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Factors Affecting the Adoption of Internet Banking Amongst IIUM' students: A Structural Equation Modeling Approach (SEM)

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Abstract

This article examines the factors that determine the internet banking adoption amongst International Islamic University Malaysia (IIUM) and its causal effects using a theoretical model based on the Technology Acceptance Model (TAM). The research model consists of four exogenous latent constructs, namely, awareness, perceived usefulness, trust and perceived risk and endogenous latent construct namely Internet banking adoption. Data relating to constructs were collected from 200 university's students in (IIUM) and subjected to structural Equation Modeling (SEM) analysis. Confirmatory Factor Analysis (CFA) was performed to examine the reliability, construct validity, convergent validity and goodness of fit of structural models and measurement models. The hypothesized structural model fits the data well. The results show that the significant factor that leads to the adoption of internet banking is perceived usefulness but awareness, trust and risk have negative significant towards the use of internet banking.

Keywords: Internet Banking Adoption (IBA), University's students, International Islamic University Malaysia (IIUM), Structural Equation Modeling (SEM)

INTRODUCTION

Over the past few decades, the world has been an unprecedented evolution of Information Technology (IT) which has affected life as we know it. All industrial sectors have been affected especially the services sector. In recent years, the banking industry has undergone rapid technological changes and development. As a consequence, banks have launched multiple service access methods via new delivery channels like ATM technology and Internet Banking Service (hereafter called as IBS). The growing importance of Information Systems (IS) in banks was the establishment of fully-fledged IBS by Security first Network bank in USA in October 1995 Grandy, (1995). IBS is a new type of information system that uses the innovative resources of the internet and allows customers to engage in financial activities through virtual spaces and environments (Malek 2011).

Furthermore, IBS is extremely beneficial to both banks and customers. The main benefits to banks are cost savings, reaching new segments of the population, efficiency enhanced reputation and better customer' service satisfaction. Jayawrdhena & Foly, (2000), suggest that IBS offers new values to customers such as reduced costs in accessing and using bank services, increased comfort and time-saving transactions that can be made 24 hours a day without requiring physical interaction with the bank speed of transaction and better administration of funds(Tuchila,2000). IBS also offers a competitive advantage to banks by providing an unlimited distribution network. Although, there are past literatures studies on the adoption of internet banking, many of these studies have tended to focus on developed countries such as USA and UK (Pikkarainen et al. 2004). However, still not predictable in some developing countries (Kaled, 2008); Zolait, 2009; Al Nahian et al. 2009; Mohammad 2010).

Since the success or failure of internet banking is contingent upon the degree of its adoption. There is a need to determine which factors influence customers' adoption of IBS. Therefore, this research tries to add to the body of knowledge in the area of technology acceptance and extends our knowledge of the factors affecting IBA by banks' customers (university's students). Furthermore, this study attempts to indentify and better understand these factors through the sampling banks' customers university' students point of view. The IBS literature suggests four success factors or constructs for Internet Banking Service Adoption IBSA (perceived usefulness, trust, risk and awareness) for this study.

LITERATURE REVIEW

Internet Banking

Internet banking or online banking can be defined as the service that allows consumers to perform banking transactions using a computer with an internet connection (Lloyd G.G.,(2007). Lloyd explains that these transactions include checking the balance in one's bank account, transferring funds between accounts, and bill paying. Pikkarainen, Karaluoto, and Pahnil (2004) defined internet banking as an internet portal used by customers for different kinds of banking services ranging from bill payment to investments. Internet banking has been defined as" the use of the internet as a remote delivery channel for banking services and an internet bank is defined as a bank that offers transactional services via the internet Lee (2000).

Ramath S. &Hema, (2010) propose that IB is the latest initiative in the spectrum of innovative banking services, ATMs, Tele banking, credit and debit cards and internet banking have emerged as effective delivery channels for traditional banking products. A study by Booz et al, (1997) indicates that online banking saving time. Furthermore, Booz predicts that approximately 20% of retail and 30 % of businessmen will use some form of Internet banking within the next five years.

