CHAPTER – V

RESEARCH METHODOLOGY
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5.1 Research Design

The table showing the research design of the study

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A comprehensive survey was administered to participants, incorporating a validated survey instrument, along with validated measurement items for the constructs. Information security threats were examined: computer performance compromise, personal information compromise, and loss of data and files. The responses (i.e., behaviour) necessary to mitigate these threats were measured by conducting an expert panel review to adapt and validate a developed survey instrument. Demographic, behavioural, and personal belief data were collected during this phase. The survey results were analysed with SPSS version 20 and AMOS.
Conclusion based Findings and Recommendations

Evaluation and Analysis of Data

Main Survey
Sample Size = 440

Final Research Instrument

Reliability and Validity of Instrument

Pilot Survey

Initial Research Instrument

Information Security Awareness and Susceptibility

Information Security Behaviour

Review of Literatures
- Review of previous or existing study
- Exploring new and related information
- Determining and defining research questions
5.1.1 Secondary Source

“Survey research is the appropriate method for this study because the study was designed to describe a population” (Babbie, 2000). The survey instrument was developed to assess the responses necessary to protect individuals from information security threats.

“The survey instrument is used to collect self-reported data from the system users. Surveys are suitable for collecting self-reported data about the participants’ behaviours. Surveys are usually used to collect data to test more than one hypothesis” (Neuman, 2002).

The required Secondary Data for the study is collected through survey method with the aid of instrument developed by means of reviewing the pertaining literatures relevant to the research area. The expertise of the Study field experts, Subject experts, Security Industry professional, Doctoral fellows was sought in designing the instrument. The development of the survey instruments included an extensive literature review, convening an expert panel review, pre-testing the resulting instruments, pilot testing the revised instruments, and finally administration of the main study with slight revisions made from the pilot study. Before using the modified survey to conduct this research, an instrument review was conducted to test the instrument’s validity and reliability. Alpha coefficients were computed to test the internal consistency of the measures.

An extensive review of literature was carried on to study about the constituents of social engineering phishing attacks, such as underlying mechanisms in phishing attacks, the techniques being used by attackers, why do users fall for phishing attacks.

5.1.2 Primary Source

The required Data for the study is collected through Primary Source by means of various literatures pertaining to the study area, Government Data, White Papers of the advocating agencies. In order to capture reliable estimates from a large group of fairly homogenous targets for the Primary data, the data collection effort focused on Academicians including Professors, Researchers, Software professionals, Post Graduate students, Business Entrepreneurs, Employees of Knowledge Process Outsourcing, Automobile component manufacturing unit.
5.1.3 Sampling and Sampling Techniques

Study was conducted in Chennai and Pondicherry region. Total sample size was 440. Simple Random Sampling procedure was followed to draw samples. Study was done in Chennai and Puducherry region as it has large base of Internet Users.

The Population Size is the no. of Internet Users in these regions was, 60 Lakhs Approximately (IAMAI, November, 2014).

In India the numbers of internet users are 462,124,989, which are estimated that, for every 100 individuals, 35 of them use internet (www.internetlivestats.com).

The Sample Size is 440. The minimum sample size as per Power Formula’s Sample size calculator is to be 384 (Krejcie et al., 1970). The Sampling Technique used in this study is Simple Random Sampling.

\[
\frac{(z^2pqn_a)}{\{e^2(n_a - 1) + z^2pq\}}
\]

\[
\frac{1.96^2 \times (0.98) \times (0.02) \times 60,00,000}{\{(0.02)^2 \times (60,00,000 - 1) + (1.96)^2 \times (0.98) \times (0.02)\}}
\]

\[
N = 384.
\]

where,
\[n_a = \text{Population size,} \quad z = \text{Confidence level at 5%,} \]
\[p = \text{Probability of success,} \quad q = \text{Probability of failure,} \]
\[e^2 = \text{Margin of Error} \]

Source: (Krejcie & Morgan, 1970).

