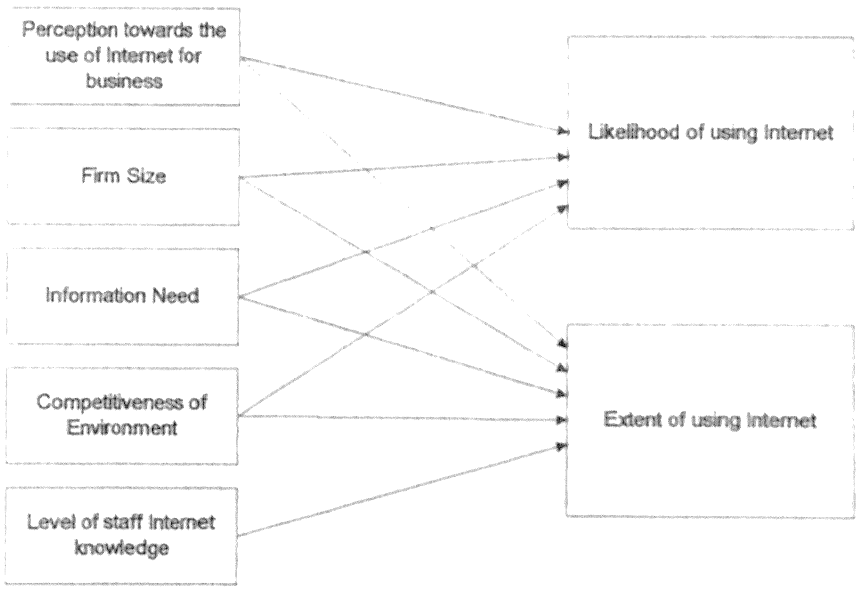
3. RESEARCH METHODOLOGY

This chapter illustrates how the research was designed and implemented. A research model was developed to show the relationship of the dependent variable and independent variables. There are two dependent variables to measure the use of Internet and five research independent variables for analysis. Nine hypothesis were developed to answer the research questions and the primary data was collected through web based survey and traditional method (by mail). The survey questionnaire consisted of five sections and the data collected was then analysed using SPSS statistical software.

3.1 Research Models

With reference to the literature review, the following research model and hypothesis were developed. As the scope of study was restricted to the organisational factors, only five factors which were considered to be most relevant were used in the model.

Figure 3-1



Source: Adapted from James (1995)

There were two variables to measure the use of Internet by business in Malaysia. - (1) Likelihood of using Internet and (2) Extent of using Internet.

The Likelihood of using Internet is defined as the decision to use or reject Internet. A dichotomous measure was used to measure: whether the organisation are Internet users or non-Internet users (does not use and intend to use Internet within the next 12 months).

On the other hand, the Extent of using Internet is defined as the number of business processes in which Internet is applied. Thus only the response from those Internet users were considered. The measure is an interval scale which counts the number of business processes that the organisation uses Internet.

There are five independent variables. The four variables: (1) Perception towards Internet; (2) Firm size; (3) Information need and (4) Competition were hypothesised to influence both the likelihood and the extent of using Internet. The fifth variable, Staff Internet knowledge, is hypothesised to influence only the extent of using Internet.

3.2 Research Hypothesis

Based on the above research model, the following hypothesis were developed as follows:-

1. The decision to adopt or not is influenced greatly by the perception towards the innovations. The more positive the perception is, the more likely the adoption will take place. Two hypothesis were developed to test the relationship.

a. H_0 : There is no relationship between perception and the likelihood of using Internet

   H_1 : The more positive the perception towards the Internet, the greater the likelihood of using it

b. H_0 : There is no relationship between perception and the extent of using Internet

H_1 : The more positive the perception towards the Internet, the greater the extent of using Internet

2. The study by Paula et al (1998) and anecdotal evidence has shown that the size of the organisation does influence the use of Internet. However, there appeared to be confusion how the relationship should be: whether small business tend to use or use more Internet than large business, or vice versa. Two hypothesis were developed to test the relationship.

a. H_0 : There is no relationship between firm size and the likelihood of using Internet

H_1 : There is a significant relationship between firm size and the likelihood of using Internet

b. H_0 : There is no relationship between firm size and the extent of using Internet

H_1 : There is a significant relationship between firm size and the extent of using Internet

3. The information need was found to have significant influence on the adoption and diffusion of innovations. The greater the information need, the greater the use of the innovation (James, 1995). As there is no empirical study on the influence of this factor on the use of Internet, it is argued that there is a similar relationship since Internet is an important source of information for organisations. Two hypothesis were developed to test the relationship.

a. H_0 : There is no relationship between information need and the likelihood of using Internet

H_1 : The greater the information need, the greater the likelihood of using Internet

b. H_0 : There is no relationship between information need and the extent of using Internet

H_1 : The greater the information need, the greater the extent of using Internet

4. The Internet was considered an important tool to create competitive advantage. Therefore, in a very competitive environment where players try anything to outsmart one another, there is a greater tendency for these players to use Internet in their business. Two hypothesis were developed to test the relationship.

a. H_0 : There is no relationship between competition and the likelihood of using Internet

