CHAPTER 3

RESEARCH METHODOLOGY

3.1. Introduction

This chapter discusses the methodology of this study, starting by defining and describing the research design and method, population, sampling, and sampling procedure. Next, it discussed the data collection procedure and justify the use of instruments and measurement of all research variables, namely GSCM practice, innovation capabilities, competitive advantage and social performance. This chapter also indicates the sources of the questionnaire adopted in this research, as well as discusses and highlights.

3.2. Research Approach and Design

According to Sekaran and Bougie (2016), the research design is the decisions towards the aim of the given study, the degree to which this research is manipulated, the kind of investigation reported in the study, its location and controlled by the researcher and the level at which the data analysed.

Whereas, there are two types of research design that all formally known as quantitative and qualitative (Sekaran & Bougie, 2016). The approach of quantitative study is generally gathered through the involvement of structured questions with the collection of numerical data via questionnaires from specific respondents. Further, the approach of qualitative study is generated from the broad answers to specific questions from responses to open-ended questions in the questionnaire, or interviews, or through observation, or from the available information gathered from different and various sources (Sekaran & Bougie, 2016). The difference between both research designs is

when collecting and analysing data, quantitative research deal with numbers and statistics, while qualitative research deals with words and meanings. In general, both researches are having an important role in gaining different kinds of knowledge.

The quantitative research approach starts with a problem statement which involves the formation of a hypothesis, a literature review, and a quantitative data analysis. Referring to Creswell (2013), where he states that quantitative research employs strategies of inquiry such as experimental and surveys, and collect data on predetermined instruments that yield statistical data. However, the findings from quantitative research can be predictive, explanatory, and confirming. The next section focuses on quantitative research methodology.

However, this study applied a quantitative research design. This type of research design can provide condensed statistical data and test the relationship between the variables of the study (Sukamolson, 2007). According to Newman and Ridenour (1998), the quantitative approach is used when one begins with a theory (or hypothesis) and tests for confirmation or disconfirmation of that hypothesis while qualitative study focuses on exploring ideas and formulating a theory or hypothesis. The goal of conducting this quantitative research study is to determine the relationship between one thing (an independent variable) and another (a dependent or outcome variable) within a population which is the manufacturing companies certified with ISO 14001 in Malaysia.

Quantitative methods enable statistical analysis and ensure the reliability and validity of the collected data (Ghauri et al., 2020; Grønhaug, 2005). Furthermore, the quantitative research design prevents bias in the results, and assist the researcher to generate finding that is representative of the whole population at a lower cost than collecting the data for the whole population (Thornhill et al., 2009).

3.3. Study Population and Sampling

Population refers to the entire group of people, events, or things that the researcher is interested in investigating in a proposed study (Sekaran & Bougie, 2016). The population of this study are the manufacturing companies in Malaysia specifically companies certified with ISO 14001 environmental management system. According to ISO (2021), the total number of certified manufacturing companies in Malaysia is 2,560 companies (see Table 2.2). According to Zailani et al. (2012), and Abdul-Rashid et al. (2017), firms certified with ISO 14001 are more likely to adopt environmental initiatives, which include green supply chain initiatives, resource recovery initiatives and environmental design.

Meanwhile, Sekaran and Bougie (2016), defined sampling research as the selection process of a sufficient number of people or elements from the population. The research sample provide an understanding of its potential population and its characteristics; thus, it allows to make generalizing to the population elements possible. Accordingly, the study population comprises the manufacturing companies with ISO 14001 certification in Malaysia. This research uses probability sampling and a specific sampling technique used is based on simple random sampling to collect data from the respondents which represent the entire data population. Therefore, in simple random sampling, every element in the population has a known and equal chance of being selected as a subject (Sekaran & Bougie, 2016).

This sampling technique is selected in this research is because it reduces the bias which happens in non-probability sampling. Individuals holding a managerial position, preferably from the environment, health and safety, operations, quality, production supply chain or engineering department, is going to be requested to respond to the questionnaire. The random sampling method is a probability method because according

to Cooper and Schindler (2011), and Creswell (2013), the chosen participants are known and selection criteria are not required in their selection. In this study, the sample comprises manufacturing companies with ISO 14001 certification in Malaysia.

