CHAPTER IV

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results and analysis of the collected data. The findings include descriptive analysis, Correlation analysis and finally the hypothesis testing results. Linear Regression was conducted to identify the major factors for evaluating information security awareness and practice in the workplace and home among the employees in USIM.

4.2 Results of the Pilot Study

The pilot study was conducted in this study to measure the reliability coefficient for the survey instrument. Criterion validity and reliability of the questionnaire in this study have been determined by using Statistical Package for the Social Sciences (SPSS). The reliability factor is measured by analyzing the questionnaire' results to obtain Coefficient Cronbach Alpha. Cronbach's Coefficient Alpha indicated that if the reliability factor is less than 0.60 then it is considered to be poor, above 0.60 is acceptable, and over 0.80 is good (Cortina, 1993). Table 7 presents the Cronbach's Alpha value of the pilot study.

Table 7: Reliability Statistics' by Cronbach Alpha for the Pilot Study

Cronbach's Alpha	Cronbach alpha coefficient value (α)
Security awareness	.813
Security practice at workplace	.712
Security practice at home	.715

The pilot study survey instrument was designed to measure the security awareness and practice in both workplace and home in general; where the pilot study measured the current security awareness and practice level among the staff only. However, in the actual study the direction has been changed to investigate the effect of policy, behaviour, training, knowledge of technology and education on information security awareness and practice for both workplace and home, a modification of the survey instrument was conducted to be consistent with the direction of the current study. The pilot study survey instrument is attached in Appendix A while the actual reliability factor is presented in Section 4.5.

4.3 Data Screening and Cleaning

Before analysing the data, data screening and cleaning procedures for errors or outliers were conducted. Furthermore, both constructs and the items in the constructs need to be validated. To ensure the validity of the constructs and to ensure the reliability of the items that are used in measuring the construct, reliability analysis was also performed. Data screening is described as the process that has to be conducted to ensure no ambiguous data characteristics exist which have the potential of effecting the findings. The screening process steps are imperative as the former steps often effect the decisions to be taken on the latter steps. Hair et al.,(2006) described outlier as relating to data with a value which are external to the normal data range. There

were 20 cases eliminated in this study. The remaining 285 cases were used for further multivariate analysis. The final usable questionnaires were 285 (N = 285), representing 93.4% of the total number of questionnaires distributed.

4.4 Results of Demographic Analysis

This section comprises the respondents' demographics such as gender, age, race, level of education and job role. The descriptive statistics of the demographical data are reported in the subsequent section.

4.4.1 Gender

Gender, from where the samples reported in this research, is plotted as shown in table 8. Overall, females were more than males, where, male comprises 45% (128 respondents) while female 55% (157 respondents) of the sample in this study. Table 8 shows the gender distribution.

Table 8: Frequency of Respondents by Gender

Gender	Frequency	Percent%
Male	128	45
Female	157	55
Total	285	100

4.4.2 Age Group

Respondents aged between 30-34 years old were considered the majority in this study with percentage (33%), followed by 25-29 years with (27%), 35-39 years

with (17%), 40 and above with (11%) respectively, while the minority were less than 20 years old with (2%). Figure 5 shows the respondents age distribution. .

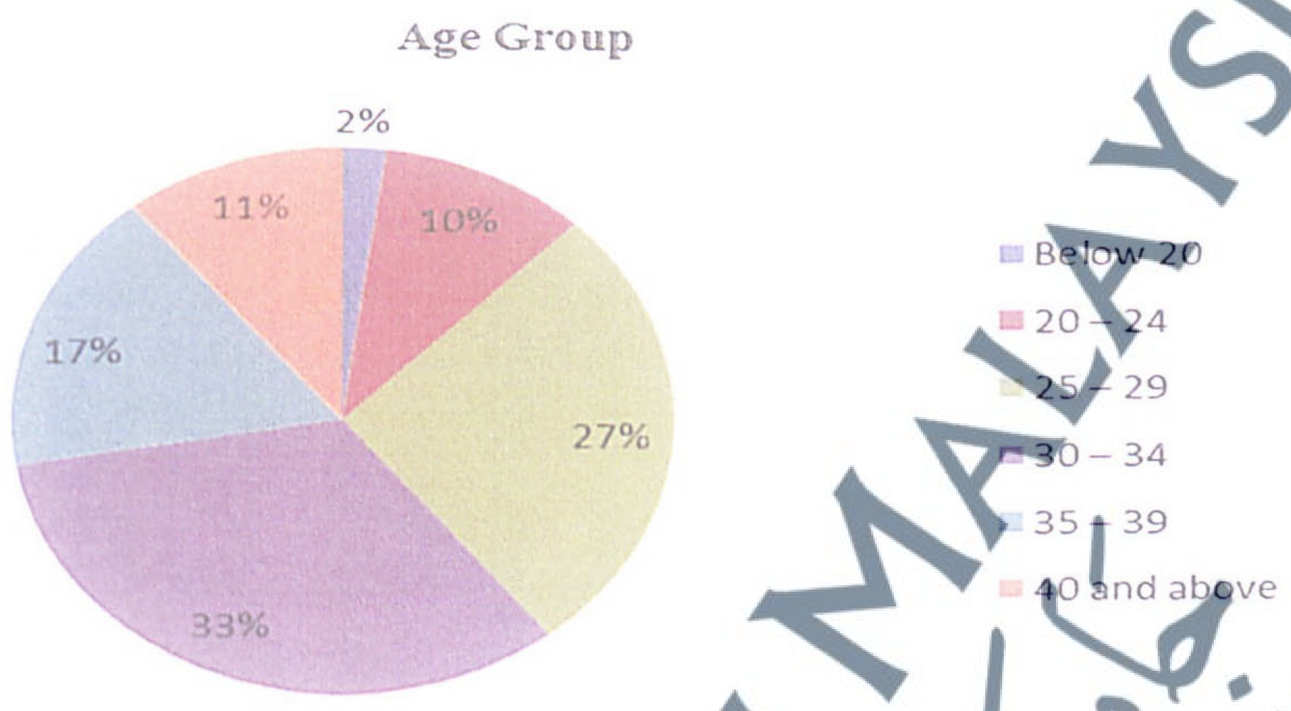

Figure 5: Age group

4.4.3 Race

The majority of the respondents were Malay with percentage (99.3%). The remaining were others with 0.7% each as shown in (Table 9).

