KNOWLEDGE MANAGEMENT SUCCESS: A NEW DIMENSION IN MALAYSIA SMES

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the research project.

(4) The word count of this research report is 10,078.

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DEDICATION

We would like to dedicate this dissertation to Ms Lee Voon Hsien, our research supervisor who also helms the role of Research Methodology and Project Coordinator, and to our families and dear friends. Without their unstinting support and encouragement, it would be impossible for us to achieve the completion of this research study.

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LIST OF ABBREVIATIONS

DV	Dependent variable
FP	Firm operational performance
GDP	Gross domestic product
IN	Product and service innovation
IV	Independent variable
KA	Knowledge acquisition
KD	Knowledge dissemination
KP	Knowledge application
KM	Knowledge management
SAS	Statistical Analytical Program
SME	Small medium enterprise

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PREFACE

With the rapid pace of change in today's world of commerce, knowledge carries unprecedented value and has become an important resource for organisations to gain a competitive edge over their competitors. In an organisation, knowledge can be regarded as intellectual capital and an indispensable asset to drive the success of the organisation. The immediate concern, in this relentless pursuit of knowledge, appears to be how organisations are able to innovate and apply knowledge to create competitive advantages for them in order to achieve better organisational operating performance. Hence, it is essential for an entity to be able to manage and harness knowledge continuously to reap benefits from this endeavour.

The continuous development of the business world has been made possible with the speed of innovation allowing for shorter product lifecycles and a higher rate of new product development. It is therefore imperative for organisations to ensure that their business strategies are innovative to build and sustain competitive advantage. Innovation can be seen as producing a new viable idea and implementing it in a way that produces value which will eventually bring about improved firm operational performance.

Through this research, practitioners and managers will be enlightened on the importance of the emphasis of knowledge management. This research study can also serve as a reference for entities to identify the different practices of knowledge management. Apart from benefiting the business related organisations, this study can also act as a blueprint for future researchers to study the influence of knowledge management in other areas.

ABSTRACT

Knowledge management has been a practice in many organizations across the globe. Recognising the importance of knowledge management, this study aims to examine the impact of knowledge management on firm operational performance via product and service innovation. As knowledge management in itself encompass effective management and distribution of knowledge, knowledge that is applied effectively will bring about positive affect to an entity. Therefore, this research aspires to portray that proper management of knowledge leads to something every entity desires: better organisational performance.

Small-medium enterprises (SMEs) in Malaysia are the targeted population of this research as they too contribute to the gross domestic product of the country. Adopted survey questionnaires were distributed to SMEs located in Selangor, Johor, Perak and Wilayah Persekutuan and data collected were further analysed using the Statistical Analytical Program (SAS). Descriptive analysis, normality and reliability test, Multiple Linear Regression and Simple Linear Regression were conducted and data was further interpreted from these analysis.

Nevertheless, the findings of this research are limited as this research was only conducted in a few states in Malaysia. Future researches can therefore consider conducting a study on other states and on other organisations such as multinational organisations.

The outcome of this study contributes suggestions to managers on the ultimate way to the improvement of firm operational performance: correct application of knowledge management which includes knowledge acquisition, knowledge dissemination and knowledge application. Knowledge resources can then be utilised and managed at their disposal and innovated into value-creating activities, giving SMEs an edge above others and thus, enhancing organisation performance.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

This introductory chapter renders the aim and objective of the research. The background of this research is being detailed initially, followed by the stating of the problem statement. It then moves on to introducing the research objectives and research questions, constructing the relevant hypotheses and ends with presenting the significance of this research.

1.1 Research Background

In this era of knowledge-based economy, organisations have to enrich its resources and capabilities in order to survive today's constantly changing rapid and competitive environment. Knowledge has replaced equipment, capital, material and labour and topped as the utmost vital resource and the ability of an organisation to create, utilise and develop its knowledge-based assets determines its success (Wang & Wang, 2012). Knowledge management (KM) is defined as an evolving set of process that can assist a firm in achieving organisational goals and enhance performance of the organisation through creating, gathering, coordinating and exploiting knowledge (Rasula, Vuksic, & Stemberger, 2012). Knowledge, as an important intangible asset should be managed extensively by the organisation (Wang & Wang, 2012). Thus, the extent to which managers are able to utilise and manage these knowledge resources at their disposal and innovate them into value-creating activities will enhance the performance of these organisations. Innovation entails successful exploitation of new ideas which is important in contributing towards business performance (Dasgupta & Gupta, 2009). Nowadays, innovation is likened to being the life blood of corporate survival and growth (Baregheh, Rowley, & Sambrook, 2009). Thus, when firms do not adopt innovative measures, this contributes to weak firm operational performance (Chong, Chong, & Gan 2011).