H_1 : The greater the competition, the greater the likelihood of using Internet

b. H_0 : There is no relationship between competition and the extent of using Internet

H_1 : The greater the competition, the greater the extent of using Internet

5. Anecdotal evidence has shown the better the staff knowledge about the IT application, the more usage of that application (James, et al 1995). Therefore, one hypothesis is developed to test the relationship.

a. H_0 : There is no relationship between staff Internet knowledge and the extent of using Internet

H_1 : The greater the staff Internet knowledge, the greater the extent of using Internet

3.3 Sample

As mentioned earlier in chapter one, two types of survey were used - Internet survey and survey by traditional method as described follow:-

3.3.1 Internet Survey

The Internet presents a unique problem for surveying (GUV 9th, 1998). The main problems is that there is no central registry of all business or web pages for Malaysia. To complete a census and try to contact every single business is not possible. As such, this Internet survey can only try to select a subset of users to participate in the survey.

The sample for Internet survey was gathered from the directory mall in MIMOS (http://www.jaring.my) and invitation e-mail was sent to all the companies (restricted to the major industry as discussed in chapter one) listed in the following directories:-

1. Jaring Direcotry Mall (http://www.jaring.my)
2. Business Connection (http://asiabiz.com/Malaysia/index.html)
3. Beta Interactive Services (http://www.beta.com.my)
4. Dotcom Sdn Bhd (http://www.mydotycom.com)
5. Malaysia Online (http://x500.mol.net.my)

In total, 595 e-mails were sent out and 96 of them were returned as "incorrect address". There were 63 participants (visited the web page in which the survey was located) but only 61 complete responses were received.

3.3.2 Survey by Traditional Method

As the sample of the Internet survey were all current Internet users, another source of sample for the non-Internet users must be sought. As such, it was decided that traditional method would be used - survey by post. Due to the time and resources constraint (refer chapter one), only sample from three main business areas.

Survey questionnaires were distributed to 300 sample selected from Times Business Directory - Manufacturers and Exporters (1997/1998 edition) using random sampling. Out of the 300 sample, only 42 were returned. As 4 were incomplete and thus only 38 responses were included in the sample.

In total, there were 99 valid responses used for the subsequent analysis.

3.4 Data Collection Procedure

The primary data was collected using survey questionnaire sent to the sample by two methods: (1) a fill-in-form web-based survey and (2) a self-administered questionnaire by post.

3.4.1 Data Collection Method

The Web-based Survey resides in the web server: URL "www.fortunecity.com" - a web server based in US which offered 20MB free space. The "Fortune City" web server was chosen because it could support Form Mail CGI (common-gateway-interface) programming which was required to administer the fill-in-form survey and to send back the answers via e-mail. The survey form was programmed using hypertext mark-up language (HTML) and the respondents could scroll the questionnaires and answer each question by clicking the mouse or typing through keyboard.

The process of preparing questionnaires and collecting data through the web-based survey is as follows:-

1. The self-administered survey was constructed using word processor before it was transformed into HTML format by using a HTML editor. Drop down menu and check box were used for the respondents to select answers and a submit and a reset button were added for the purposes of submitting the survey for processing or resetting the answers.

2. The HTML survey was then uploaded to the web server. For more detail, please refer to URL: "http://campus.fortunecity.com/student/142/survey1.html ".

3. The request for participation in the survey were sent to the sample via e-mail. The content of the e-mail included a short description about the researcher and the objective of the survey, as well as the URL link to the web-based survey. Efforts was made to increase the response rate by offering an incentive - the opportunity for the participants to view the results of the survey.

4. After the respondents answered all the questions and pressed the "submit" button at the bottom of the survey, the answers would be sent back to the recipient - the researcher via e-mail. An optional box for filling in the respondent e-mail address was included for future communication and viewing of the survey results.

The responses from the Internet survey can be received almost immediately when the respondents choose to answer the questionnaire. Therefore, there is no time wasted on waiting like the survey by mail. It was then decided to conduct for a period of two weeks - from 15 December 1998 to 31 December 1998, basically allowing sufficient time to contact all the selected sample by e-mail and one week for them to respond.

The Survey by Traditional Method was performed by sending a package consisting of a cover letter and survey questionnaire and a pre-paid self addressed envelope to the sample. The responses were sent back by the respondents using the self-addressed enveloped. As the traditional method usually involves longer time because of the time taken in the delivery, the survey was conducted for a period of one month - from 8 December 1998 to 8 January 1999.

3.4.2 Survey Questionnaires

There were two sets of survey questionnaires for the two survey methods. Both questionnaires asked basically the same questions except questions used to

differentiate the current Internet users from the non-Internet users. Therefore, questions like 'Does your organisation use Internet?" was excluded from the web-based survey form as the web sample were all Internet users.

The survey questionnaires was divided into five sections. They were:

Section A was intended to differentiate the Internet users from the non-Internet users. The non-Internet users were directed to section B after answer question 1. The Internet users were asked about their length of using the Internet, namely - basic access through the ISPs, electronic mail (e-mail) and web site or home pages. Detail information such as who develops the web page, the number of staff assigned for managing and maintaining the Internet usage, training, accessibility and level of Internet knowledge of the staff were also investigated. The respondents were then asked to select the business functions that used Internet. The business functions listed were based on the literature review and a few researches done by foreign researcher, but were modified to reflect the common usage by Malaysia companies.

