

## **CHAPTER 3: RESEARCH METHODOLOGY**

### **3.1 INTRODUCTION**

The previous chapter provides theories related to e-commerce adoption among SMEs. This chapter presents the proposed model framework, the development of hypotheses, as well as the selection of measures and questionnaire design. The sampling design and data collection procedure, and the analysis technique used in this study are also explained.

### **3.2 DEVELOPMENT OF HYPOTHESES**

Many past studies have advocated that the use of e-commerce positively influences an organisation's performance, specifically in terms of growth (Raymond et al. 2005), financial gain (Johnston et al., 2007), and competitive advantage (Teo, 2007). However this study is more interested in how the SMEs perceive those benefits. Examples of benefits typically associated with e-commerce adoption are: increase of revenues and profits, reduction in costs, improvement in customer service, development of new market segments and the streamline of business operations. Therefore, hypothesis 1 reflects the relationship described:

H1: The perceived relative advantage is positively related to adoption of e-commerce

In this study, perceived compatibility refer to how well e-commerce fits with the current business processes as well as the suppliers and customers. According to Grandon and Pearson (2004), compatibility between e-commerce and firm's culture, values and preferred work practices is an important factor in determining adoption. Consequently, the lack of organisational compatibility may impose constraints on the level of e-commerce used (Gibbs and Kramer, 2004). Therefore, Hypothesis 2 reflects the level of perceived compatibility and e-commerce adoption:

H2: The perceived compatibility is positively related to adoption of e-commerce.

Perceived complexity is defined as the degree to which a firm perceives the adoption of e-commerce would be complicated. Many studies have found significant relationship between complexity and ecommerce adoption (e.g Huy and Filiatraut 2006; Joen et al. 2006). SMEs might perceive e-commerce as something which is complex and not applicable to their current level of business. Since SMEs are known to have low level of managerial and technical skills, they might perceive implementation of e-commerce as very challenging (Hussin et al., 2008). Hence, Hypothesis 3 was derived:

H3: The perceived complexity is negatively related to adoption of e-commerce.

In the context of Malaysia, among the major barriers to e-commerce adoption in Malaysia are: not having e-commerce knowledge, lack of e-commerce skills, and lack of skilled workers to operate e-commerce (Sulaiman and Jaafar 2003).

Therefore, Hypothesis 4 is derived:

H4: The e-commerce knowledge and expertise is positively related to adoption of e-commerce.

According to Saffu et al. (2008), top management's enthusiasm to adopt information technology is one of the factors that contribute towards adopting of e-commerce. Hypothesis 5 is postulated to reflect this relationship:

H5: The management attitude towards e-commerce is positively related to adoption of e-commerce

As described in the literature review section, the external change agents that might influence e-commerce adoption include the organisation advisors, the government, external consultants, and also e-commerce solution providers.

Hence, Hypothesis 6 is derived:

H6: The adoption of e-commerce is positively related to external change agents.

A number of recent studies have discussed how the interactions with other organisations in a global economy have enforced these SMEs to adopt e-commerce technologies (e.g Hinson and Abor, 2005; Sarosa and Underwood, 2005; Nirjar and Tylecote, 2005; Jaw and Chen, 2005; Hinson and Sorensen, 2006). This shows that the pressure from trading partners also affect the whether e-commerce is adopted. Hence, Hypotheses 7 reflects the relationship postulated:

H7: The adoption of e-commerce is positively related to pressure from trading partners

Relationships among players within the same industry also affect the overall industry structure (Gregor and Johnston, 2000). These relationships determine the extent of competition and rivalry within the industry and play a role in e-commerce adoption. Therefore, the last hypothesis in this study reflects this scenario:

H8: The adoption of e-commerce is positively related to pressure from competitors.

As describe in the literature review and reflected in the research model, below is the summary of the hypotheses developed for this study. There are altogether eight hypotheses.

Table 3.1: Summary of Hypotheses

No	Hypothesis
	Technological Context
H1	Perceived relative advantage is positively related to adoption of e-commerce.
H2	Perceived compatibility is positively related to adoption of e-commerce.
H3	The perceived complexity is negatively related to adoption of e-commerce.
	Organisational Context
H4	E-commerce knowledge and expertise is positively related to adoption of e-commerce.
H5	Management attitude towards e-commerce is positively related to adoption of e-commerce.
	Environmental Context
H6	External change agent is positively related to adoption of e-commerce
H7	Pressure from trading partners is positively related to adoption of e-commerce.
H8	Pressure from competitors is positively related to adoption of e-commerce.