There are several reasons on why manufacturing firms were selected as samples of this study. Firstly, they represent the largest sector in terms of employment, sales, and contribution toward the nation and global economy (Abdullah et al., 2014). According to DOSM (2020), in February 2020 the manufacturing sector recorded growth in sales of 7.0% which increase sales value to register at RM110.6 billion compared to the previous year recorded sales was RM103.4 billion. Secondly, despite being the biggest sector, manufacturing firms have been identified as the main contributor of environmental decline in Malaysia such as enormous amounts of wastes, exploitation of natural resources, and overconsumption of energy (Abdul-Rashid et al., 2017). Thirdly, certification in ISO 14001 proved that the companies were expected to be involved in the implementation of green supply chain management (GSCM) practices and aware with the requirement of environmental procedures and standards (Zailani et al., 2012). Therefore, the selection of manufacturing firms as the sample of the study is considered as appropriate and important to accomplish the research objectives.

3.3.1. Sample Size

Sample size defined as the actual number of subjects that been chosen as a sample to indicate characteristics of the population or it can be known as a subset of the population. However, Hair et al. (2017), claimed that the selection process is more important than the calculation of sample size. Based on the common rule of thumb, a sample size between 30 and 500 can be considered effective depending on the sampling

design and on the research questions (Roscoe, 1975). In this sense, there are many approaches have been evaluated and discussed in the past regarding determination of sample size. Anderson and Gerbing (1988), suggested 150 participants for a minimum level but some other researchers claimed that 200 is an acceptable sample size level for SEM analysis (Chou & Bentler, 2000). For moderately reliable results, Hoyle and Kenny (1999), recommend to achieve at least 100 participants per model. Likewise, Healey (2014), stated that the general rule of thumb for a sample size is 100 or more. On the other hand, Kelloway (1998), indicated that at least 200 samples are needed for a model that incorporates latent variables. Hair et al. (2010), mentioned that the minimum sample of 100 would be appropriate for the purpose of regression, or the preferable ratio of 20 observations for each construct in the study. However, another rule of thumb suggested that the minimum sample size is preferred to be greater than 200 to perform confirmatory factor analysis and structural equation modelling (Crocker & Algina, 1986).

Luck and Rubin (1987) stressed the importance of sample size in statistical analysis because according to the authors, complex analyses require sample of large size. The chosen size is based on the sampling table by Krejcie and Morgan (1970) it simplified the sample size decision by providing a table to ensure a great decision model. Krejcie and Morgan provided a table for sample size selection because it is considered a scientific guideline that offers a certain sample size based on the size of a certain population. In this study, a sample size corresponds with the size of the population (N=2,560) manufacturing firms certified with ISO 14001 should be represented by sample with 335 respondents. Based in Krejcie and Morgan, suggested that the targeted sample size should be 335 respondents among ISO 14001 certified manufacturing firms in Malaysia is required in this study.

Table 3.1: Sampling Size

Population size	Sample size	Population size	Sample size
10	10	500	217
50	44	1000	278
100	80	1500	306
150	108	2000	322
200	132	2400	311
250	152	2600	335
300	169	2800	338

Source: Krejcie& Morgan (1970)

As for the sample size, the Table 3.1 shows that the size of 335 is appropriate for the population with the size of 2,560 with confidence level of 95% and margin of error 5.0% (see Appendix 2).

3.4. Data Collection Method and Procedures

The data of the study collected through a questionnaire survey that is developed to investigate the relationship between GSCM practice, innovation capabilities, competitive advantages and social performance among manufacturing firms in Malaysia. Due to the Covid-19 pandemic, questionnaires were only distributed via email with a direct link to a web survey to answer the questionnaire. Of that, 600 initial emails sent to the manufacturing firms that certified with ISO 14001. Following, three steps procedures to distribute the questionnaires (initial e-mail plus two follow-ups).