With the exception of cash withdrawals internet banking gives customers access to almost any type of banking transaction at the click of the mouse (De Youngm 2001). E-banking technologies refer to financial activities that involve use of electronic technology Lee, (2000) ranging from the now ubiquitous automatic teller machines to other services such as direct deposit, electronic bill payment, electronic funds transfer, telephone banking and online banking. Dube, chitura & Runyowa (2009) identify that there are three functional level/ kind of internet banking that are currently employed in the market place and these are: Informational, Communicational and Transactional.

THEORETICAL UNDERPINNING THEORY OF IBSA

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was one of a number of studies that have helped in providing theoretical framework for research in the adoption of information technology over the last two decades. TAM has been used extensively as the basis of a range of empirical studies (Mohammed & Kalial, 2011). Introduced by Davis in 1986 TAM was specially designed to explain and predict the behavior technology acceptance at work by specifying the determinants in belief, attitude, intention-IT usage relationships (Davis, 1989).

Moreover, Moon & Ki,m, (2001) added that to increase external validity of TAM, it is necessary to further explore the nature and specific influences of technology and usage –context factors that may alter the user's acceptance. For instance, recent research has indicated that "trust" has a striking influence on users' willingness to engage in online exchange of money and sensitive personal information. Another example is the perceived risk, Munirudeen (2007) claimed that perceived risk is a major determinant of adoption behavior business to consumers (B2C) e-commerce environment.

Since the introduction of TAM in 1986, a number of studies have applied it in a broad variety of IT applications to predict user acceptance behaviors of computer technologies such as wireless internet (Lu, Yu & Yao, 2003) email and voice mail (Adams, 1992), online shopping (Gefen & Straub,1997). As Hamza, Youngs & Aymen (2011) mentioned that the TAM posits a user's adoption of new information system is determined by that user's intention to use the system which in turn is determined by the user's beliefs about the system.

According to Davis (1989) noted that technology acceptance research must address how other variables affect usefulness, ease of use and user acceptance. Therefore, perceived ease of use and perceived usefulness may not fully explain behavior intentions towards the use of internet banking, necessitating a search for additional factors that can better predict the acceptance of internet banking.

Additionally, Muniruddeen (2007) stated that TAM examines the mediating role of perceived ease of use and perceived usefulness in their relation between systems characteristics (external variables) and the probability of system use. The use of an extended TAM as a theoretical framework is adopted to examine the effect of external variable such as, security and privacy, risk, trust and awareness on the intention to use IB. In addition to TAM being a widely used and proven model, other reasons for the adoption of this model are because TAM is simple and IB is an information system and an application used by many internet users.

FACTORS INFLUENCING ADOPTION OF INTERNET BANKING

Previous studies will show that altitudinal factors (also referred to as perceptions, characteristics, or experiences) affecting internet banking adoption. Some factors have most frequently demonstrated statistically significant relationship with internet banking adoption such as perceived usefulness, perceived, risk, trust, and awareness Lloyd Gibson,(2007). These factors demonstrated statistically significant relationship in studies performed in the developing countries like (AbuShanab, 2005 ; Malik, 2011) in Jordan; (Khalid, 2008) in Oman; (Salem Omer, 2010) in Labia; Daghfous & Toufaily (2007) in Lebanon; (Padachik& Rojid 2008) in Mauritius; (Al Nahian, 2009) in Bangladesh and (Azanee, 2011) in Malaysia .

Awareness

Rogers (1983) defined awareness of innovation as: innovation exists and gains some understanding of how function. While Sathye (1999, p. 325) has defined awareness of innovation as: understanding whether the customer is aware or not aware of service itself and its benefits. He also shows that low level of IBS awareness is a critical factor in causing customers not to adopt online banking. Hence, this study hypothesizes positive linkage as follows:

H 1: awareness has significant and positive influence on Internet banking adoption. Perceived usefulness

Perceived usefulness can be defined as: the extent to which a person believes that using the system will enhance his/her job performance (Davis, 1989, p. 320). According to Rahmath & Hema (2011) defined perceived usefulness as the extent to which a person deems a particular system to boost his/her job performance. Hence, this study hypothesizes positive linkage as follows:

H2: Perceived usefulness has significant and positive influence on Internet banking adoption.