Table 9: Race

Race	Frequency	Percent %
Malay	283	99.3
Others	2	0.7
Total	285	100

4.4.4 Level of Education

Figure 6 shows the distribution of the respondent's level of education. The majority of the respondents hold bachelor with a percentage of (26%) followed by

diploma with (25%), PhD with (22%), certificate (SPM, STPM, etc.) with (15%) and the minority respondents were master degree holders with (12%).

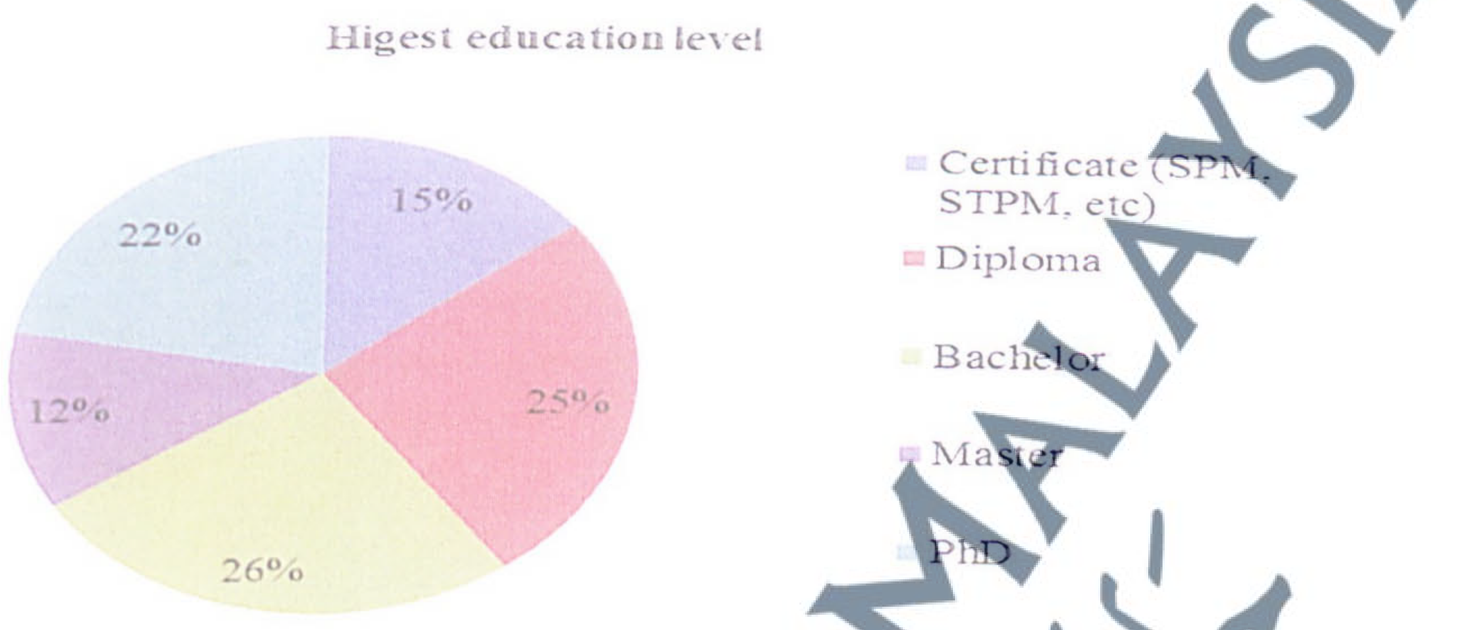

Figure 6: Level of education

4.4.5 Main Job Role

There were two main job roles of the respondents in USIM as seen in (Table 10). Administration staffs were the majority with a percentage of 61.4% and the academic staffs with 38.6%.

Table 10: Main job role

Job role	Frequency	Percent %
Academic staff	110	38.6
Administration staff	175	61.4
Total	305	100

4.5 Reliability Assessment through Reliability Analysis

The present section discusses the result of the reliability analysis conducted on items for each examined construct. The reliability measurement exhibits information regarding the variables' consistency that is used in the measurement tools (Hair et al.,

2006; Pallant, 2013). The reliability of the measurement tools for the current study was assessed using internal consistency technique. In this technique, the degree to which the items in the scale measure the same underlying attribute is measured (Pallant, 2013), in terms of Cronbach Alpha which is considered the most suitable test (Sekaran, 2000; Cavana et al. 2001) for its wide acceptance. The findings of the reliability test for each section of the questionnaire were illustrated in Table 11.