The list of firms was gathered from the Federation of Malaysian Manufacturers (FMM) and Standard and Industrial Research Institute of Malaysia (SIRIM) which they also aid collect the data due to Covid-19 pandemic and challenges in getting response from manufacturing companies. In the email the researcher explained to the respondents

about the purpose of the survey and their participation is on voluntary basis in order to encourage respondents to complete and return the questionnaire.

However, during the beginning of the Covid-19 pandemic many manufacturing firms were not able to provide feedback because there were ordered to close their factories due to the speared of the virus among employees as manufacturing sector involved with many employees and human interaction. Therefore, selected data was aimed to finish within two months but it has been extended to four months between May 2021 to August 2021 in order to allow more companies to participate in the questionnaire.

3.5. Research Instruments

To develop the measures, we include 69 items in the study to measure overall variables. These items are going to be measured by using a five-point Likert scale ranging from "1" (strongly disagree) to "5" (strongly agree). The questionnaire is drawn to gather information in four sections as detailed below:

3.5.1. Demographic Information Survey

Section A: consists of a demographic Information Survey. This information includes personal data characteristics such as age, gender, professional qualification, job title, number of employees, sector classification, industry classification and the age of the organization (see Appendix 1).

3.5.2. Implementation of GSCM Practices

Section B: the implementation of green supply chain management practices is developed based on environmental awareness and its long-term benefit to the organization (Wongleedee, 2020). There are various questionnaires of GSCM practices

that have been applied in different fields (Chan et al., 2012; Luthra et al., 2016; Tan, 2016; Zhu & Sarkis, 2007). The variable of GSCM practice includes 5 dimensions and a total of 26 items to address the implementation of GSCM practices adopted from (Çankaya & Sezen, 2019; Eltayeb & Zailani, 2014; Green et al., 2012; Hyland & Gieskes, 2017; Scur & Barbosa, 2017; Seman et al., 2018; Shafique et al., 2017; Sundram et al., 2017; Zhu & Sarkis, 2007). Therefore, the implementation of GSCM practices in manufacturing firms, the measurement scale ranging from "1" (strongly disagree) to "5" (strongly agree) which has been examined by (Abu Seman et al., 2019; Tan, et al., 2016) The measurement has been tested previously in the Malaysian context in the manufacturing industry (Abu Seman et al., 2019) (see Appendix 1).

However, this scale was adopted in the present study because of its extensive development and validation and because it is deemed to be among the most effective instruments used for the evaluation of green practices. Furthermore, the measure was revealed to be effective even in studies concerning diverse cultures like Asian and European (Tariq et al., 2019). Moreover, the instrument has been tested among manufacturing industries in Malaysia. For instance, Sundram et al. (2017), conducted a study among manufacturing companies in Malaysia it shows the coefficient alpha for the scale were ranged from 0.863 to 0.922, which are regarded as good and satisfactory. (See Appendix 1).

Table 3.2: Implementation of GSCM Practices Questionnaire

Code	Internal Environmental Management
IEM1	My company is a commitment to Green Supply Chain Management.
IEM2	My company supports good environmental practices and policies.
IEM3	My company collaborate cross-functional cooperation for environmental improvements
IEM4	My company established an environmental protection index of recycling, gaseous reduction and energy conservation
IEM5	My company has an environmental management system (ISO14001 certificate).

IEM6	My company comply with environmental compliance and auditing programs.

Key: IEM: internal environmental management.

Code	Green Purchasing
GP1	My company provides design specifications to suppliers that include environmental requirements for purchased items.
GP2	My company requires its suppliers to develop and maintain an environmental management system (EMS).
GP3	My company requires its suppliers to have a certified EMS such as ISO 14001
GP4	My company uses a questionnaire to collect information about its suppliers' environmental aspects, activities and/or management systems
GP5	My company makes sure that its purchased products must contain green attributes such as recycled or reusable items
GP6	My company make sure that its purchased products must not contain environmentally undesirable items such as lead or other hazardous or toxic materials

Key: GP: green purchasing.

