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FACTORS AFFECTING AWARENESS ON INFORMATION SECURITY IN INTERNET BANKING AMONG UNIVERSITI TEKNOLOGI PETRONAS (UTP) STUDENTS

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ABSTRACT. Internet banking is becoming one of the important services to many consumers. Most of the banking transactions can now be done online regardless of time and place. Information security is one of the crucial components in Internet banking where it ensures the confidentiality of bank users' information. It was found that there is lack of empirical studies on awareness of information security in Internet banking among tertiary education students. Therefore, this study is conducted to fulfill two objectives; (1) to identify potential factors that can influence awareness on information security in Internet banking among tertiary education students, and (2) to measure the relationship between the identified factors and the level of awareness on information security for Internet banking among tertiary education students. Seven factors have been identified from the literature including security concern, security care, social norm, computer literacy, regulatory literacy, recovery facility and information support. This study applied questionnaire instrument to evaluate the relationship between the identified factors and the level of awareness on Internet banking information security among tertiary education students. Universiti Teknologi PETRONAS (UTP) students have been selected as subject for this study which represent tertiary education students. Descriptive and inferential analyses were used to analyze the consolidated data. Results showed that all seven factors influenced the level of awareness except the social norm.

Keywords: information security, Internet banking, security concern, security care, social norm, computer literacy, regulatory literacy, recovery facility, information support

INTRODUCTION

Ignorance on information security in Internet banking could be the main cause for fraudulent to happen easily. Fraudulent in Internet banking is highly linked to various threats such as adware, keylogger, malware, phishing, spyware, Trojans and viruses (Subsorn & Limwiriya-kul, 2011). Phishing for example is one of the method widely where a scam email is sent to Internet banking users informing of a security breach to the user's account and requesting the user to change the password (Gan et al., 2008). Once the user changes the password, the intruder captures it and uses it to access the user's account. The number of phishing cases is increasing from year to year (Gan et al., 2008). In Malaysia, there were only 3 cases reported in 2000 but the number of cases has increased drastically in 2004 (106 cases) and 2007 (364

cases). It is therefore important to have strong awareness on the information security in Internet banking to reduce the number of fraud.

There seems to be a lack of empirical studies on the awareness of information security for Internet banking among the tertiary education students. There were many similar studies conducted on various target respondents including general bank customers (Fatimah et al., 2013), (Nasri & Zarai, 2014), (Waithaka & Nzeveka, 2015), corporate customers (Munasinghe, 2014) and adult customers (Rubha & Kothai, 2015). However, very minimal emphasis has been focusing on tertiary education students. This group has been chosen due to their tendency in using Internet banking as compared to other groups including elderly (Padachi et al. (2008).

This study was therefore conducted to fulfill two research objectives; (1) to identify potential factors that can influence the awareness on information security in Internet banking among tertiary education students and (2) to measure the relationship between the identified factors and the level of awareness on information security for Internet banking among the tertiary education students. In this study, Universiti Teknologi PETRONAS (UTP) students were chosen as the main subject.

LITERATURE REVIEW

Through Internet, banking fraudulent can be made through various threats including malware, keylogger, identity theft, social engineering, phishing, man-in-the-middle attack (MitM) and shoulder surfing (Ojalere et al., 2014). As mentioned by Gan et al. (2008), the most significant threat for information security in Internet banking is phishing. As cited by Vrancianu and Popa (2010) from May 2004 to May 2005, 1.2 million consumers lost 929 million dollars due to phishing.

As mentioned, there have been existing studies conducted on information security in Internet banking. Zhu (2015) expand Theory of Planned Behavior as the theoretical framework. This theoretical framework involved three independent variables; attitude, subjective norm and perceived behavioral control; and two dependent variables; intention and behavior. The expanded independent variables include security concern and security care toward attitude, familiarity and knowledge toward internal control factor for perceived behavioral control and, channel and technology for external control factor for perceived behavioral control.

Three most significant factors making the Internet banking user being the fraudulent victims have been identified as user's behavior, literacy and service quality. Based on the study by Zhu (2015), in China, 50% of the respondents said they were not actively care about the information security for their Internet banking. This is worse where 64% of the respondents admitted that they do not really know how to use Internet banking. Here, it was proven that behavior of users themselves allow them to be the victims of phishers. Therefore, this user's behavior factor can be divided in two sub-factors including security concern and security care.