Table 11: The Cronbach alpha value for reliability test for each Section of the questionnaire

Domains	Workplace Cronbach alpha coefficient value (α)	Home Cronbach alpha coefficient value (α)
Security Awareness	.758	.746
Security Practice	.738	.702
Policy factor	.736	.702
Behaviour factor	.724	.712
Training factor	.704	.704
Knowledge of IT factor	.810	.714
Education factor	.715	.723

Based on the reliability of each tested domain, all the items have an average reliability ($\alpha \geq 0.7$) which is considered acceptable level of reliability. Cronbach alpha value of 0.7 is considered the lower limit of acceptability (Hair et al., 2006; Hair, 1998; Sekaran, 2000).

4.6 Results of the Descriptive Analysis of Study

In this section, the variables were subjected to descriptive analysis in order to identify their characteristics. The results of the descriptive analysis are presented separately to each variable in the research model.

4.6.1 Security Awareness

The results of the descriptive statistics to each item of the security awareness at workplace and home are presented in Table 12.

Table 12: Descriptive Statistics for Security Awareness

Items	Workplace		Home	
	Mean	±Std. Deviation	Mean	±Std. Deviation
I am aware with the vulnerabilities associated with sharing devices.	2.74	.596	2.74	.582
I am aware with the encryption that can prevent unauthorized access to confidential information.	2.60	.672	2.55	.713
I am aware that it is important to back up my files.	2.66	.661	2.70	.604
I am aware that information security is necessary to protect my information.	2.73	.583	2.78	.500
I am aware with virus protection software that requires frequent updates.	2.80	.488	2.73	.588

Respondents were asked about their security awareness at workplace and home by using a Likert scale with "1 = No, 2 = Not Sure and 3 = Yes". Results revealed that the overall mean was 2.71 ± 0.430 for workplace and 2.70 ± .424 at home. The highest mean refers to the statement that they aware with virus protection software that requires frequent updates for workplace with (2.80) this might be because the virus protection software is common in use for securing computers so the majority of respondents are aware of using such software. While at home, the highest mean refers to the statement they are aware that information security is necessary to protect their information with (2.78). The lowest mean refers to the statement they were aware with the encryption that can prevent unauthorized access to confidential information for workplace with (2.60) and for home with (2.55) this might be due to encryption is the advanced level of security protection procedures.

4.6.2 Security Practice

The results of descriptive statistics to each item of security practice at workplace and home are presented in Table 13.

Table 13: Descriptive Statistics for Security Practice

Items	Workplace		Home	
	Mean	±Std. Deviation	Mean	±Std. Deviation
I log off my computer whenever I leave it.	2.69	.631	2.72	.650
I regularly backup my data.	2.58	.705	2.45	.775
I do not download or install unauthorized copies of software.	2.65	.653	2.67	.643
I make sure the antivirus software is enabled and updated.	2.56	.677	2.58	.691
I use firewall protection	2.78	.516	2.79	.494

Respondents were asked about their security practice at workplace and home by using a Likert scales of "1 = No, 2 = Not Sure and 3 = Yes". Results revealed that the overall mean was 2.65 ± .447 for workplace and 2.64 ± .444 for home. The highest mean score refers to respondents use of firewall protection both in home with (2.79) and in workplace with (2.78), the user practice of logging off their computer whenever they leave it comes second with percentages (2.72) at home and (2.69) at workplace, while the users practice of not downloading or installing unauthorized copies of software comes third with (2.67) for home and with (2.65) for workplace. The practice of making sure the antivirus software enabled and updated comes next with mean scores (2.58) for home and (2.56) for workplace. The lowest mean score goes to respondents regularly backup their data with (2.45) for home and (2.58) for workplace, this might be due to that in the workplace backup data is one of the policy and procedures to recover from disaster that could damage information system.

4.6.3 Policy

The results of descriptive statistics to each item for policy at workplace and home are presented in Table 14.

Table 14: Descriptive Statistics for Policy

Items	Workplace		Home	
	Mean	±Std. Deviation	Mean	±Std. Deviation
Team related to security is needed.	2.75	.579	2.53	.729
I know who to contact if my computer is hacked or infected.	2.56	.697	2.74	.588
My computer is configured to automatically update.	2.58	.670	2.64	.615
I have policies on which websites I am allowed to visit.	2.74	.588	2.17	.856
There are guidelines regarding information security that I can refer to.	2.60	.635	2.16	.860

Respondents were asked about the policy at their workplace and home by using a three- Likert scales "1 = No, 2 = Not Sure and 3 = Yes". The result revealed that the overall mean was 2.65 ± .443 for workplace and 2.45 ± .499 for home. The highest mean refers to the team related to security is needed for workplace with percentage (2.75), while policies of the allowed websites to be visited in workplace comes with (2.74), the guidelines for information security that can be referred to in workplace with (2.60). At home, the highest mean refers to knowing who to contact if the users computers are hacked or infected with a percentage of (2.74) while if the computers are configured to automatically update with (2.64). The lowest mean refers to policies of the allowed websites to be visited in home with percentage (2.17), while if there are guidelines regarding the information security that they can refer to at home comes with (2.16), this may due to the fact that there are no developed policies to

home users as a guideline to refer to, even on using internet, but at workplace, employees are governed by USIM policies and regulations in using the internet.

4.6.4 Behaviour factor

The results of the descriptive statistics to each item of the behaviour factor at workplace and home are presented in Table 15.

