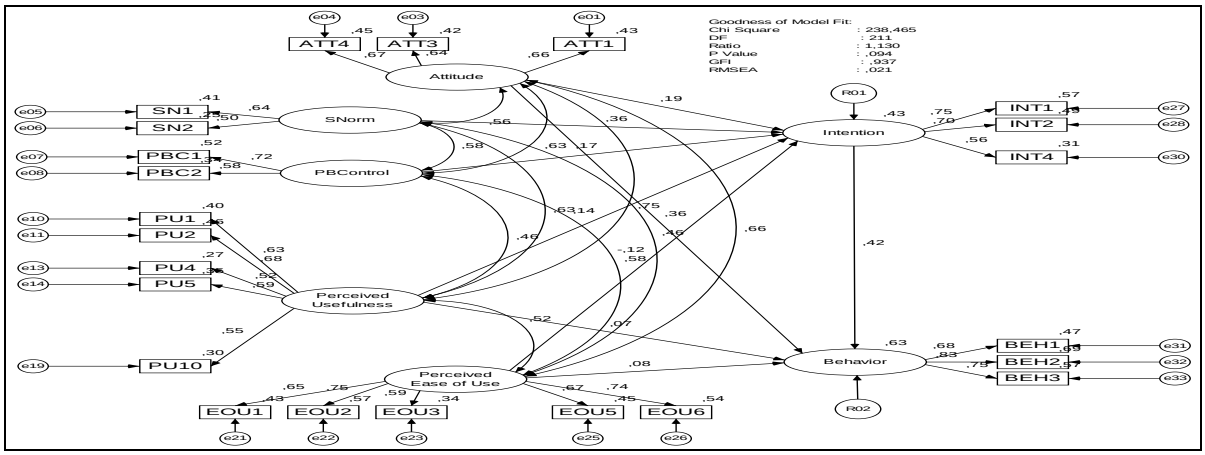

Figure 5: Re-specified Model

MEDIATING EFFECT ANALYSIS OF RE-SPECIFIED MODEL:

Table 11a shows the indirect effect estimates to test the mediating effect of intention on the five relationships as hypothesized in H7 to H11. Accordingly, the re-specified model only generates three mediating effects for H7 (intention mediates relationship between attitude and behavior), H10 and H11. Thus H8, H9 and H10 were rejected. Unfortunately, the indirect effect estimates for all three hypotheses were small and insignificant implying the absence of mediating effects of intention on these three relationships. In other words, the direct effects from the three variables (attitudes, perceived usefulness and perceived ease of use) to behavior were higher or significant compared to indirect effects. Thus, H7, H10 and H11 were rejected.

TABLE 12A: INDIRECT EFFECT OF VARIABLES INTERACTION

Exogenous	Mediated	Endogenous	Path	Indirect Effect Estimate	Mediating Hypothesis
Attitude	Intention	Behavior	Attitude → Intention → Behavior (0.190 * 0.424)	0.085	Not Mediating
Perceived Usefulness	Intention	Behavior	Perceived Usefulness → Intention → Behavior (0.139 * 0.424)	0.058	Not Mediating
Perceived Ease of Use	Intention	Behavior	Perceived Ease of Use → Intention → Behavior (0.082 * 0.424)	0.034	Not Mediating

TABLE 12B: TOTAL EFFECT OF MEDIATING VARIABLE

Exogenous	Mediated	Endogenous	Path	Total Effect
Attitude	Intention	Behavior	Attitude → Intention → Behavior (0.362 + 0.085)	0.447
Perceived Usefulness	Intention	Behavior	Perceived Usefulness → Intention → Behavior (0.074 + 0.058)	0.132
Perceived Ease of Use	Intention	Behavior	Perceived Ease of Use → Intention → Behavior (0.082 + 0.034)	0.116

Note: *Standardized path estimates are reported*

COMPETING MODEL ANALYSIS:

Further to our analysis of structural path of re-specified model, we embarked on testing the original TPB and TAM model or competing models individually. Figure 6 illustrates the structural path model of TPB model fitted to our data. The results indicate the model has a good fit at p value =.403 (p>.05) and GFI of .975 well above the standard of 0.95. The SMC or R^2 for explaining variance in behavior was .63 and variance in intention was .42. Consequently, three direct effects are significant (H2: subjective norms to intention; H12new: attitude to behavior and H6: intention to behavior). Both attitude and perceived behavior control have no significant impact on intention (see table 12). Accordingly, Figure 7 shows the results of competing model of TAM. The goodness of fit indices indicate adequate model fit (p-value=.098, GFI=.958). Exceptionally, all direct effects were significant (H4: perceived usefulness to intention; H13new: perceived usefulness to behavior; H14new: perceived ease of use to behavior and H6: intention to behavior) except for H5: perceived ease of use to intention which was insignificant (see table 14). Squared multiple correlation (R^2) for explaining variance in intention is 28% and for explaining variance in behavior was 61%. Comparatively both competing structural models (TPB and TAM) exhibit a good fit indicating its robustness in internet purchasing setting.

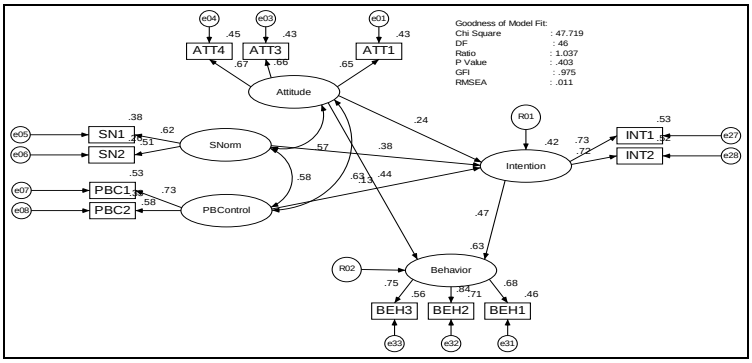

Figure 6: Competing Model of TPB

TABLE 13: STANDARDIZED REGRESSION WEIGHTS OF COMPETING MODEL OF TPB

Endogenous	Exogenous	Std. Estimate	S.E.	C.R.	P	Relationships
Attitude	Intention	0.237	0.123	1.831	0.067	Insig
Subjective Norm	Intention	0.378	0.144	2.399	0.016	Sig
PB Control	Intention	0.131	0.130	0.926	0.355	Insig
Attitude	Behavior	0.435	0.080	4.789	0.000	Sig
Intention	Behavior	0.469	0.086	5.023	0.000	Sig

TABLE 14: GOODNESS OF FIT ANALYSIS OF COMPETING MODELS (N=304)

Finals Models	TPB	TAM
Items remain	12	15
CMIN	47.719	101.188
Df	46	84
CMIN /df	1.037	1.205
p-value	0.403	0.098
GFI	0.975	0.958
CFI	0.998	0.987
TLI	0.997	0.984
RMSEA	0.011	0.026