Perceived Trust

Trust can be defined as “generalized expectancy …that the word, promise, oral or written statement of another individual, or group can relied upon” Samsudin et. al.,(2009). While, Patrick (2002) defined trust as: “users thought, feeling, emotions, or behavior that occur when they feel that an agent can be relied upon to act in their best interest when they give up direct control. Hence, this study hypothesizes positive linkage as follows:

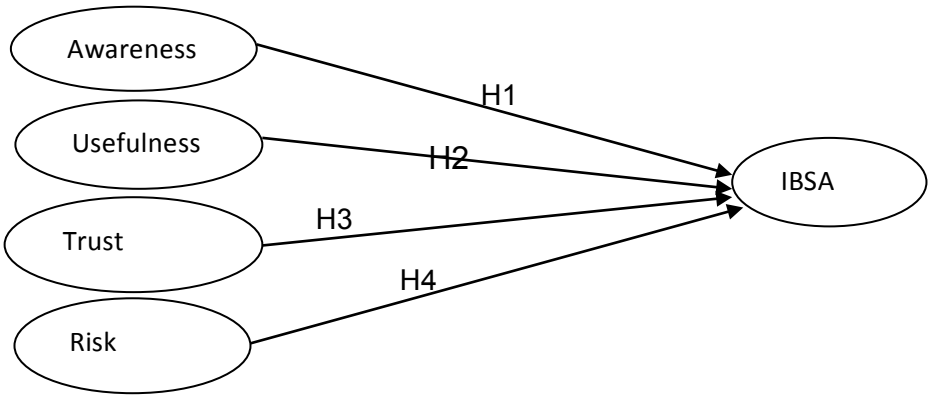
H 3: Trust has significant and positive influence on Internet banking adoption.

Perceived risk

According to Grabeer & Faullant (2008 P448) perceived risk is:"Uncertainty which primarily relates to potential technological sources of errors and security gaps". As Norazah M., (2010) 9 defined that perceived risk is the consumer's subjective expectation of suffering a loss in pursuit of a desired outcome and he reported that perceived risks of innovation were inversely related to adoption in telephone based direct banking services. Hence, this study hypothesizes negative linkage as follows

H 4: Perceived risk has significant and negative influence on Internet banking adoption

The research Framework figure (1)



METHODOLOGY

200 completed questionnaires were received among bank' customers (university's students) located in International Islamic University Malaysia IIUM via simple random sampling SRS. The questionnaire was divided into two sections: part one describes about respondents' demographic and part two aims to identify level of consumer satisfaction and perception in internet banking adoption includes importance to banking needs, awareness, perceived usefulness, trust and perceived risk. The five point Likert scale ranging from 1-strongly disagree to 5- strongly agree was used for the questions to indicate a degree of agreement or disagreement with each of a series of statements related to the stimulus objects. The date was analyzed by examining the distribution of responses based on frequencies and percentages. Next the structural Equation Modeling (SEM) analysis using AMOS .18 was conducted.

RESULTS AND FINDINGS

Frequency Distribution

Table (1) summarizes the socio-demographic profile of the sample. There were 200 university' students who participated in the survey with 145 of them males and 55 females. 63% of the students are between the age 17-25 and the remaining of them is aged between 26-35 years. And 8.5 of the student are more than 35. The survey revealed that 124 respondents are degree and 60 of them master , 20% of the

respondents are PhD and 14 students are diploma.70% of the respondents have less than RM 1000 monthly and 30% of them get RM 1000 and above. 55.5% of the students are Internet banking users and 46.5% are non users.