Table 15: Descriptive Statistics for Behaviour Factor

Items	Workplace		Home	
	Mean	±Std. Deviation	Mean	±Std. Deviation
I'll make sure that when I delete a file from the computer or USB stick, that the information is totally removed.	2.79	.520	2.73	.587
I feel that my PC is safe.	2.60	.662	2.55	.693
I often take information from the office and use a computer at home to work on it.	2.64	.656	2.59	.705
I do not share my password.	2.65	.613	2.60	.667
I use the same password both for work and home accounts.	2.63	.634	2.61	.661

Respondents were asked about their behaviour practices in using computers at workplace and home by using a three- Likert scales "1 = No, 2 = Not Sure and 3 = Yes". The result revealed that the overall mean was 2.66 ± .427 in workplace and 2.62 ± .453 in home. The highest mean refers to that the users will make sure that the information is totally removed when they delete a file from the computer or USB stick with a percentage of (2.79) at workplace and (2.73) at home while if they do not share their password at workplace with (2.65) and at home with (2.60). The lowest mean refers to the users feeling that their PC is safe both in workplace with a percentage of (2.60) and in home with (2.55).

4.6.5 Training factor

The results of the descriptive statistics to each item of the training factor are presented in Table 16.

Table 16: Descriptive Statistics for Training Factor

Items		
	Mean	±Std. Deviation
I attended security training course lately.	2.25	.941
I receive adequate information security training.	2.20	.926
Training makes me more aware (increase my awareness).	2.56	.723
Training promotes security awareness.	2.59	.748
Training promotes security practices.	2.55	.703

Respondents were asked about their training by using a three- Likert scales "1 = No, 2 = Not Sure and 3 = Yes". The result revealed that the overall mean was 2.43 ± .589. The highest mean refers to that training promotes security awareness with (2.59), if the training makes the users more aware comes with (2.56), training promotes security practice with (2.55) and if the users attended security training course lately with (2.25). The lowest mean refers to if the users receive adequate information security training with (2.20)

4.6.6 Knowledge of IT

The results of descriptive statistics to each item of knowledge of IT at workplace and home are presented in Table 17.

Table 17: Descriptive statistics for knowledge of IT factor

Items	Workplace		Home	
	Mean	±Std. Deviation	Mean	±Std. Deviation
I have installed, updated, and enabled, antivirus software on my computer.	2.75	.573	2.65	.653
I know what the risk is when opening e-mails from unknown senders; especially if there is an attachment.	2.64	.621	2.62	.648
I know what an email scam is and how to identify it.	2.72	.599	2.57	.638
I know how to use antivirus software and how to scan for viruses.	2.78	.554	2.64	.649

Respondents were asked about their knowledge of IT at workplace and home by using a three- Likert scales "1 = No, 2 = Not Sure and 3 = Yes". The result revealed that the overall mean was 2.62 ± .413 at workplace and 2.672 ± .401 at home. The highest mean (2.78) for workplace and (2.64) for home refers to the users knowledge of how to use antivirus software and how to scan for viruses. If the users have installed, updated, or enabled, antivirus software on their computers comes with (2.75) at workplace and with (2.65) at home. The lowest mean score refers to the users knowledge about the risk when opening e-mails from unknown senders; especially if there is an attachment with (2.64) at workplace while at home, the lowest mean score refers to the users knowledge about what an email scam is and how to identify it with (2.57), this might due to the fact that the users are not familiar with the threats of an email application.

4.6.7 Education

The results of descriptive statistics to each item of education at workplace and home are presented in Table 18.

Table 18: Descriptive statistics for Education

Items	Workplace		Home	
	Mean	±Std. Deviation	Mean	±Std. Deviation
I know what social engineering (phishing) attack is.	2.77	.544	2.73	.581
I know what to do if my computer is infected with a virus.	2.60	.667	2.64	.633
I never found a virus or a Trojan on my computer.	2.55	.683	2.59	.663
My computer has no value to hackers, they do not target me.	2.59	.710	2.59	.714
I always download and install software on my computer.	2.64	.599	2.61	.617

Respondents were asked about their education at workplace and home by using a three- Likert scales "1 = No, 2 = Not Sure and 3 = Yes". The result revealed that the overall mean was 2.63 ± .440 for workplace and 2.63 ±.440 for home. The highest mean goes to the users new knowledge about what social engineering (phishing) attack is in workplace with (2.77) and in home with (2.73). The second mean goes to if the users always download and install software on their computer at workplace with (2.64) and if they know what to do if their computer is infected with a virus at home with (2.64). The lowest mean refers to if the users never found a virus or a Trojan on their computer in workplace with (2.55) and in home with (2.59), this may be due to the fact that virus threats are common through using the internet.

4.7 Correlation Analysis

In the present study, Pearson Correlation analysis was conducted in order to examine the relationship between the independent variables (policy, behaviour, training, knowledge of technology and education) and the dependent variables

(security awareness and security practice) both in workplace and home. Correlation analysis is considered a statistical method that is used to describe the strength and direction of the linear relationship between two variables (Pallant, 2013). The degree of correlation is concerned with measuring the strength and importance of a relationship between the variables. To achieve this, the bivariate association was conducted.

The procedure computes Pearson's Correlation coefficient with significant levels. Pearson Correlation coefficients can only take one value which ranges from - 1 to +1. The magnitude of the absolute value by ignoring the sign provides an indication of the strength of the relationship between two variables. Burn (2000) provides a guideline to explain the strength of the relationship between two variables (r) as shown in Table 19.

Table 19: Burn Guideline of Correlation Strength

Absolute Value of Correlation Coefficient	Remarks on Correlation (rho)	Nature of Relationship
0.90 - 1.00	Very high correlation	Very strong relationship
0.70 - 0.90	High correlation	Marked relationship
0.40 - 0.70	Moderate correlation	Substantial relationship
0.20 - 0.40	Low correlation	Weak relationship
Less than 0.20	Slight correlation	Relationship so small as to be negligible

Source: Burn (2000).