Literacy in this study refers to consumers' knowledge on various aspects with regards to information security in Internet banking. Consumers with low literacy level will have higher chance to be defrauded by phisher or intruder. Based on readings, literacy can divided into three categories; social norm, computer literacy and regulatory literacy.

In Information System (IS) such as Internet banking, service quality refers to quality that Internet banking system can provide to the consumers (Yang, Shaohan, Zhouc, & Zhou, 2004). This system should ensure the comfortability of the consumers while using the system. Two main aspects that need to be taken into consideration in providing high service quality in

Internet banking are; recovery facility and information support. These aspects are very important in protecting consumer's information.

RESEARCH METHODOLOGY

This study was conducted in three phases; preliminary, data collection and data analysis. In preliminary phase, related articles including journals, books and conference papers have been reviewed. From these readings, the scope was identified, which is tertiary education students.

In this study, cross-sectional cause and effect design have been applied. This study involved identifying factors that influence the awareness on the importance of information security in Internet banking and evaluating the relationship between the identified factors and the level of awareness. Cross-sectional research design would be the best method in conducting this study.

Questionnaire was used as the research instrument. The questions in the questionnaire were adapted from the studies conducted by Dixit and Datta (2010), Poon (2008) and (Haque, Muhammad Sabbir, & Tarofder, 2009). The questionnaire was constructed based on the research framework designed (refer to Figure 1).

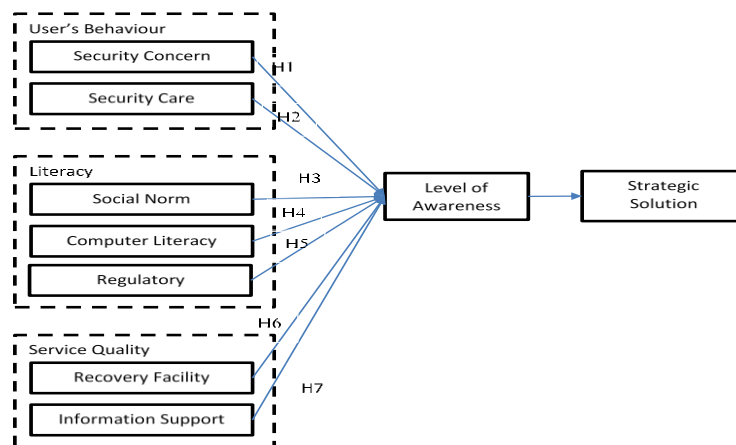


Figure 1. Research Framework

The questionnaire was divided into six sections where Likert scale of 1 to 5 has been applied (1 strongly disagree and 5 strongly agree).

Reliability is a measurement of stability and consistency of the results derived from unit of analysis. For this test, questionnaire was distributed to 30 UTP Undergraduate students who are in technology stream. As analyzed, the reliability score was 0.738 which is higher than passing score (0.7).

Convenient sampling where the selection of respondents could be easily found. The reason of applying this sampling technique was because of inability to determine the size of population. Even though the findings of this study could not be generalized, there is still need for proof of concept using statistical analysis. The findings could still be reported as usual. This study was conducted among 151 Undergraduate students of Universiti Teknologi PETRONAS.

Descriptive analysis including frequency, percentage, mean, mode and median were used in this study. Meanwhile, for inferential analysis (hypothesis testing), multiple regression

analysis was applied. At the end of this analysis, hypotheses that have been proposed earlier in this study were proven whether they are accepted or rejected.

RESULTS & DISCUSSION

Descriptive Analysis

In this analysis, frequency analysis using percentage and mean have been performed. Table 1 presents both analyses. Based on Table 1, means of scale rated by respondents were between 3.00 and 4.50. According to Likert scale, Scale 1 indicates strongly disagree, Scale 2 disagree, Scale 3 neutral, Scale 4 agree and Scale 5 strongly disagree. Out of 7 factors, only 3 factors have been rated as agreed (scale 4) by all respondents. The remaining 4 factors indicate vague where the mean rates were between scale 4 (agree) and scale 3 (neutral). Therefore, frequency using percentage has been applied to discuss on the findings (Ahmad Sobri, 2014).