Code	Eco-Design and Packaging
EP1	My company design products for reduced consumption of material/energy
EP2	My company design products for reuse, recycling, recovery of material and/or parts
EP3	My company design products to avoid or reduce the use of hazardous products and/or their manufacturing process
EP4	My company design products for disassembly
EP5	My company make sure that its packaging has recyclable contents

Key: EP: green purchasing.

Code	Customer Cooperation
CC1	My company cooperate with customer for eco-design
CC2	My company cooperate with customers for cleaner production
CC3	My company cooperate with customers for green packaging
CC4	My company cooperate with customers for using less energy during product transportation
CC5	My company cooperate with customers for developing an environmental database of products

Key: CC: customer cooperation.

Code	Investment Recovery
IR1	My company is involved in sales of excess inventories/materials.
IR2	My company is involved in sales of scrap and used materials
IR3	My company is involved in the sales of excess capital equipment.
IR4	My company is involved in the sales of by-products and waste.

Key: IR: investment recovery.

3.5.3. Innovation Capabilities

Section C: innovation capability was measured with 22 items developed by Camisón and Villar-López (2014), and Kafetzopoulos and Psomas (2015). The instrument measures the perception of innovation capabilities within the manufacturing industry setting. According to OECD (2018), the scale is composed of four dimensions of innovation capabilities involves product and process innovations, while non-innovation capability involves marketing and organizational innovations. The respondents are required to answer each item based on a five-point Likert scale ranging from "1" (strongly disagree) to "5" (strongly agree) that used to evaluate the innovation capabilities among manufacturing industry in Malaysia which has been examined by (Lee et al., 2014). The instrument has been tested in the context of the manufacturing industry by the previous study conducted by Kafetzopoulos and Psomas (2015), in their study the value of alpha for meaning, competence, autonomy and impact are 0.93, 0.92, 0.90 and 0.89, respectively. The measurement also has been used to measure innovation capabilities (Asadi et al., 2020; Godin, 2008) (See Appendix 1).

Table 3.3: Innovation Capabilities Questionnaire

Code	Product Innovation
PTI1	My company can introduce new and innovative products into the market
PTI2	My company is able to develop environmentally friendly products.
PTI3	My company make efforts to develop new products in terms of hours/persons, team and training involved
PTI4	My company is able to improve products' design.
PTI5	My company's products are modified and improved
PTI6	My company enhances the manufacturing technology of new products

Key: PTI: Product Innovation.

Code	Process Innovation
PSI1	My company has a pioneer disposition to introduce new processes
PSI2	My company is able to adjust the processes at all levels concerning the production process, inventory, distribution, logistics, etc.

PSI3	My company displays the clever response to new processes introduced by other companies
PSI4	My company improves existing machinery and equipment.
PSI5	My company uses machinery adaptations and develops original processing solutions
PSI6	My company is able to offer environmentally friendly processes.

Key: PSI: Process Innovation.

Code	Marketing Innovation
MI1	My company has close relationship management with major customers
MI2	My company has good knowledge of different market segments
MI3	My company has a highly efficient sales-force
MI4	My company's product distribution is efficient
MI5	My company has good knowledge of market conditions

Key: MI: marketing innovation

Code	Organization Innovation
OI1	My company has good coordination and cooperation of R&D, sales, marketing and manufacturing departments
OI2	My company has high-level integration and control of the major functions
OI3	My company has a high capacity for developing and gaining access to new technologies
OI4	My company has a high level of capability at identifying the innovative strategy of competitors
OI5	My company is highly capable of identifying external opportunities and threats

Key: OI: organization innovation.

3.5.4. Competitive Advantages

Section D: competitive advantages at the organization level indicate the ability of an organization to have better utilization of their resources (efficiency) to meet their objectives (effective) compared to other competitors in the market (Moori et al., 2018). Given the importance of green practices to a firm's competitive position, several studies have tried to identify the possible consequences of greening the supply chain. Competitive advantages been measured by 14 items adopted from (Li et al., 2006; Tan & Shaharudin, 2016). This variable is a three-dimensional construct, price/cost, quality and delivery to determine the performance of the company under competitive

advantages. Respondents indicated their agreement with each item on a five-point Likert scale whereby, 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. According to previous studies conducted by Ganeshkumar and Madan (2015), Li et al. (2006) and Tan and Shaharudin (2016), the coefficient alpha ranged from 0.87 to 0.91. (see Appendix 1).