Table (1) distribution of respondents IIUM students on the basic demographic factors

Demographic factors	Categories	No. of Respondents and %
Gender	Male	145 (72.5%)
	Female	55 (27.5%)
Age	17- 25 years old	126 (63%)
	26-35 years old	57 (28.5%)
	36-45 years old	14 (7%)
	46- above	3 (1.5%)
Education	Diploma	14 (7%)
	Bachelor	124 (62%)
	Master	40 (20%)
	PhD	22 (11%)
Monthly income :RM	Less than 1000	140 (70
	1010- 2500	40 (20%)
	2510 above	20 (10%)
Utilization of Internet	Users	107 (53.5%)
	Non users	93 (46.5%)
How often do you use it	Frequent	58 (35.5%)
	Occasional	105 (46.5%)

STRUCTURAL EQUATION MODELING

The results of SEM include two competent: the measurement model and the structural model. The measurement model gives the relationship between latent variables and observed variables. The structural model studies path strength and the direction of the relationships the latent variable. For example, figure (2) shows a CFA that test the measurement model. Each construct is indicated by five indictors items, thus five latent constructs are measured by 22 measured indictor variables (A1-O4)

The measurement model

A confirmatory factor analysis (CFA) using AMOS was conducted to test the measurement model. It is necessary to test that the measurement model has a satisfactory of validity and reliability before for a significant relationship in the structural model. The psychometric properties of the measurement model in terms of reliability, convergent validity and discriminant validity were evaluated (see Table 2).

Composite reliability (CR) was used to measure the reliability of a construct in the measurement model. CR offers a more retrospective approach of overall reliability and estimates consistency of the construct itself including the stability and equivalence of construct (Hair, Black, 2010). A value of .70 or greater is deemed to be indicative of good scale reliability. Table (2) shows the results of the calculated composite's reliability to support construct reliability. The reading of composite reliability of the latent variables is above 0.70. Therefore, all latent variables have good reliability.

Convergent validity shows the extent to which indictors of a special construct converge or have a high proportion of variance in common (Hair, 2010). The results of the Confirmatory Factor Analysis (CFA) in table (2) show that standard factor loading of observed variables are adequate ranging from 0.579 to 0.832. This finding indicates that the constructs conform to construct convergent validity.