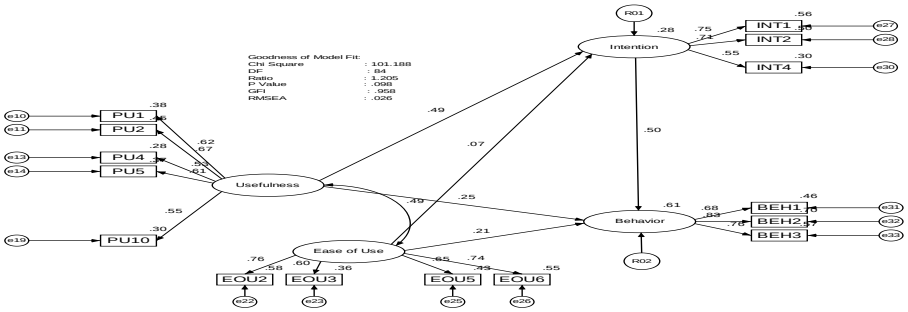

Figure 7: Competing Model of TAM

TABLE 15: REGRESSION WEIGHTS OF COMPETING MODEL OF TAM

Exogenous	Endogenous	Std. Estimate	S.E.	C.R.	P	Relationships
Perceived Usefulness	Intention	0.490	0.104	4.838	0.000	Sig
Perceived Ease of Use	Intention	0.072	0.076	0.829	0.407	Insig
Intention	Behavior	0.503	0.080	5.668	0.000	Sig
Perceived Usefulness	Behavior	0.247	0.081	2.801	0.005	Sig
Perceived Ease of Use	Behavior	0.210	0.055	2.971	0.003	Sig

OVERALL COMPARISON BETWEEN STRUCTURAL MODELS:

Table 15 indicates the overall comparison between four structural models (hypothesized, re-specified, TPB competing and TAM competing models) derived from the study. It shows that hypothesized model produces four significant direct impacts, re-specified model produces two significant direct impacts, TPB competing model supports three direct impacts and TAM competing model supports four direct impacts. It seems that the direct impact of subjective norms on intention was consistently significant across three models namely, hypothesized, re-specified and TPB competing models. Conversely, the path from attitude to intention was consistently insignificant across the same three models. Other direct paths revealed inconsistent relationships between differing structural models.

For mediating effects of intention on each hypothesized paths, we found two partial mediating effects of intention. The first effect was the partial mediating effects of intention on the relationship between attitude and behavior in TPB competing model. The second was the partial mediating effect of intention on the relationship between perceived usefulness and behavior in TAM. Mediating effects were not substantiated in hypothesized and revised model. Lastly, among the four structural models, revised model achieved the highest SMC (R^2),

explaining 62.9% variance in internet purchasing behavior, followed Theory of Planned Behavior (TPB) and Technology Acceptance model (TAM). According, hypothesized model obtained the lowest R^2 of 55% variance in internet purchasing behavior.

TABLE 16: COMPARISON BETWEEN HYPOTHESIZED MODEL, RESPECIFIED MODEL AND COMPETING MODEL

Endogenous	Mediation	Exogenous	Hypothesized Model			Re-specified Model			Competing Model of TPB			Competing Model of TAM		
			Std. Estimate	P	Hypothesis Status	Std. Estimate	P	Hypothesis Status	Std. Estimate	P	Hypothesis Status	Std. Estimate	P	Hypothesis Status
Attitude	-	Intention	0.130	0.272	Rejected	0.190	0.332	Rejected	0.237	0.067	.	.	.	-
Subjective Norm	-	Intention	0.310	0.020	Asserted	0.389	0.040	Asserted	0.378	0.016	Asserted	.	.	-
Perceived Behavior Control	-	Intention	0.185	0.051	Asserted	0.172	0.258	Rejected	0.130	0.385	Rejected	.	.	-
Perceived Usefulness	-	Intention	0.337	0.002	Asserted	0.139	0.430	Rejected	.	.	.	0.490	0.000	Asserted
Perceived Ease of Use	-	Intention	-0.089	00.535	Rejected	0.119	0.279	Rejected	.	.	.	0.072	0.407	Rejected
Intention	-	Behavior	0.745	0.000	Asserted	0.424	0.000	Asserted	0.469	0.000	Asserted	0.593	0.000	Asserted
Attitude	Intention	Behavior	.	.	.	0.085	.	Rejected	.	.	.	.	.	-
Subjective Norm	Intention	Behavior	.	.	.	.	.	Rejected	.	.	.	.	.	-
Perceived Behavior Control	Intention	Behavior	.	.	.	.	.	Rejected	.	.	.	.	.	-
Perceived Usefulness	Intention	Behavior	.	.	.	0.068	.	Rejected	.	.	.	.	.	-
Perceived Ease of Use	Intention	Behavior	.	.	.	0.034	.	Rejected	.	.	.	.	.	-
Attitude	-	Behavior	.	.	.	0.362	0.015	Asserted	0.436	0.000	Asserted	.	.	-
Perceived Usefulness	-	Behavior	.	.	.	0.074	0.519	Rejected	.	.	.	0247	0.005	Asserted
Perceived Ease of Use	-	Behavior	.	.	.	0.082	0.359	Rejected	.	.	.	0.210	0.005	Asserted
Goodness of Fit Indices:														
Chi-square			78.5462			238.465			47.719			101.188		
df			479			211			46			84		
Chi-square/df			1.582			1.130			1.037			1.205		
p			0.000			0.094			0.403			0.098		
RMSEA			0.865			0.937			1.975			0.958		
RMR			0.043			0.021			0.011			0.026		
R^2			55.2%			43.4%			41.5%			28.0%		
r			55.5%			62.9%			62.7%			60.6%		