Table 3.4: Competitive Advantages Questionnaire

Code	Price/Cost
PC1	My company offer competitive price compared to our competitor.
PC2	My company offer price as low or lower than our competitor.
PC3	My company direct manufacturing cost/production cost was reduced compared to our competitor.
PC4	My company total product cost reduced compared to our competitor.
PC5	My company raw material cost reduced compared to our competitor.

Key: PC: price/cost.

Code	Quality
QY1	My company is able to compete based on quality.
QY2	My company offer products that are highly reliable as compared to our competitor.
QY3	My company offer products that durable as compared to our competitor.
QY4	My company offer a high-quality product to our customer as compared to our competitor.
QY5	My company offer products which are conformance to design.

Key: QY: quality.

Code	Delivery
DY1	My company deliver needed kind of product as compared to our competitor.
DY2	My company delivers customer order on time as compared to our competitor.
DY3	My company meets delivery schedules as compared to our competitor.
DY4	My company fulfilment spends increased as compared to our competitor

Key: DY: delivery.

3.5.5. Social Performance

Section (D2): The evaluation of social performance is examined in terms of practices such as customer satisfaction, social projects, stakeholder welfare, educational opportunities for all personnel and occupational health and safety of employees (J. Wang & Dai, 2018). In this study, social performance is measured by using 16 items

adopted from Çankaya and Sezen (2019), in the field of the manufacturing industry. Their study showed high reliabilities of 0.89. The respondents are required to answer each item based on a five-point Likert scale ranging from "1" (strongly disagree) to "5" (strongly agree).

Table 3.5: Social Performance Questionnaire

Code	Items
SP1	My company has improvement in customer satisfaction
SP2	My company has improvement in its image in the eyes of its customers.
SP3	My company has improvement in investments in social projects (education, culture, sports)
SP4	My company has improvement in relations with community stakeholders, e.g., non-governmental organizations (NGOs) and community activists.
SP5	My company has improvement in employee training and education.
SP6	My company has improvement in occupational health and safety of employees.
SP7	My company has improvement in overall stakeholder welfare or betterment

Key: SP: Social Performance

Table 3.6: Summary of Questionnaire's Sources, Dimensions and Number of Items

NO.	Variables and source	Dimensions	No. of items
1	**GSCM practice** (Çankaya & Sezen, 2019; Eltayeb & Zailani, 2014; Le, 2020; Tan et al., 2018; Zhu & Sarkis, 2004)	**Five dimensions** - Internal environmental management - Green purchasing - Eco-Design and Packaging - Customer cooperation - Investment recovery	26
2	**Innovation Capabilities** (Camisón & Villar-López, 2014; Kafetzopoulos & Psomas, 2015; Lee et al., 2018)	**Four dimensions** - Product innovation - Process innovation - Marketing innovation - Organizational innovation	22
3	**Competitive Advantage** (Li et al., 2006; Tan & Shaharudin, 2016)	**Three dimensions** - Price - Quality - Delivery	14
4	**Social Performance** (Çankaya & Sezen, 2019; Cheah et al., 2019)	**Flat Construct**	7
		Total	**69**

3.6. Content Validity

The validity of the content or instruments comprehend the testing of the usability of the selected and chosen measurements for data collection. Further, Hair et al. (2010), revealed that content referred to the correspondence between the instrument items and the concept. However, the main objective of content validity is to approve the selection of scale items based on the past empirical study and theoretical consideration (Hair et al., 2010). In this study, the instruments for the gathering of data in the manufacturing companies certified with ISO 14001 in Malaysia tested for validity. This type of validity is tested by the use of expert judgment and pilot study.