Table (2) Reliability and Items loading

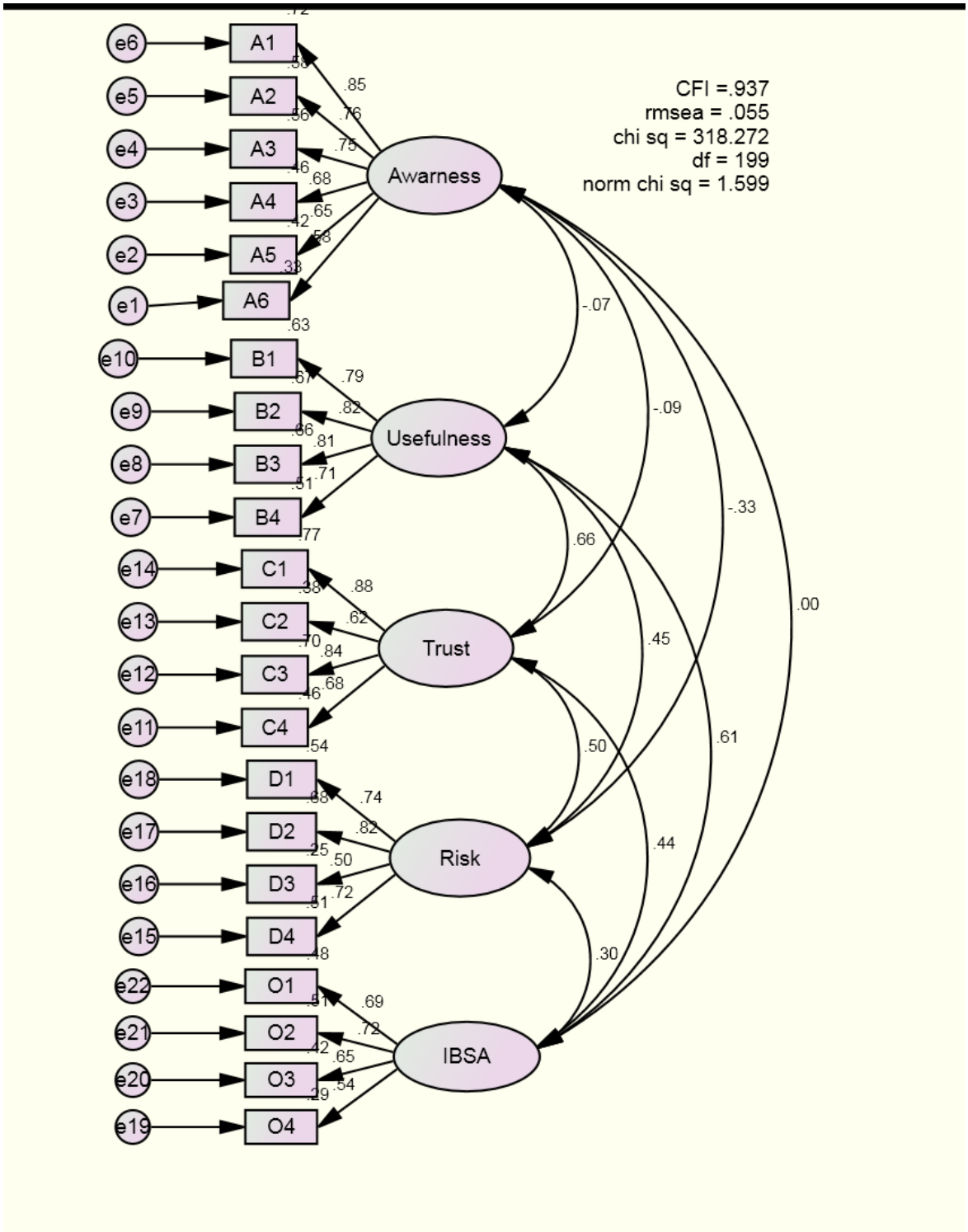
Constructs	Items	Standardized Loading	Composite reliability	Average variance Extracted
Awareness	A1	0.832	0.760	0.859
	A2	0.800		
	A3	0.787		
	A4	0.747		
Usefulness	A5	0.737	0.761	0.864
	A6	0.661		
Trust	B1	0.805	0.736	
	B2	0.771		0.835
	B3	0.760		
Risk	B4	0.711	0.728	
	C1	0.821		0.783
	C2	0.797		
IBSA	C3	0.749	0.711	0.739
	C4	0.579		
	D1	0.863		
	D2	0.814		
	D3	0.648		
	D4	0.588		
	O1	0.762		
	O2	0.730		
	O3	0.715		
	O4	0.637		

Discriminant validity shows the extent to which a construct is truly distinct from other constructs (Hair, 2010). A commonly used statistical measure of discriminant validity is a comparison of the Average Variance Extracted (AVE) value with correlation squared. Table (2) demonstrates the average AVE the latent variable correlation and square root of the AVE. The correlation between two exogenous constructs higher than 0.85 shows lack of discriminant validity. As for this study, all constructs have discriminant validity

with strength of correlations. As figure: (2) indicates the correlation among exogenous constructs.

The diagram shows there are strength correlations among constructs
For example, perceived usefulness has strength positive correlation with trust and IBSA, the values are (0.66, 0.61) respectively. However, it has low negative correlation with awareness (-0.07) and it has no interaction with IBSA (0.00). On the other side, awareness has low negative correlation with usefulness, trust, risk and the values are (-0.07, -0.9, -0.33) respectively. Furthermore, trust has positive correlation with usefulness, risk and BSA (0.66, 0.50, and 0.44) except awareness and also risk has positive correlation with IBSA 0.33. Overall, some constructs have discriminant validity low negative strength and other have positive of correlation, ranging from 0.00 to 0.66.