Firm operational performance can be gauge by looking at customer satisfaction, productivity and cost management of the organisation (Wang & Wang, 2012). KM practices is not only limited to large organisations but can also be applied in small and medium enterprises (SMEs) (Chong et al., 2011).

1.2 Problem Statement

According to the latest SME Census 2011[1] which was employed from the beginning of this research, a large sum of 97.3% (645,136) of the total establishments in Malaysia are SMEs. SMEs here is defined as such that in the manufacturing sector number of employees are within 75 – 200 while in the services sector number of employees are within 30 – 75 (Malaysia Department of Statistics, 2011). With such a large number of establishments, however, SMEs in Malaysia only account for 32.5% of the contribution to the national Gross Domestic Product (GDP) (Malaysia Department of Statistics, 2011). SMEs are often relied on to spearhead industrial development and are a significant source for economic growth in Malaysia (Tan, 2011). However, the disappointing percentage despite such a large figure of establishments proves that the firm performances of SMEs are below par. The creation and use of KM is not look into seriously by SMEs in Malaysia due to minimal grasp of the concept of KM (Wong & Aspinwall, 2004). By understanding the strategies of KM, the process of product and service innovation in an organisation can be enhanced (Lopez-Nicolas & Merono-Cerdan, 2011). Proper implementation of KM processes by SMEs in Malaysia have been proven will lead to the creation of knowledge-innovative SMEs.

Although the success factors of KM acceptance in SMEs have been proven and established (Tan, 2011), research on the relationship between KM and product and service innovation as well as firm operational performance have yet to be piloted among SMEs in Malaysia.

[1] SME Census 2011 was the latest census as of the start of this research in May 2013.

Past studies amongst all types of enterprises as a whole have come to a conclusion that the realization of KM can bring about innovation which leads to improved firm performance but they are more applicable to large entities (Wang & Wang, 2012). KM studies conducted on SMEs are on a broader spectrum as they are more skewed towards ascertaining the enterprises' perception towards KM practices and developments (Chong et al., 2011) instead of looking at the influence of KM in terms of innovation and firm performance. The contribution of KM in the biotechnology and telecommunication industry which includes large corporations has been conducted in Malaysia but its influence on the SMEs in Malaysia was not evident (Palacios, Gil, & Garrigos, 2009). Although the idea of KM and its relationship with innovation and firm performance have been proposed in professional service firms (Fischer, 2011), there are limited research that suggests this impact on SMEs and particularly in Malaysia.

1.3 Research Objectives

The research objectives for this research are as follows:

1.3.1 General Research Objectives

- To identify the KM factors that are related to product and service innovation.
- To study the relationship between product and service innovation (IN) and firm operational performance (FP) among SMEs in Malaysia.

1.3.2 Specific Research Objectives

- To analyse the relationship between KM implementation and firm operational performance via innovation in SMEs in the manufacturing and services sector.

- To analyse the relationship between KA and IN.
- To analyse the relationship between KD and IN.
- To analyse the relationship between KP and IN.

1.4 Research Questions

The research questions for this research are as follows:

1.4.1 General Research Questions

- What are the KM factors that are related to IN?
- What is the relationship between IN and FP among SMEs in Malaysia?

1.4.2 Specific Research Questions

- What is the relationship between KM implementation and FP via IN in SMEs in the manufacturing and services sector?
- What is relationship between knowledge acquisition (KA) and IN?
- What is relationship between knowledge dissemination (KD) and IN?
- What is relationship between knowledge application (KP) and IN?

1.5 Hypotheses of the Study

The hypotheses constructed for this research are as follows:

H1: Knowledge acquisition positively affects innovation.

H2: Knowledge dissemination positively affects innovation.

H3: Knowledge application positively affects innovation.

H4: Innovation positively affects firm performance.

1.6 Significance of the Study

The findings of our research may be used as a reference point for SMEs that are keen in focusing on KM to improve innovation in its products and services as well as to increase their organisation's worth. By applying the KM processes into organisation, the organisation will have a value added advantage and this will place the organisations an edge above the others (Tan, 2011). Furthermore, our findings aim to support the notion suggested by Darroch (2005) that firms with KM capabilities will be able to utilise resources more efficiently and thus will be more innovative and lead to better firm operational performance. This is because once KM capabilities are recognised, SMEs in Malaysia will have a more thorough insight of the concept of KM and the level of awareness towards the importance of KM will be enhanced.

1.7 Chapter Layout

This study contains five chapters. The first chapter will be organized in the following manner whereby the theory of KM is first described and what prior researches have performed previously, in short, explaining the overall concept of the research. Subsequently, the next chapter discusses the past empirical studies and theoretical framework relevant to the study and the proposed conceptual framework. It also details the hypothesis developed for this study based on past studies. Following that, the methodology used to obtain empirical data will be outlined in the third chapter, outlining the research design, data collection method, sampling design as well as the research instrument. Chapter four presents the data analysis obtained using the Statistical Analysis System (SAS) system. Lastly, the final chapter provides a summary of the analysis of the results, discussing major findings, limitations and recommendations. This chapter also concludes the entire research.