3.6.1. Expert Judgment

In this study, the researcher followed the judgment of experts of similar studies in the topic area to measure content validity by describing and determining the areas of content domain. According to Kline (2015), expert opinion is the basis for establishing content validity. As noted earlier, this research used four latent variables that consist of 12 dimensions. Thereafter, a total of 69 items were sent to four experts for their opinions about the extent to which these items were suitable for measuring the aspects they were designed for, and the extent to which the questionnaire items were clear.

In this research, English questionnaires version were presented and emailed to four experts from senior management and engineering lecturers and the feedbacks were positive. This shows that the survey has validity and is appropriate for this study. Moreover, the experts also asked if they can provide further advice, recommendation and some modifications on the questionnaire items in terms of the phrases to make them clearer and more comprehensive. However, the feedback contains using easiest formatting possible in the questioner to get the targeted answers for goodness of the

collected data. Also, avoid using many reversed items to easy the analysis and apply five Likert scales preferable to start 1 is strongly disagree and 5 strongly agree. Therefore, some items were slightly revised and resentenced to be easier and more understandable, then the questionnaire was distributed to determined sample based on the suggestions offered by experts. The content validity of questionnaire measurement was related to four latent variables, namely GSCM practice, innovation capabilities, competitive advantage and social performance among manufacturing firms certified with ISO 14001 in Malaysia (See Appendix 2).

3.6.2. Pilot Study

A pilot study in social studies is considered advisable to undertake a pilot survey. Zikmund et al. (2003), explained the pilot test as an experimental study that carried in terms of improvisation of research instrumentations. The pilot study is defined as a small-scale administered version or trial run done in the preparation before conducting the actual study. Kothari (2004) claimed that before collecting the actual data, a pilot study should be considered to test the questionnaire items in terms of editing its language based on the results obtained from the pilot study. The purpose is of this test is to expose defects in the plan of the research (Fraenkel et al., 2012; Kothari, 2004). Furthermore, a pilot study was performed to identify the reliability of the research instrument, as well as to ensure that the research instrument is good and clear to be understood and responded to by the respondents (Hair et al., 2010). Reliability is known as the degree to which measurements are free from error (Zikmund et al., 2003). Therefore, high reliability in research instruments indicates minimum error variance if the test indicates a high value in reliability (Sekaran & Bougie, 2016).

In this research, a total of 30 questionnaires were distributed to the manufacturing companies certified with ISO 14001 in Malaysia through an online survey due to the current issue of Covide-19. The pilot test questionnaires were distributed to the respondents based on a convenience basis. In addition to the questions related to variables of this study, the respondents were given specific questions obtaining their views on the clarity of directions, easiness of survey completion and the time expected to be invested in responding to its items. Certain explanation concerning the survey was provided to the participants, such as the explanation concerning the content and purpose of the questionnaire. The participating companies were from randomly selected manufacturing companies certified with ISO 14001.

This study determined the reliability of the instruments by employing a Cronbach alpha test. According to Pallant (2020), Cronbach's alpha is the most widely used measurement for assessing internal consistency reliability. Hair et al. (2010) indicated that the values of Cronbach's alpha are between 0 (very low consistency) to 1 (very high consistency). Pallant (2020), added that the value of Cronbach's alpha above 0.7 is acceptable, and a value above 0.8 is preferable. Table 3.7 shows the result of the reliability analysis for each variable included in this study that exceeds the acceptable value (>0.7). For the data, they were processed using basic statistical analysis using SPSS. The descriptive analysis of the pilot survey's functional data is detailed next.

Table 3.7: Result of The Reliability Analysis

Variables	Dimensions	Cronbach's Alpha	
GSCM practices (GSCM)	Internal environmental management (IEM)	0.87	**0.928**
	Green purchasing (GP)	0.81	
	Eco-Design and Packaging (EP)	0.84	
	Customer cooperation (CC)	0.83	

	Investment recovery (IR)	0.71	
Innovation Capabilities (IC)	Product innovation (PTI)	0.77	**0.929**
	Process innovation (PSI)	0.83	
	Marketing innovation (MI)	0.73	
	Organizational innovation (OI)	0.88	
Competitive Advantages (CA)	Price/cost (PC)	0.82	**0.927**
	Quality (QY)	0.86	
	Delivery (DY)	0.76	
Social Performance (SP)		0.82	**0.823**
Total of reliability results			**0.962**