Figure 2: The measurement model shows how the constrains are drawn in Amos



The structural model

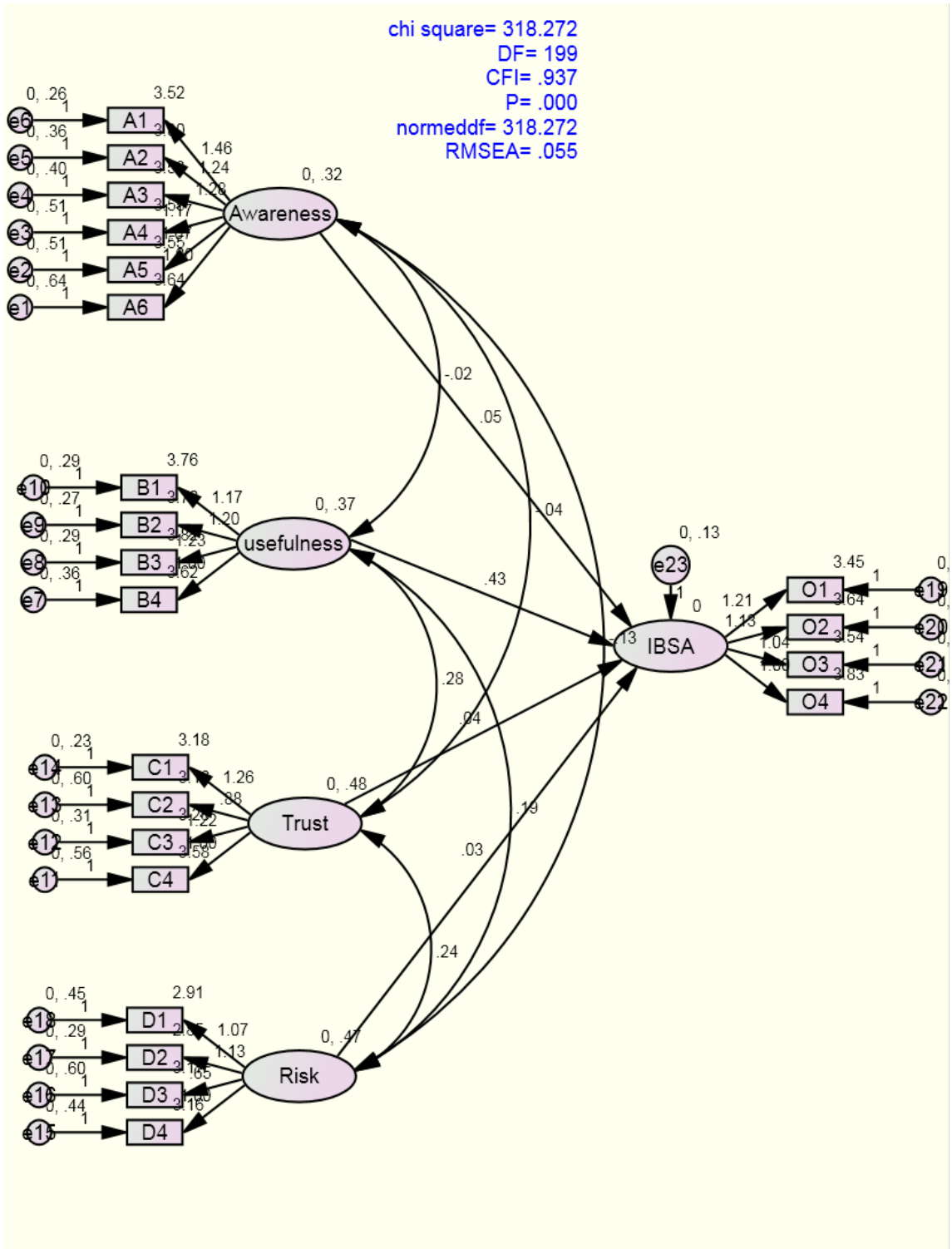
Goodness of Fit Indices

All confirmatory factor analysis (CFA) of constructs produced relatively good fit as indicated by the goodness of fit indices such Goodness index GFI is more than 0.90 and RMSEA value is less than 0.08. Furthermore, the test of structural model was performed using SEM in order to examine the hypothesized conceptual framework by performing a simultaneous. Table (3) depicts the Goodness-of-Fit for the model was met. Chi-square\df= 318.272; CFI= 0.937, GFI= 0.879, NFI= 0.849, P=0.000, RMSEA= 0.055 and normed chi-square= 1.65. The overall values provided evidence of a good model fit. As a result, all fitness indexes namely NFI, IFI, CFI are above than 0.90 which indicate that the model employed in the study a good fit to the data.