1.8 Conclusion

In a nutshell, the first chapter aims to convey the big picture of the study for readers to grasp the objective of the research. The following chapter provides the literature review to support this research project as well as to introduce the proposed conceptual model to the readers.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter outlines theoretical concepts and past empirical studies related to this research project that leads to the formation of hypotheses statements. It aims to support the proposed research topic as well as introducing the research model.

2.1 Review of the Literature

2.1.1 Relationship between KA and IN

Knowledge acquisition requires intensive effort and a high degree of experience in recognising and capturing new knowledge (Liao, Wu, Hu, & Tsui, 2010).

Liao et al., (2010) studied the linkage between KA, absorptive capability and innovation competence on Taiwan's knowledge-intensive industries. A survey was conducted and 362 valid research samples were returned from firms in the financial and manufacturing industries in Taiwan. Data were then analysed using a confirmatory factor analysis, convergent validity, discriminant validity and path analysis. Outcome of the study was such that KA holds a positive relationship to a firm's innovative capability.

The role of KA as a function between social capital and innovation for firms located in science and technology parks (STPs) was studied by Martinez-Canas, Saez-Martinez and Ruiz-Palomino (2012). A partial least squares analysis was conducted on the 214 survey collected from Spanish tenants.

Findings of the study concluded that KA fully mediates the relationship between social capital and firm innovation.

Jiang and Li (2009) examined the implication of strategic alliances on firm-level performance by adopting KM (knowledge creation / acquisition, sharing) practices to innovation. The study was conducted by inspecting surveys from 127 German partnering firms. An approach called latent structural equation modelling was adopted in this study which lead to the findings that knowledge creation contributes positively to innovation.

H1: Knowledge acquisition positively affects innovation.

2.1.2 Relationship between KD and IN

Knowledge dissemination, also known as knowledge transfer and sharing of knowledge, is focused on bringing together intellectual resources and availing them across organisational frontiers (Wei, Choy, & Chew, 2011).

A study was conducted to identify whether management of knowledge (knowledge dissemination, acquisition and responsiveness to knowledge) is a vital antecedent of innovation was conducted by Darroch and McNaughton (2002) by collecting surveys from 443 New Zealand firms with 50 or more employees. To determine whether the variables hold a relationship, the ordinary least squares regression analysis on SPSS was used to analyse the data accumulated. As a result, KD was concluded to be part of a strategic architecture of a firm and provides support to outcomes such as innovation.

In 2009, Hu, Horng and Sun investigated the impact of knowledge sharing and team culture on service innovation performance. Questionnaire surveys were collected from 621 employees of international tourist hotels and a moderated regression analysis was used to interpret the data. As a conclusion, the relationship between and among knowledge sharing and service innovation are substantial and strong.

Hurmelinna-Laukkanen (2011) aimed to elucidate the role of knowledge protection and knowledge sharing in relation to innovation endeavours amongst Finnish companies which involves R&D collaboration in Finland. A linear regression analysis was used to evaluate data collected from 242 surveys and the study concluded that both knowledge protection and knowledge sharing are positively related to innovation performance and a positive relationship also exists between the two independent variables.

H2: Knowledge dissemination positively affects innovation.

2.1.3 Relationship between KP and IN

Knowledge application refers to knowledge that is shared within a firm allowing the firm to respond timely to changes, adjust its strategic direction, create solutions for problem and improve firm efficiency (Gold, Malhotra, & Segars, 2001).

A study was conducted to study the relationship among intra firm knowledge sharing and the mediating effect of knowledge application on innovation among entrepreneurial firms (Li, Liu, Wang, Li, & Guo, 2009). The target respondents were 607 Chinese firms and questionnaire surveys were posted to these firms. Regression analyses and F-test were conducted on the data collected which in turn brought about a conclusion stating that there exist a positive relationship between intra firm knowledge sharing and a firm's innovation is mediated by knowledge application.

The impact of KM (knowledge utilisation, acquisition, conservation, protection, creation, approach, sharing) on the service innovative ability of an organisation was examined by Jyoti, Gupta and Kotwal (2011). Questionnaire surveys were being used to collect data from employees working in private telecommunication organizations in Jammu, India. A structural equation model was used to analyses 331 surveys collected. The study revealed that a significant relationship does indeed exist between KM

and innovation and that knowledge utilization, the strongest determinant affects technical and non-technical innovation.