As per the formula, it was found that 384 is the sample representation for population of 60,00,000. Based on the result 440 System users were taken as a sample size.
The Respondents were Computer system Users in the Work & Home Environment. The respondents were from various spectrum of organizations which includes, Financial Banking; Educational; Software Technological and Service providers, Manufactures, to name a few, The Royal Bank of Scotland, Indian Overseas Bank, Walaa Insurance, Pondicherry University, VIT University, National Institute of Technology, SIEC - Maison des Examens, France, Cognizant Technology Solutions, Inautix Technologies, Hexaware Technologies , Tata Consultancy Services, Concentrix Technologies, IBM, SAP Labs, Infosys, L&T Infotech, HCL technologies, Symantec Software services, Kudometrics, Wipro, Photon Infotech Inc., ZARA Security Solutions, Meru Networks, Yazhisribio Laboratories, Symphony Teleca, Fohmics, Vasundhara Minerals, Motherson Sumi, D'one Media, FL Smidth, , Unisys Global Services India Ltd., Indian Oil, PMC Sierra,

The respondents were from various designations in the organizations like, Director , Senior Test engineer, Associate Test engineer, Senior Developer, Technical leader, Senior Software Engineer, Associate Software Engineer, Ph.D. Scholars, Senior Research Fellow, Systems Engineer, Database Administrator, Senior Associate, Senior Member Technical Staff, Assistant Professor, Team Leader, Administrative Clerk, Security Consultant, Manager, Associate Consultant, Associate System engineerSenior Software Engineer, Technical Lead, Research Scholar, Senior consultant, IT Analyst, Senior Quality Assurance Engineer, Manager, Senior Hardware Engineer, Senior Software Engineer, Business Analyst, Associate Professor, System Engineer, Senior Analyst, Product Engineer, Project Consultant, Individual users.

The data was collected from wide spectrum of users to avoid biasness in the responses. The responses were obtained by means of distributing the hard copy of the survey instrument and collecting the filled in responses. Also, email survey was adopted. The instrument was send through email ID of the respondents through a survey link and the responses were obtained. Only duly filled in response were used in analysis.

The Place of Study is system users from Chennai and Puducherry.

The Statistical Tools used were, One-way ANOVA, Independent Sample T test, Confirmatory Factor Analysis, Path analysis, Structure Equation Model (SEM). The Software Used in analysis is SPSS and AMOS.
5.1.4 **Statistical tools used**

The statistical tools used for data analysis of primary data collected are

(1) **Multivariate analysis**:
- Exploratory Factor analysis (EFA)
- Confirmatory Factor Analysis (CFA)
- Multiple regression and
- Structural Equation Modelling (SEM).

(2) **Bi -Variate Analysis**:
- Independent sample T-Test and
- One way Analysis of Variance.
5.1.5 Measurement Assessment

The measurement model was assessed by Reliability, Convergent and Discriminant validity.

“Reliability refers to the extent to which a particular research technique consistently produces the same results, given repeated studies of the same concept” (Babbie, 2000). “Reliability analysis is a basis or foundation to evaluate the internal consistency of a measurement instrument. The most common statistic for evaluating reliability is Cronbach’s alpha. Reliability was tested by Cronbach’s alpha.” According to Hair et al., items have acceptable reliability if the Cronbach’s alpha value is greater than 0.6 and high reliability if the Cronbach’s alpha value is greater than 0.7. To determine reliability, in this research, the instrument is validated relative to a theoretical perspective; reliabilities result in Cronbach’s alpha of 0.60 or higher were used (Nunnally & Bernstein 1994). The instruments used in this research demonstrated high reliability.

“Validity refers to the extent to which the findings of a study accurately reflect the reality of what is being explored” (Babbie, 2000).

In order to confirm convergent validity, which provides an understanding of correlation among factors, the AVE was calculated for each construct. The convergent validity was assessed by factor loadings, and AVE. The results showed that the AVE values were above 0.5 as suggested (Fornell et al., 1981).

The loadings for all items exceeded the recommended value of 0.6. All of the constructs exceeded the threshold for composite reliability, as they were greater than 0.70. All values of average variance extracted were higher than 0.5 (Hair et al., 2006).

To confirm discriminant validity, the correlations between the factors were evaluated. Specifically, none of the constructs should correlate higher than 0.85 (Kline, 2005). In addition, AVE can also be used for discriminate validity analysis to provide additional evidence. “The AVE values for each construct should be larger than its correlations with the other constructs. AVEs that are larger than all the squared correlation between constructs provide evidence of discriminant validity” (Segars, 1997). Discriminant
validity was assessed by examining whether the square root of AVE for each construct was higher than the squared correlation between that construct and all other constructs (Fornell et al., 1981). The results show that discriminant validity was met. The square root of the AVE for each construct was greater than the correlation between constructs. As a result, the measurement model demonstrated adequate reliability, convergent validity and discriminant validity.

The constructs do not correlate higher than the suggested limit of 0.85 (Kline, 2005). They displayed sufficient convergent and discriminant validity.