### 3.3 THEORETICAL FRAMEWORK

After reviewing all the related literature and generating the hypotheses for this study, the following conceptual framework is illustrated in Figure 2.1 below. The framework consists of 8 independent variables, all of which are postulated to affect the same dependent variable, e-commerce adoption.

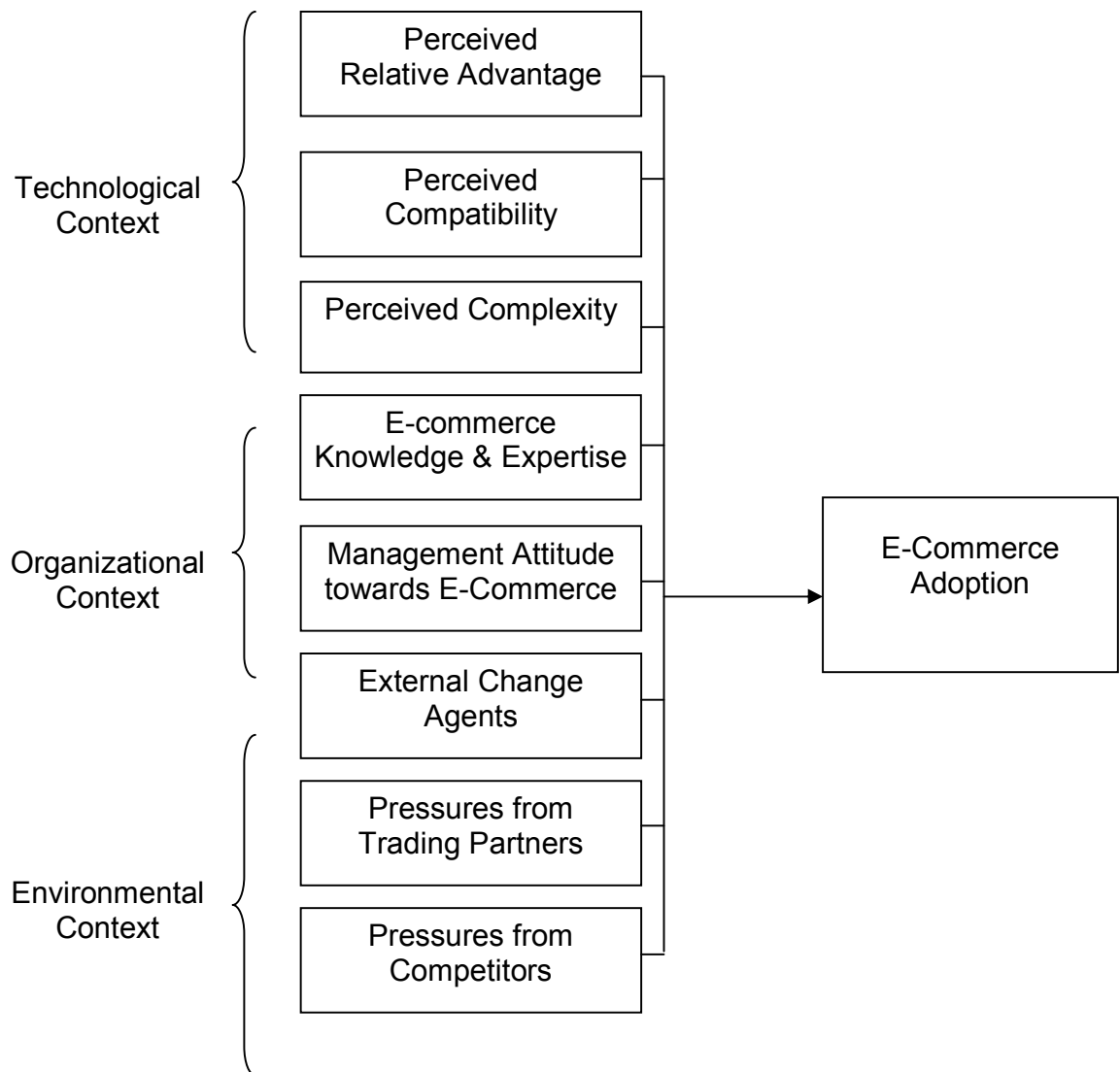


Figure 3.1: Theoretical framework

### 3.4 SELECTION OF MEASURES

Items used to measure the constructs to confirm content validity were adapted from previous studies (Chan and Hui, 2001, Gengatharen and Standing, 2004, Scupola, 2003, Scupola, 2004) that have incorporated the Tornatzky and Fleischer's (1990) model. These measures are the independent variables of the conceptual model and are categorized in Table 3.2.