3.6.3. Assessment of Multivariate Outliers

In this research, the assessment of multivariate outliers was the second step in the process of data analysis. Outliers refried to the observation that has an unusual value for a single variable (Tabachnick & Fidell, 2007). Moreover, outliers in the data set are the extreme response that has been given by the participants towards the variables which could falsify the results (Hair et al., 2017). Furthermore, these outliers can be identified by their distinct and different characteristics such as values with high or low on a variable or falling at the outer ranges of the distribution (Hair et al., 2010).

To detect multivariate outliers, Hair et al. (2010) and Tabachnick and Fidell (2007), purposed to use the multivariate outliers. In this research, multivariate outliers were tested through SPSS by applying Mahalanobis distance for each response. However, a score greater than the critical value for each response is going to be considered as an outlier. Therefore, there are four variables in this research which are GSCM practices, innovation capabilities, competitive advantages and social performance. Hence, the number of critical values used is 18.467, using an alpha level of 0.001 (Tabachnick & Fidell, 2007). If the Mahalanobis score is greater than the critical value, in this case, it considers as an outlier and the data would be deleted to

enable the formation of usable and valid data to achieve good progress and outcomes of SEM analysis. However, in this research, the test of Mahalanobis distance (D2) showed that there were no multivariate outliers in the data set as the maximum value of Mahalanobis distance was 11.081 (see Table 3.8).

Table 3.8: Examining Existence of Significant Outliers

Residuals Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Predicted Value	258	2.426	6.893	5.049	0.920
Std. Predicted Value	258	-2.849	2.004	0.000	1.000
Standard Error of Predicted Value	258	0.054	0.186	0.086	0.034
Adjusted Predicted Value	258	2.443	6.972	5.050	0.919
Residual	258	-2.905	2.051	0.000	0.856
Std. Residual	258	-3.381	2.386	0.000	0.996
Stud. Residual	258	-3.391	2.391	0.001	1.002
Deleted Residual	258	-2.924	2.059	-0.002	0.867
Stud. Deleted Residual	258	-3.464	2.414	0.002	1.008
Mahal. Distance	258	0.003	11.081	1.992	2.557

3.7 Data Analysis

The current study is used two software to be used to analyse the data. This study used SPSS and Smart PLS to analyse the collected data.

3.7.1. Statistical Package for the Social Sciences (SPSS).

The first software used is the Statistical Package for the Social Sciences (SPSS). The main purpose of SPSS is to be used for analysis and descriptive statistics such as reliability of an instrument and Cronbach's alpha to measure the internal consistency. SPSS Preliminary analysis is useful to treat the missing data and outliers. The missing data or a missing value occurs when respondents from the population reface or omit to answer a certain question. Furthermore, outliers in the data set are from extreme

respondents towards the variables which could affect to falsify the result (Leguina, 2015). Moreover, SPSS provides a useful tool to examine the multivariate outliers by using the Mahalanobis distance for each respondent. Hence, if the Mahalanobis score is more than the critical value, the case is considered as outliers and will be removed from further analysis.

However, descriptive analysis is known as the procedure where researchers are transforming the raw data into a form that will allow providing information about the description of a set of factors to generate interpreted and understood analysis (Sekaran & Bougie, 2016). Consequently, this study analysed the other descriptive data such as standard deviation, means and variance obtained for the interval-scaled independent and dependent variables.

3.7.2. Smart-PLS

Smart-PLS is a structural software that could be used to test the proposed research hypotheses and overall research framework. Hair et al. (2010), argued that Structural Equation Modelling (SEM) is one of the most useful and powerful statistical techniques in conducting and analysing a social since studies which is usually meant to examine several relationships simultaneously. To test the study model, Structural Equation Modelling (SEM) technique enable the researcher to provide a tool for research to enable them to test the structural model altogether and assess the overall fit of the research model. Moreover, by using the Structural equation modelling technique with Smart PLS it has been widely recommended due to it is capability to deal with complex models, handle the small size of the sample as well as having numerous endogenous and exogenous constructs and indicator variables, or non-normal data

distributions (Leguina, 2015). Such situations in which it is used are commonly found in studies in social sciences (Hair et al., 2014).