Table (3): Goodness of fit Indices for Structural Model

Fit Indices	Accepted Value	Model Value
Absolute Fit Measures		
Chi-square		318.272
Df(Degree of Freedom)		199
Probability		0.000
GFI(Goodness of Fit Index)	> 0.90	0.876
RMSEA(Root Mean Square Error of Approximation)	< 0.08	0.055
RMR		0.53
Normed chi-square		1.599
Incremental Fit Measures		
NFI (Normed Fit Idex)	> 0.90	0.849
CFI (Comparative Fit Index)	> 0.90	0.937
RFI (Relative Fit Index)	> 0.90	0.825
IFI (Incremental Fit Index)	> 0.90	0.938
Parsimony Fit measures		
AGFI (Adjusted Goodness of Fit Index)	> 0.80	0.842
PCFI (parsimony Comparative of Fit Index)	> 0.50	0.807
PNFI (parsimony Normed Fit Index)	> 0.50	0.732

Figure (3): The Structural Equation modeling result (Standardized path coefficients)



HYPOTHESES

Hypothesis 1 postulates that the awareness has significant and positive influence on Internet banking adoption. As evident in the Table (4), awareness of banks' customers was not significantly due to B (beta) = 0.062. So, the hypothesis is not supported. However, this study found the hypothesis 2 perceived usefulness has significant and positive influence on internet banking adoption B= 0.562. Therefore, this hypothesis is supported. On the other hand, the results of hypothesis' 3, trust was not significantly and positive influence on internet banking adoption because of B= 0.057 and also perceived risk was not significantly and negative influence on internet banking adoption B = 0.042. Consequently, the hypotheses 3 and 4 were not supported. The table (4) shows summary of hypotheses testing results.

Table (4) Summary of Hypotheses and path coefficient -Testing Result

Path	Estimate (B)	S. E.	C.R.	P	Results
IBSA ←— Awareness	0.062	0.068	0.756	0.450	Not supported
IBSA ←— Usefulness	0.562	0.104	4.106	0.000	Supported
IBSA ←— Trust	0.057	0.077	0.489	0.625	Not Supported
IBSA ←— Risk	0.042	0.070	0.411	0.681	Not supported

Note: B standardized beta coefficient; S.E. = standard error; C.R.= critical ratio $P < 0.05$

CONCLUSION

This study is concerned with an empirical investigation of factors that could affect Internet banking adoption on IIUM students. These factors include awareness, usefulness, trust and perceived risk. As hypothesized in H2, Usefulness was found to have a positive and direct influence on internet banking adoption. A large standardized coefficient, B= 0.512 as compared to other factors. On the other hand, awareness, trust were found to have positive and not significant influence on Internet banking adoption B beta= 0.062; 0.04 respectively. However, perceived risk has negative and not significant influence on internet banking adoption. Usefulness is the only significant predictor which influences the internet banking adoption in this study. As for the remaining constructs, they are not the significant predictors in this study due to the fact that nature of population itself which were students might influence the result of the study.

Moreover, most of respondents use online banking occasionally and many respondents have a little knowledge about the e-banking services because of they do not have much money in their bank' accounts. Despite the useful findings of the study, this empirical study has several limitations that need to be acknowledged. Several factors were examined in this study.

Future studies should attempt to draw profiles based on characteristics other than these factors. And also the empirical data for this study was collected in International Islamic university Malaysia IIUM which have technological different environment from some other places.

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