Table 1. Descriptive Analysis

Factor	Rate (%)			Mean (out of 5)
	Agree	Neutral	Disagree	
Security Concern	83.32	14.70	1.84	4.24
Security Care	84.10	12.60	3.30	4.48
Social Norm	35.77	43.93	20.33	3.20
Computer Literacy	48.74	34.46	16.80	3.47
Regulatory Literacy	50.33	29.30	20.38	3.45
Recovery Facility	74.85	19.70	5.45	4.04
Information Support	63.80	30.90	5.30	3.85
Level of awareness	66.48	25.56	7.96	3.88

Agree and disagree columns were produced by combining the percentage of agree and disagree, and the percentage of disagree and strongly disagree respectively. Based on Table 1, most of the respondents agreed with all factors asked except social norm. The highest agree percentage was security care (84.10%) followed by security concern (83.32%), recovery facility (74.85%), information support (63.80%), regulatory literacy (50.33%) and computer literacy (48.74%).

Low percentage in agree on social norm as rated by respondents was due to current practice towards acquiring information on Internet banking information security. The items asked for this factor includes “my family and I keep reminding each other in Internet banking security”, “I keep reading any update on Internet banking information” and “I used to share any updated information regarding Internet banking system with my colleagues”.

Finally, on the level of awareness, 66.48% of the respondents rated agree which indicates that they are aware with the importance of information security in Internet banking.

Inferential Analysis

Inferential analysis has been applied to determine the relationship between the identified factors and level of awareness of Internet banking information security. This analysis was essential to prove the hypotheses to be either accepted or rejected. For this study, multiple

regression analysis were conducted to validate the overall research framework, to evaluate on which factors are more important and to proof all hypotheses.

Table 2 presents the findings on validation of overall framework. Based on Table 2, value R square determines the validity of overall framework (Hayes, 2013). If the value of R square equals to 0, it indicates that the framework does not work at all. In Table 2, the R square value is 0.515 which indicates 51.50% variability towards dependent variable (Hayes, 2013). In the simplest word, it could be reported in general that most of the factors influence the dependent variable which is level of awareness on Internet banking information security.

Table 2. Overall Framework Validation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.644 ^a	.515	.486	.48806	.515	14.281	7	141	.000

There are three readings which are very important to be analyzed. The columns are Beta (coefficient), t and Sig (refer to Table 3). Beta column presents the ranking of importance of factors that influence the level of awareness on Internet banking information security. Higher value of Beta indicates higher importance of the variable factor (variable) (Hayes, 2013). Therefore, the most important factor is security care followed by security concern, recovery facility, information support, regulatory literacy, computer literacy and social norm. This finding is in line with the finding from descriptive analysis.

Table 3. Prove of Hypotheses

No	Hypothesis	Beta	t	Sig.	Proof
H1	User's security concern has positive influence to the level of awareness in Internet banking information security	.384	1.737	.010	Accept
H2	User's security care has positive influence to the level of awareness in Internet banking information security	.441	3.278	.001	Accept
H3	User's social norm has positive influence to the level of awareness in Internet banking information security	.035	.426	.671	Reject
H4	User's computer literacy has positive influence to the level of awareness in Internet banking information security	.370	3.976	.000	Accept
H5	Regulatory has positive influence to the level of awareness in Internet banking information security	.373	1.727	.036	Accept
H6	System recovery facility has positive influence to the level of awareness in Internet banking information security	.382	2.473	.007	Accept
H7	System information support has positive influence to the level of awareness in Internet banking information security	.380	2.120	.025	Accept

Column t and Sig. determine the significance of the factors in influencing the level of awareness (Hayes, 2013). These columns will also prove the hypotheses. If t value is bigger 1.645 and Sig. value is lesser than 0.05, the alternative hypotheses are accepted (Pallant, 2010). Based on Table 3, all hypotheses were accepted except for H3. This finding is consistent with the findings in previous analyses.

In summary, most of the factors that have been identified shall influence the level in awareness on Internet banking information security among students in Universiti Teknologi PETRONAS except for social norm. Social norm towards Internet banking information secu-

ity could be enhanced by cultivating knowledge sharing among Internet banking users. Social media is the most frequently used media by all people including children, youngsters and elderly. This media should be fully utilized in sharing the knowledge on information regarding Internet banking information security so that the level of awareness on this matter could be leveraged.

CONCLUSION & FUTURE WORKS

Seven factors that have been identified and included in this research framework. These factors were identified through thorough literature studies conducted. The relationship between the factors and the level of awareness of Internet banking security has been explored using questionnaire instrument compound with relevant statistical analyses. The analyses were descriptive and inferential analyses. The results showed that all factors except social norm influenced the level of awareness of Internet banking information security among UTP Undergraduate students. The most important factor is security care followed by security concern, recovery facility, information support, regulatory literacy and computer literacy.

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