There are few steps in analysing the data to test the proposed hypotheses and the overall research framework of this study.

- Assessing the Measurement Model (Outer Model)

The purpose of the assessing the measurement model is to evaluate the reliability and validity of the construct measures. There are two types of measurement models known as reflective and formative model. The reflective mode has arrow pointing from the construct to the observed indicators in the measurement model. If the construct changes, all items in the measurement model are changed too. Therefore, all indicators are highly correlated. On the other hand, formative mode has arrows pointing from the indicators in the measurement model to the constructs. In other words, it means that all indicators together form the construct. Since formative indicators represent independent sources of the construct's content, they should not be highly correlated. To examine the reliability and validity for both reflective and formative construct, Hair et al. (2011) mentioned that certain evaluation should be carried out as presented in Table 3.9

Table 3.9: Assessing Measurement Model

Criterion for Measurement Model:	Description
Composite Reliability (Internal Consistency)	composite reliability should be higher than 0.708 (in exploratory research, 0.60 to 0.70 is considered acceptable)
Indicator Reliability	Indicator reliability: the indicator's outer loadings should be higher than 0.708. Indicators with outer loadings between 0.40 and 0.70 should be considered for removal only if the deletion leads to an increase in composite reliability and AVE above the suggested threshold value
Convergent Validity (AVE)	Average variance extracted (AVE) should be higher than 0.5
Discriminant Validity	• An indicator's outer loadings on a construct should be higher than all its cross loadings with other constructs. • The square root of the AVE of each construct should be higher than its highest correlation with any other construct (Fornell-Larcker criterion).

Source: Hair et al., 2014

With regard to internal consistency, composite reliability is preferred over Cronbach's Alpha in order to overcome some of the limitations using Cronbach's Alpha (Anderson and Gerbing, 1988). The main limitation is that it assumes equal reliabilities of all items. Composite reliability provides a better estimate of variance shared by the respective indicators (Hair et al., 2006).

•Assessing the Structural Model (Inner Model)

An outer model which is reliable and valid allows evaluating of the estimates of the inner path model, also known as the structural model. The results obtained from assessing the structural model results helps the researcher in determining how well the empirical data support the theory/concept as well as in describing the previous empirical conformation of the theory/concept (Hair et al., 2014, p167-168). The key criteria for assessing the structural model are as shown in Table 3.10.

Table 3.10: Assessing Structural Model

Criterion for Structural Model:	Description
Significance for path coefficient	The estimates obtained for the structural model relationship (i.e., path coefficient) should have standardized values between -1 and +1. Path coefficient close to +1 represent strong positive relationships (and vice versa for negative values) and usually significant. Path coefficients close to 0 are usually nonsignificant.
Coefficient of determination (Level of R^2 values)	R^2 value ranges from 0 – 1 with higher levels indicating higher level of predictive accuracy. R^2 values of 0.75, 0.50, or 0.25 can be described as substantial, moderate, or weak, respectively.
The f^2 effect size	Effect size (f^2) is the change in R^2 value when specified exogenous construct is omitted from the model. It can be used to evaluate whether the omitted construct has a substantive impact on the endogenous constructs. f^2 values of 0.02, 0.15, or 0.35 can be viewed as whether a predictor latent variable has a weak, medium, or large effect (Cohen, 1988).
Predictive relevance ($Q^2$and q^2)	The Q^2 value is obtained by using blindfolding procedure. It is only applied to endogenous constructs that have a reflective measurement model specification as well as to endogenous single-item construct. Q^2 values larger than 0 suggest that the model has predictive relevance for a certain endogenous construct.

3.8. Summary

This chapter has described the methodology used in this study, which includes research approach and design, study population, sample, sample size, research instrument and data analysis method to test the research questions as well as content validity and pilot study. The next chapter 4 will discuss the result of the data analysis.