4.7.1 Independent Variables and Security Awareness at Workplace

Table 20 represents a summary of the relationships between the independent variables (policy, behaviour, training, knowledge of technology and education) and

the dependent variable (security awareness) in workplace. In general, the results revealed that there are significant and positive relationships between policy, behaviour, training, knowledge of IT and education with security awareness at workplace. All variables have a moderate positive relationship with security awareness at the workplace except training has small positive relationship as the significant yielded a value of .001 and the correlation value were (R = .376** - .684**).

Table 20: Summary of correlations of variables Policy, Behaviour, Training, Knowledge of IT, Education and Security Awareness at Workplace (Dependent variable) of the study model

Independent variables	Correlation coefficient ®	Strength of relationship
Policy	.684**	Moderate
Behaviour	.593**	Moderate
Training	.376**	Small
Knowledge of IT	.655**	Moderate
Education	.677**	Moderate

* Correlation is significant at 0.01 level (2-tailed).

4.7.2 Independent Variables and Security Awareness at Home

Table 21 represents a summary of the relationships between the independent variables (policy, behaviour, training, knowledge of technology and education) and the dependent variable (security awareness) at home. In general, the results revealed that there are significant moderate relationships between behaviour, knowledge of IT and education with security awareness at home. All the variables show a moderate relationship with security awareness at the home, as the significant yielded a value of .001 and the correlation value (R =.630**- .344**), except for policy and training variables as they show a small relationship (R = .344**).

Table 21: Summary of correlations of variables Policy, Education, Behaviour, Knowledge of It, Training and Security Awareness at Home (Dependent variable) of the study model

Independent variables	Correlation coefficient ®	Strength of relationship
Policy	.344**	Small
Behaviour	.479**	Moderate
Training	.397**	Small
Knowledge of IT	.448**	Moderate
Education	.630**	Moderate

* Correlation is significant at 0.01 level (2-tailed).

4.7.3 Independent variables and Security Practice at Workplace

Table 22 represents a summary of the relationships between the independent variables (policy, behaviour, training, knowledge of technology and education) with the dependent variable (security practice) at workplace. In general, the results revealed that there are significant moderate relationships between policy, behaviour, training, knowledge of IT and education with security practice at workplace. All variables show a moderate relationship with the security practice at the workplace, as the significant yielded a value of .001 and the correlation value were (R = .696** - .484**).

Table 22: Summary of Correlations of Variables Policy, Education, Behaviour, Knowledge of IT, Training and Security Practice at Workplace (Dependent variable) of the study model

Independent variables	Correlation coefficient ®	Strength of relationship
Policy	.696**	Moderate
Behaviour	.582**	Moderate
Training	.484**	Moderate
Knowledge of IT	.606**	Moderate
Education	.682**	Moderate

* Correlation is significant at the 0.01 level (2-tailed).

4.7.4 Independent Variables and Security Practice at Home

Table 23 represents a summary of the relationships between the independent variables and the dependent variables. In general, the results revealed that there are significant moderate relationships between policy, behaviour, training, knowledge of IT and education with security practice at home. All variables show a moderate relationship with the security practice at home, as the significant yielded a value of .001 and the correlation value were (R = .670** - .402**).

Table 23: Summary of correlations of variables Policy, Education, Behaviour, Knowledge of It, Training and Security Practice at home (Dependent variable) of the study model

Independent variables	Correlation coefficient ®	Strength of relationship
Policy	.426**	Moderate
Behaviour	.512**	Moderate
Training	.402**	Moderate
Knowledge of IT	.447**	Moderate
Education	.670**	Moderate

* Correlation is significant at the 0.01 level (2-tailed).

4.8 Regression Analysis

In the present study, a standard regression method is used to investigate the relationships between the independent variables (policy, behaviour, knowledge of IT , education and training factor) with the dependent variables (security awareness and practice at workplace and home) as all the independent variables were assumed to have equal importance. The Linear Regression is a statistical method that is used to predict the variance in a single dependent variable that is caused by the effect of more than a single independent variable (Hair et al., 2007; Lewis et al., 2007; Sekaran,

2006). The method provides relative contribution for individual variables and indicates which of the variables among the set best predicts the outcome. The R^2 standard value is 1 which indicates a perfect linear relation between both sets of variables. However, if the value is equal to 0 then it shows no linear relationship between the variables. The regression model's significance, the value of R^2, unstandardized coefficients and standardized coefficients are presented. Based on Leech et al., (2005), the definitions of the above are as follow:

- The regression model's significance: ANOVA analysis is used to test the significance of the regression model where a significant level less than .05 indicates the combination of the independent variables significant prediction of the dependent variable.
- Value of R^2: The value varies from 0.0-1.0 and it indicates that percentage of the variance can be depicted from the combination of the independent variables. Based on the statements of Leech et al. (2005), if R^2 value more than 0.49 then the strength of the relationship is considered extremely large, if the value is between 0.26-0.49 then it is considered large, between 0.13-0.26 is medium and between 0.2-0.13 is small.
- Unstandardized coefficients (B): The independent variables' coefficient in the regression equation.
- Standardized coefficients (β): The average amount of the dependent variables increases by a single standard deviation. The value ranges from -1.0 to 1.0. The negative value indicates that the independent variables have a negative relationship with the dependent ones while the positive value indicates a positive relationship. The value also represents the weight of every independent variable influence on the dependent variable.

4.9 Evaluating Each of the Independent Variables

This section aims to identify and compare the prediction strength of the independent variables on the dependent variables. In other words, this study aims to identify which independent variables in the model contributed to the prediction of the dependent variable by using Beta value. In this study, the interest is to compare the contribution of each independent variable in the model.