Section B was intended to find out the degree of information needs of the organisations and the competitiveness of the environment in which they operated in. There were three questions for each research variable, and both Internet adopters and non-adopters were required to answer this section.

Section C was intended to collect the degree of the perception of the organisation towards the use of Internet. It had ten short statements to measure the attribute relative advantage, three questions for compatibility, and one each for trialability, ease of use and observability. Both Internet adopters and non-adopters were required to answer.

Section D was intended to investigate the reasons that may prevent the organisations from using (non-Internet users) or using more (Internet users) of the Internet. There were fifteen questions covering areas such as cost, market potential,

measurement problems, lack of knowledge, and others as stated in the literature reviews. Both Internet adopters and non-adopters were required to answer.

In addition, the problems experienced by the Internet users were also investigated. There were seven questions which were related to the usage - cost of maintenance, difficulty in promoting the sites and customer targeting, additional staff and time to manage the site and respond to customer feedback and service provided by ISPs. Only Internet users were required to answer.

The sentiment of the respondent regarding using or using more Internet in the near future was also gathered. It was measured in Likert sacle (1 to 5) with 1 being the "most probably" and 5 being the "most probably not".

Section E was intended to gather demographics about the organisations. Information such as the type of industry, years of establishment, number of employees, annual turnover, main customers (individual consumers or/and organisations), sales and marketing area (local, regional or Global), how they distribute their product and services (distributor; agent; retailer; wholesaler or direct to consumers), Internal IS department, ownership of the company (Malaysian, foreigners), the location of the company (state) and the position of the respondent.

3.5 Measurement

This section explains how the research variables were measured. When assigning only an identification or label to a group of objects, nominal scale was used. On the other hand, interval scale will be used when measuring a degree or level of a variable in relations to a group of objects.

3.5.1 Likelihood of Using Internet

This is a dependent variable and the possible answers were: yes, no and Intend to. Therefore, the measure is dichotomous and will differentiate the Internet users from the non-users and those planning to use Internet.

3.5.2 Extent of Using Internet

This is another dependent variable and will be measured by summing up the numbers of business functions which use Internet. There were thirteen business functions in question 7 and the respondent could check as many boxes as relevant. The total number of business functions represented the extent of Using Internet of the respondent and thus the measurement was in interval scale.

3.5.3 Perception Towards Internet

There section C was dedicated to measure the perception. Based on Rogers's innovation theory (1995), there were five attributes - relative advantage, compatibility, ease of use, trialability, and observability. Questions 10 which consisted of 10 statements was to measure the attribute "relative advantage". Question 11 which consisted of 6 statements was to measure the rest of the attributes. The measurement scale was in Likert: 1 = strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree. The total score of these attributes determined the level of favourable perception towards the Internet and was assigned as interval scale.

3.5.4 Firm Size

With the reference to the categorisation by Chew (198x), it was decided to use number of employee (question 17) as the basis to distinguish the large company from the small and medium sized company. The organisations were categorised in one of the three groups:

- Small: employs 50 or less employees.
- Medium: employs 51 to 100 employees.
- Large : employs more than 100 employees.

3.5.5 Information Need, Competition and Staff Internet Knowledge

The question 6, 8 and 9 (each with three statements) were used to measure the level of staff Internet knowledge, Information Need and Competition respectively. Likert scale : 1 = strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree was used and the total score from these statements determined the level of each research variable. The measurement was assigned as interval scale.

3.6 Data Analysis Techniques

The following analysis techniques were used to analyse the data:

Reliability Test was used to test the reliability of the scale of the research variables. As the research variables comprised of many items, a test need to be done to check if these items were measuring to a certain extent, the research variables. Cronbach's alpha is used to test the internal consistency of these items and value exceeded 0.6 would be considered significant (Sinivasan 1985 and James 1995).

Factor Analysis was used for two primary functions: (1) to identify the underlying construct in the data and to test if the items were tapping to the designed construct; (2) to reduce the number of variables to a manageable sets. Principal component

was used and if necessary, varimax or oblique rotation would be used to reduce the number of complex variables. Factors with loading of more than 0.5 were accepted as they were considered very significant (Nunnally 1978 and James 1995).

Pearson correlation was used for identifying significant relationships between variables and further analysis on the relationships would be conducted using t-test and Chi-square. T-test was used to test the relationships between two interval data or between one categorical data and one interval data. When both data were categorical, Chi-square was used.

Discriminant Analysis was used for identifying the combination of individual variables which best explain for the statistically significant relationship between the independent variables and the dependent variable. In this case, the dependent variable was the likelihood of using Internet and was of categorical scale whereas the independent variables were of interval data.

Multiple Regression Analysis was used for identifying the combination of variables which best explain for the statistically significant relationship between the independent variables and the dependent variable. In this study, the dependent variable was the extent of using Internet which was measured in interval scale.