Table 3.2: Measures of e-commerce adoption factors

Factor	Items	Source
Perceived Relative Advantage	Useful in job	Chan and Hiu (2001)
	Enhance effectiveness on the job	Chan and Hiu (2001)
	Enables to accomplish specific tasks quickly	Chan and Hiu (2001)
	Increase productivity	Chan and Hiu (2001)
	Improve organization performance	Chan and Hiu (2001)
Perceived Compatibility	With nature of our operations	Gengatharen and Standing (2004)
	With organization culture	Chan and Hiu (2001)
	With organization values	Chan and Hiu (2001)
	With preferred work practices	Chan and Hiu (2001)
Perceived Complexity	Difficult to use	Scupola (2003)
	Learning to operate would be hard	Scupola (2003)
	Interaction would be confusing	Scupola (2003)
	Take a long time to use successfully	Scupola (2003)

Table 3.2 continued: Measures of e-commerce adoption factors

E-commerce Knowledge and Expertise	Fully aware of e-commerce capabilities	Gengatharen and Standing (2004)
	Has the right people to initiate	Gengatharen and Standing (2004)
	Know how e-commerce can help	Gengatharen and Standing (2004)
	Know what e-commerce activities to be adopted	Gengatharen and Standing (2004)
Management Attitude towards E-commerce	Regards e-commerce as a high priority	Chan and Hiu (2001)
	Enthusiastic about the adoption	Chan and Hiu (2001)
	Always supports any e-commerce initiatives	Gengatharen and Standing (2004)
	Willing to invest in e-commerce initiatives	Gengatharen and Standing (2004)
External Change Agents	Recommended by advisors	Scupola (2003)
	Pressured by the government	Scupola (2003)
	Demonstrated by external consultants	Scupola (2003)
	Convinced by e-commerce solution providers	Scupola (2003)
Pressure from Trading Partners	Depend on firms already using e-commerce	Chan and Hiu (2001)
	Pressured by trading partners	Chan and Hiu (2001)
	Will affect relationship with trading partners	Chan and Hiu (2001)
Pressure from Competitors	Competition is a factor in adopting	Chan and Hiu (2001)
	Pressured by industry players	Chan and Hiu (2001)
	Will affect competitive advantage	Chan and Hiu (2001)

The dependent variable, extent of e-commerce adoption was computed by adding the number of e-commerce applications adopted by the SMEs.



### **3.5 SAMPLING DESIGN**

In order to collect the necessary response from a large number of SMEs, survey questionnaires were used. To generalize the results, a sample size of 300 was targeted. Convenient sampling is used to select the data for this research. A list of SMEs was obtained from SME Corp. The initial plan was to randomly select 700 SMEs from the Klang Valley region from the list. The respondents would then be contacted, either via email or post, to take part in the survey.

### **3.6 DATA COLLECTION PROCEDURE**

#### **3.6.1 Questionnaire**

A quantitative survey was used to collect the primary data, by using a structured questionnaire. The questionnaire was designed based on past researches on e-commerce (Lewis and Cockrill, 2002). The questionnaire was divided into four sections, as shown below:

- Section A: Demographics Profile
- Section B: Organisation Profile
- Section C: E-commerce Adoption
- Section D :E-commerce Adoption Factors

The first section (Section A) asked for the respondents' demographics, such as gender, age, education level and current position within the organization. This section also helped to filter out respondents whose current position is not executive level or above.

The second section (Section B) asked about the nature of the organization, such as the total number of employees and yearly revenue. The corresponding answers are then used to verify that the respondents' company is indeed an SME, according to the SME definition.

The third section (Section C) determined the current e-commerce adoption level within the organization. Finally, the fourth section (Section D) contained questions that represent the e-commerce adoption determinants, as described in the research framework.

The multiple-item methods were used in the final two sections (Section C and D). Each item was measured based on a seven-point Likert scale from strongly disagree (1) to strongly agree (7). The odd number rating scale was adopted as it allows the respondent to 'sit on the fence' by selecting a neutral statement. The final version of the questionnaire can be viewed in Appendix 1.