4.9.1 Independent Variables and Security Awareness at Workplace

The results of Linear Regression analysis in Table 24 and 25 show that policy, behaviour, knowledge of IT and education contribute significantly to the security awareness at workplace. Policy with (β = .249, $p < .05$), behaviour with (β = .180, $p < .05$), knowledge of IT with (β = .274, $p < .05$) and education with (β =.216, $p<.05$) contribute significantly to the security awareness at workplace. Training does not significantly contributed to security awareness at workplace with ($p > .05$). As can be noticed from Table 24, R^2 was statistically significant, with $F = 75.910$ and $p < .001$. As a result, the common expression of the regression equation is stated as follows: security awareness at workplace = .467 + .242 policy + .182 behaviours + .251 knowledge of IT + .211 educations and + (-.052) training. The five independent variables were observed to have a positive correlation to the security awareness at workplace as indicated by the positive R value of .759 in Table 24. A computed R^2 value of .576 suggests that the variables explain more than 57.6% of the variance in the security awareness at workplace (with a standard error estimate of .283). Overall, all factors have magnitude effect on security awareness at workplace except training.

Table 24: Results of Linear Regression summary between variables (Policy, Behaviour, Knowledge of IT, education and Training) and Security Awareness at Workplace (dependent variable)

Model Summary				
Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.759	.576	.569	.283

a. Predictors: (Constant), Policy, Behaviour, Knowledge of IT, Education and Training
b. Dependent Variable: Security Awareness at workplace

Table 25: Results of Linear Regression Relative Contribution of Variables (Policy, Behaviour, Knowledge of IT, Education and Training) contributing to Security Awareness at Workplace (dependent variable)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.467	.119		3.914	.000
Policy	.242	.070	.249	3.452	.001*
Behaviour	.182	.053	.180	3.444	.001*
Training	-.052	.035	-.071	-1.471	.142
Knowledge of IT	.251	.051	.274	4.899	.000*
Education	.211	.073	.216	2.895	.004*

a. Dependent Variable: Security Awareness at Workplace
*significant level is at .05 ($p < .05$)

4.9.2 Independent Variables and Security Awareness at Home

The results of Linear Regression analysis in Table 26 and 27 indicate that policy, behaviour, knowledge of IT and education contributes significantly to the security awareness at home as policy factor contributes with ($\beta = .106$, $p < .05$), behaviour with ($\beta = .140$, $p < .05$), knowledge of IT with ($\beta = .243$, $p < .05$) and education with ($\beta = .407$, $p < .05$). Only the training factor does not significantly contributed to security awareness at home with ($p > .05$). As can be noticed from Table 26, R^2 is statistically significant, with $F = 50.043$ and $p < .001$.

As a result, the common expression of the regression equation is stated as follows: security awareness at home = .525 + .090 from policy + .131 from behaviour + .217 from knowledge of IT + .389 from education and + .008 from training. The five independent variables were observed to have a positive correlation with the security awareness at home as indicated by R positive value of .688 in Table 26. A computed R^2 value of .473 suggested that the variables explain more than 47.3% of the variance in the security awareness at home (with a standard estimated error.310). In other words, all the factors have magnitude effect on security awareness at home, except training.

Table 26: Results of Linear Regression summary between variables (Policy, Behaviour, IT Knowledge, education and Training) and Security Awareness at Home (dependent variable)

Model Summary				
Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.688	.473	.463	.310

a. Predictors: (Constant), Policy, Behaviour, Knowledge of IT, Education and Training
b. Dependent Variable: Security Awareness at home

Table 27: Results of Linear Regression relative contribution of variables (Policy, Behaviour, IT Knowledge, education and Training) contributing to Security Awareness at Home (dependent variable)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.525	.148		3.569	000
Policy	.090	.044	.106	2.062	.040*
Behaviour	.131	.050	.140	2.623	.009*
Training	.008	.042	.011	.182	.855
Knowledge of IT	.217	.044	.243	4.995	.000*
Education	.389	.066	.407	5.942	.000*

a. Dependent Variable: Security Awareness at home
*significant level is at .05 ($p < .05$)

4.9.3 Independent Variables and Security Practice at Workplace

The results of the Linear Regression analysis in Table 28 and 29 show that policy, behaviour, knowledge of IT and education contribute significantly to the security practice at workplace where for policy the value is (β = .289, $p < .05$), behaviour is (β = .160, $p < .05$), knowledge of IT is (β = .158 $p < .05$) and education is (β =.188, $p<.05$) which all contribute significantly to the security practice at workplace. Training factor does not significantly contribute to security practice at workplace where its value is ($p > 05$). As can be noticed from Table 28, R^2 is statistically significant, with F = 71.561and $p < .001$. As a result, the common expression of the regression equation is stated as follows: Security practice at workplace = .355 + .291 from policy + .168 from behaviour + .151 from IT knowledge + .191 from education and + .069 from training. The five independent variables were observed to have a positive correlation to the security awareness at workplace as indicated by the positive R value of .750 in Table 28. A computed R^2 value of .562 suggests that the variables explain more than 56.2% of the variance in the security practice at workplace (with a standard estimated error of .298). In other words, all the factors have a magnitude effect on security practice at workplace, except training and education factor.

Table 28: Results of linear regression summary between variables (Policy, Behaviour, Knowledge of IT, education and Training) and Security Practice at Workplace (dependent variable).