5. DISCUSSION:

This study attempts to examine the goodness of fit of the hypothesized structural model by integrating TPB and TAM. As expected, the hypothesized model do not achieve model fit (p value=.000, p <.001). This implies that hypothesized model was not supported. However, the re-specified model accomplished model fit and supports three direct effects. Firstly, subjective norms have a direct significant effect on intention. Chai and Pavlou (2004) have found similar finding while George (2002) found otherwise. This could imply that families, friends and referent others could have certain amount of influence on intention to purchase on-line rather than on the actual purchasing behavior. This could be especially true amongst university students since they may have intentions to purchase online but could be hindered by friends' opinions and involvement. Second, attitude was found to have a direct significant impact on internet purchasing behavior. Past studies have obtained similar result (Celik, 2008; George, 2002, 2004; Chai and Pavlou, 2004). Those who have positive attitude about internet purchasing are likely to purchase online. Thirdly, intention has a direct significant and positive effect on internet purchasing behavior. This is supported by numerous past studies (George 2002; Venkatesh, Morris, Davis, & Davis, 2003; Venkatesh, 2000; Ajzen, 1985; Ajzen, 1991; Eagly, & Chaiken, 1993).

In the hypothesized model, intention was not a mediator between exogenous variables and behavior. When all the five factors were present at the same time, customers tend to have the inclination to purchase direct rather than just thinking about it. This means that in most cases internet users are likely to purchase directly once they have the opportunity to be online. Purchasing is made mandatory when internet customers need to commit by direct payment through the internet. Most internet users may not need to think and ponder once they want something. For example, when they browse a website to buy an airline ticket, they usually will purchase it immediately due to special offers which have time limit. Similarly, over time, internet technology is becoming more user-friendly and accessible than before. This makes on-line purchasing a matter of a few clicks only. Alternatively, our findings seem to indicate that when TPB or TAM competing model were tested individually, intention tends to play a partial mediating role for attitude in TPB and for perceived usefulness in TAM. Our explanation could be that internet purchasing intention intervenes the relationship between attitude and internet purchasing behavior because a person's attitude to purchase might change when that person feels insecure or unsure about the information given. Also, websites that are perceived as useful or beneficial to internet users is more likely to attract online purchasers.

6. SUGGESTION FOR FUTURE RESEARCH:

Future research should investigate the model in a different setting such as in public and private sector organization. There is also a need for research into how potential customers can be assured that particular Website can be relied on, example: personal information gathered from its customers were not sole to others (George, 2002). In addition, more research needs to be done on refining the measures used here and employing them in a study specially aimed at investigating internet purchasing behavior and its antecedents. Therefore, offline surveys should be performed complementarily in conjunction with online surveys to collect representative samples by prospective researchers because students as customers seem to be reluctant to supply any information on the internet (Celik, 2008).

7. CONCLUSION:

The research investigates the antecedents of two well-known intention/behavior models viv-a-vis TPB and TAM. This paper concludes that the hypothesized integrated model between TPB and TAM fails to achieve model fit. However, several direct paths are found to be significantly related to either intention or behavior. The model also fails to assert the mediating effect of intention in all instances except partial mediation in TBP and TAM individual models. Generally, the revised model is the best model to explain the internet purchasing behavior compared to TPB and TAM individually.

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