### **3.6.2 Pilot Test**

Before the commission of the survey, a pilot test of the structured questionnaire was conducted, involving several respondents. The questionnaire was assessed in terms of ease of understanding, logical consistencies, sequence of the items, contextual relevance and so to enable the questionnaire to be further refined.

26 respondents from various SMEs participated in the pilot test. Personal visits were made to managers of selected SMEs, and they were requested to participate in the survey. Cooper and Schindler (2003) stated that the pilot test group size may range from 25 to 100 respondents and do not have to be statistically selected.

The pilot test revealed that the average time duration to complete the questionnaire is only 5.5 minutes, which is appropriate, considering the number of questions in the questionnaire. All the pilot test respondents also claimed that the questions were clear and comprehensible, indicating that the survey had a relatively low level of difficulty.

### **3.6.3 Data Collection**

Based on the sampling list, the survey was made available to the shortlisted respondents. The questionnaire was made into an online form and its URL was sent to each of the 500 respondents that have email addresses. Another 200 printed version of the survey was posted to the rest.

However, it was discovered that unlike medium-sized enterprises, many of the small-sized enterprises did not take part in survey, thus resulting in an overall low response rate.

Therefore, to reach out to small-sized enterprises, physical questionnaires were then distributed in person to a number of SME's in the Klang Valley. Field assistants were used to carry out the survey and collect the necessary data. The locations visited include Mara Headquarter Building in Kuala Lumpur, Kompleks PKNS Shah Alam, Kompleks PKNS Bangi, and Diamond Square Gombak. For each company approached, the personnel was interviewed and assisted in filling up the questionnaire. This approach was adopted since many pilot test respondents indicated that they prefer someone to help write down their responses.

## **3.7 DATA ANALYSIS TECHNIQUES**

### **3.7.1 Descriptive Analysis**

Descriptive statistics were applied to summarize the demographic profile of the respondents and the mean of each of the factors. Variance and standard deviation were obtained to measure variability around the mean of a distribution.

### **3.7.2 Reliability Analysis**

The reliability of the instruments used was one of the concerns in this study. The reliability scale text would be utilized to determine the instruments validity. According to Sage et al. (1980), measurements are reliable if the true aspects of the trait measured, instead of the chance aspects. Therefore, the instrument must be reliable to the extent that the scores by the respondents should be almost equal if measurement is repeated.

In order to examine the reliability of the instruments, the Cronbach's Alpha was used to measure reliability of the underlying dimensions. The Cronbach's Alpha estimate indicates how highly the items in the questionnaire are interrelated in order to determine the instrument reliability. According to Nunnaly (1978), the Alpha which is more than 0.7 indicates a high reliability.

### **3.7.3 Correlation Analysis**

Correlation analysis was used to examine whether there was any association between each of the factors and the extent of e-commerce adoption. The extent of e-commerce adoption was computed by adding the number of e-commerce applications being adopted by the respondents, which means that the higher the score, the higher the adoption.

In determining whether the factors have any influence on the extent of e-commerce adoption, that is to test the hypotheses formulated earlier, regression analysis was used. For the purpose of regression analysis, the extent of e-commerce adoption is the dependent variable while the factors are the independent variables. It was performed using the SPSS software.

The hypotheses and their relationships were tested through correlation by individually measuring e-commerce adoption in relation to each of the factors. Correlation analysis indicates if a linear relationship exists between two variables. Although correlation does not indicate the reasons the relationship is present, the correlation coefficient does tell if the relationship is significant or not. A perfect positive correlation has a coefficient of 1.0, no correlation has 0 and a perfect negative coefficient has -1.0.

## **Multiple Regression**

Multiple regression was employed to assess the significant level of each of the eight determinants. Regression is an analysis of a predictor variable's relationship to a dependent variable. In this study, multiple regression via stepwise analysis was employed. In stepwise regression, the order of entry for variables is based strictly on statistical criteria with an objective of determining which independent variables best predict the dependent variable (Tabachnick and Fidell, 1989). The SPSS program selects the variables in the order of their ability to contribute to the overall prediction. Hair et al. (2006) claimed that stepwise estimation is a powerful and popular approach to variable selection since it assesses the contribution of each independent variable to the regression model, based on the greatest contribution.

## **3.8 CONCLUSION**

This chapter has presented the fundamental structure of the research methodology used in this study. The proposed research framework was adopted from previous researcher's research model. Eight hypotheses were developed and will be answered in the next chapter.