Model Summary				
Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.750[a]	.562	.554	.298

a. Predictors: (Constant), Policy, Behaviour, Knowledge of IT, Education and Training

b. Dependent Variable: Security Practice at workplace

Table 29: Results of Linear Regression Relative Contribution of Variables (Policy, Behaviour, Knowledge of IT, education and Training) Contributing to Security Practice at Workplace (dependent variable)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.355	.126		2.812	.005
Policy	.291	.074	.289	3.936	.000*
Behaviour	.168	.056	.160	3.009	.003*
Training	.069	.037	.091	1.861	.064
Knowledge of IT	.151	.054	.158	2.784	.006*
Education	.191	.077	.188	2.474	.014*

a. Dependent Variable: Security Practice at workplace
*significant level is at .05 ($p < .05$)

4.9.4 Independent variables and Security Practice at Home

The results in Table 30 and table 31 indicate that policy with ($\beta = .197$, $p < .05$), behaviour with ($\beta = .166$, $p < .05$), knowledge of IT with ($\beta = .228$, $p < .05$) and education with ($\beta = .434$, $p < .05$) contribute significantly to the security practice at home except the training that does not significantly contributed to security practice at home with ($p > .05$). As can be noticed from Table 30, R^2 was statistically significant with $F = 65.896$ and $p < .001$. As a result, the common expression of the regression equation is stated as follows: security practice at home = .175 + .175 from policy + .163 from behaviour +.213 from knowledge of IT + .434 from education and + (-.037) from training. The five independent variables were observed to have a positive correlation to the security practice at home as indicated by the positive R value of .736 in Table 30. A computed R^2 value of .541 suggests that the variables explain more than 54.1% of the variance in the security practice at home (with a standard estimated error of .303). In other words, policy, behaviour, knowledge of IT and education have a magnitude effect on security practice at home.

Table 30: Results of Linear Regression summary between variables (Policy, Behaviour, Knowledge of IT, education and Training) and Security Practice at Home (dependent variable)

Model Summary				
Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	.736	.541	.533	.303

a. Predictors: (Constant), Policy, Behaviour, Knowledge of IT, Education and Training
b. Dependent Variable: Security Practice at home

Table 31: Results of Linear Regression relative contribution of variables (Policy, Behaviour, Knowledge of IT, education and Training) contributing to Security Practice at Home (dependent variable)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.175	.144		1.216	.225
Policy	.175	.043	.197	4.119	.000*
Behaviour	.163	.049	.166	3.334	.001*
Training	-.037	.041	-.050	-.918	.359
Knowledge of IT	.213	.043	.228	5.012	.000*
Education	.434	.064	.434	6.792	.000*

a. Dependent Variable: Security Practice at home
*significant level is at .05 ($p < .05$)

4.10 Hypothesis Testing

This section investigates the relationship between policy, behaviour, training, knowledge of IT, education, and security awareness and security practice both in workplace and home. The purpose of the investigation is to achieve the following research objectives:

1. To investigate the effect of policy, behaviour, training, knowledge of technology and education on information security awareness and practice for both workplace and home.

2. To investigate the awareness and practice level of information security among the employees in USIM based on the identified factors.

To support the investigation, the following hypotheses were tested. The acceptance or rejection of the stated hypotheses can be found in Table 32 end of this section.

The five examined hypotheses are;

Hypothesis 1:

H1a: Policy has a positive effect on security awareness and practice at workplace.

The results in table 25 show a significant effect of policy on security awareness at workplace ($\beta = .249$, $t = 3.452$, $p = .001$ ($p < .05$).

The results in table 29 show that there is a significant effect of policy on security practice at workplace ($\beta = .289$, $t = 3.936$, $p = .001$ ($p < .05$).

H1b: Policy has a positive effect on security awareness and practice at home.

The results in table 27 show a significant effect of policy on security awareness at home ($\beta = .106$, $t = 2.062$, $p = .040$ ($p < .05$).

The results in table 31 show a significant effect of policy on security practice at home ($\beta = .197$, $t = 4.119$, $p = .001$ ($p < .05$). Therefore, hypothesis 1 is accepted.

Hypothesis 2:

H2a: Behaviour has a positive effect on security awareness and practice at workplace.

The results in table 25 show a significant effect of behaviour on security awareness at workplace ($\beta = .180$, $t = 3.444$, $p = .001$ ($p < .05$).

The results in table 29 show a significant effect of behaviour on security practice at workplace ($\beta = .160$, $t = 3.009$, $p = .003$ ($p < .05$).

H2b: Behaviour has a positive effect on security awareness and practice at home.

The results in table 27 show there is a significant effect of behaviour on security awareness at home ($\beta = .140$, $t = 2.623$, $p = .009$ ($p < .05$).

The results in table 31 show a significant effect of behaviour on security practice at home ($\beta = .166$, $t = 3.334$, $p = .001$ ($p < .05$). Therefore, hypothesis 2 is accepted.

Hypothesis 3:

H3a: Training has a positive effect on security awareness and practice at workplace.

The results in table 25 show there is no significant effect of training on security awareness at workplace ($\beta = -.071$, $t = -1.471$, $p = .142$ ($p > .05$).

The results in table 29 show there is no significant effect of training on security practice at workplace ($\beta = .091$, $t = 1.861$, $p = .064$ ($p > .05$).

H3b: Training has a positive effect on security awareness and practice at home.

The results in table 27 show there is no significant effect of training on security awareness at home ($\beta = .011$, $t = .0182$, $p = .855$ ($p > .05$).

The results in table 31 show there is no significant effect of training on security practice at home ($\beta = -.050$, $t = -.918$, $p = .359$ ($p > .05$). Therefore, hypothesis 3 is rejected.

Hypothesis 4:

H4a: Knowledge of Technology has a positive effect on security awareness and practice at workplace.

The results in table 25 shows a significant effect of knowledge of IT on security awareness at workplace ($\beta = .274$, $t = 4.899$, $p = .001$ ($p < .05$).

The results in table 29 shows a significant effect of knowledge of IT on security practice at workplace ($\beta = .158$, $t = 2.784$, $p = .006$ ($p < .05$).

H4b: Knowledge of Technology has a positive effect on security awareness and practice at home.

The results in table 27 show there is a significant effect of knowledge of IT on security awareness at home ($\beta = .243$, $t = 4.995$, $p = .001$ ($p < .05$).

The results in table 31 shows there is a significant effect of knowledge of IT on security practice at home ($\beta = .228$, $t = 5.012$, $p = .001$ ($p < .05$). Therefore, hypothesis 4 is accepted.

Hypothesis 5:

H5a: Education has a positive effect on security awareness and practice at workplace.

The results in table 25 show there is no significant effect of education on security awareness at workplace ($\beta = .216$, $t = 2.895$, $p = .004$ ($p < .05$).

The results in table 29 show there is no significant effect of education on security practice at workplace ($\beta = .188$, $t = 2.474$ $p = .014$ ($p > .05$).

.**H5b:** Education has a positive effect on security awareness and practice at home.

The results in table 27 show there is a significant effect of education on security awareness at home ($\beta = .407$, $t = 5.942$, $p = .001$ ($p < .05$).

The results in table 31 show there is a significant effect of education on security practice at home ($\beta = .434$, $t = 6.792$, $p = .001$ ($p < .05$). Therefore, hypothesis 5 is accepted.

Table 32: Summary of Results

Hypothesis	Significance	Supported or not supported
H1	Yes	Supported
H2	Yes	Supported
H3	No	Not supported
H4	Yes	Supported
H5	Yes	Supported

4.11 Summary of Correlations of (independents variables) and Security Awareness and Practice at Workplace and Home (Dependent variable)

In the stage of hypothesis testing, correlation analysis were mainly employed in order to examine the relationship between independent variables and security awareness and practice both in workplace and home dependent variable, The correlation and significant value between independent variable and each dependent variable was summarized in Table 33 and Table 34 respectively.

Table 33 represents a summary of the relationships between the independent variables (policy, behaviour, training, knowledge of technology and education) with the dependent variable (security awareness) at workplace and home the result indicates that all the factors have a moderate relationship with security awareness at workplace except of training factor has a small relationship, while at home all the factors have a moderate relationship with security awareness at home except of policy and training factors.

Table 33: Summary of Correlations of (independents variables) and Security Awareness

	Security Awareness at Workplace		Security Awareness at Home	
Independent variables	Correlation coefficient	Strength of relationship	Correlation coefficient	Strength of relationship
Policy	.684**	Moderate	.344**	Small
Behavior	.593**	Moderate	.479**	Moderate
Training	.376**	Small	.397**	Small
Knowledge of IT	.655**	Moderate	.448**	Moderate
Education	.677**	Moderate	.630**	Moderate

In terms of security practice, Table 34 represents a summary of the relationships between the independent variables (policy, behaviour, training, knowledge of technology and education) with the dependent variable (security practice) at workplace and home the result indicates that all the factors have a moderate relationship with security practice at both workplace and home.

Table 34: Summary of Correlations of (independents variables) and Security Practice

	Security practice at Workplace		Security Practice at Home	
Independent variables	Correlation coefficient	Strength of relationship	Correlation coefficient	Strength of relationship
Policy	.696**	Moderate	.426**	Moderate
Behavior	.582**	Moderate	.512**	Moderate
Training	.484**	Moderate	.402**	Moderate
Knowledge of IT	.606**	Moderate	.447**	Moderate
Education	.682**	Moderate	.670**	Moderate

4.12 Security Awareness and Security Practice at workplace and home of the USIM employees.

Table 35: Descriptive Statistics of Security Awareness and Security Practice at Workplace and Home

	Workplace		Home	
	Mean	±Std. Deviation	Mean	±Std. Deviation
Security Awareness	2.71	.430	2.70	.424
Security Practice	2.65	.447	2.64	.444

There are two important variables measured in this study; security awareness and security practice which are divided into two parts; one at workplace and another at home. The variables were measured by using a three- Liker scale; 1 = no, 2 = not sure and 3 = yes. The results show that both of security awareness at workplace with (2.71) and at home with (2.70) were higher than the security practices at workplace with (2.65) and at home with (2.64). A score of 2.5 and above is considered a high level; less than 2.5 is moderate and 2.0 and below is low. Thus, these scores of security awareness and security practice in both workplace and home are at high level. The findings indicated that the employees' security awareness and practice at their workplace and home are at high level but in favour of workplace over home.

4.13 Summary

This chapter presents the data analysis and results pertaining to reliability assessment, response rate, demographic profile, descriptive analysis, correlations analysis, and hypothesis testing. In the first part of the analysis, the researcher tested the pilot study and reliability analysis was conducted to test the reliability of the items

in each construct and the validity of the instrument used in this research. The results indicated that the instrument which is used in this study is reliable and valid to measure the construct. The descriptive analysis was employed to demographic profile of the sample. This includes the personal characteristics and the descriptive profile of the investigated variables. In addition, correlations test was conducted between the independent and the dependent variables. The findings revealed that all the independent variables were found to be statistically correlated to each other except training. Further, Standard Linear Regression was conducted in order to investigate the relationships between the independent variables and the security awareness and practices at home and workplace. All the independent variables have a significant effect on security awareness and practice except training which has no significant effect on the security awareness and practice in both workplace and home.