In 2005, Darroch performed a study to empirically examine the connection between KM (knowledge acquisition, dissemination, responsiveness to knowledge) product and services innovation as well as firm performance. Mail surveys were sent to CEOs representing firms with 50 or more employees from a cross-section of industries and a structural equation modelling analysis was performed on the data collected. Results of the study were such that the hypotheses tested were proven correct: responsiveness to knowledge positively affects innovation.

H3: Knowledge application positively affects innovation.

2.1.4 Relationship between IN and FP

Innovation is a cycle wherein knowledge is acquired, shared and incorporated with the purpose to create new knowledge, which encompasses products and services (Plessis, 2007). Innovation is regarded as an asset in an organisation (Liao et al., 2010).

Doran and Ryan (2012) conducted a research to study the factors which drive eco-innovation and test if eco-innovating firms perform better than non-eco-innovating firms. Data was gathered from firms in Ireland. From the 2,181 surveys that were gathered from the Irish Community Survey 2006-2008, an ordinary least squares (OLS) estimation technique were being used to analyse and determine the influence of eco-innovation on firm performance. Results were such that eco-innovation is more important than non-eco-innovation in determining firm performance.

A research on whether KM, strategic orientation and innovation contribute to improve business performance was carried out by Ferraresi, Quandt, Santos and Frega (2012) on Brazilian companies. A total of 241 web-based questionnaires were collected and were analysed using a structural equation

modelling technique. The research concluded that KM did not have a direct effect on firm performance unless it is being mediated by strategic orientation and innovation.

In 2012, Wang and Wang studied the quantitative relationship between knowledge sharing and innovation, as well as how the latter affects firm performance. Survey questionnaires were collected from 89 high technology firms in Jiangsu Province of China and analysis of these surveys were performed using convergent validity. Results generated were such that while knowledge sharing positively affects innovation, however, innovation quality has no direct effect on operational performance but it does positively affect financial performance.

H4: Innovation positively affects firm performance.

2.2 Review of Relevant Theoretical Models

In today's business globalisation, knowledge is considered the essence of business that is also a commercial asset and thus should not be left unattended as compared to assets such as land, labour and capital (Tan, 2011). Knowledge has evolved to be the very essence that drives an organisation and theories has been formed to further understand the connotation of KM.

Knowledge based theory (KBT) as proposed by Nonaka, Toyama and Nagata (2000) is the capability to acquire and apply knowledge, in other words, knowledge management (KM). Successful creation of knowledge must then be translated to the current evolving needs of an organisation. KBT was built upon and extended from the resource based view (RBV) theory of a firm which was first promoted by Penrose (1995) in 1959 which lacks in the aspect of portraying how a firm can create and manage knowledge. Hence, KBT which links acquiring, disseminating and applying knowledge being more precise allows better management of knowledge which enables innovation.

Besides contributing to innovation, KBT also contributes to the following sectors as depicted in Table 1 below.

Table 2.1: Contribution of KBT in Other Areas.

Author	Explanation
Guchait, Namasivayam and Lei (2011)	KBT plays a role in enhancing customer satisfaction through continuous improvement of processes to meet customer goals.
Racherla and Hu (2009)	For crisis management and planning, KBT is implemented to develop a typology from the needs of hospitality managers and to watch out for any potential crisis in the tourism and hospitality industry.
Mishra & Bhaskar (2011)	KBT is also used in the development and preservation of internal skills and capabilities, by virtue of which knowledge is a core competency of an organisation.
Lee, Goh and Chua (2010)	Health care portals also use KBT to manage the large quantity of health related information which will be exchanged and shared with their users.
Mehta (2008)	KBT plays a role in ensuring success in global software companies.

Source: Developed for the research

KM is a process that advances concerted environment for capturing and creating prospects to generate new knowledge and provide mediums to apply what the organization knows in its effort to meet its long term goals (Dasgupta & Gupta, 2009). In the following years, entities with the capability of initiating new knowledge and effectively and efficiently applying it will succeed in creating competitive advantage (Lopez-Nicolas & Merono-Cerdan, 2011). For decades, studies have been conducted to examine the effects of managing knowledge effectively and efficiently.

Table 2.2: Evolution of Knowledge Management Process in Past Literatures.

Past Literatures	KM Processes
Fong and Choi (2009)	Acquisition, Creation, Storage, Distribution, Use and Maintaining
Darroch (2005)	Knowledge acquisition, Knowledge dissemination and Responsiveness to knowledge
Darroch and McNaughton (2003)	Knowledge acquisition, Knowledge dissemination and Responsiveness to knowledge
Lytras, Poulodi and Poulymenakou (2002)	Relating, Acquiring, Organising, Enabling, Reusing, Transferring and Using
Despres and Chauvel (1999)	Mapping, Creating, Storing, Applying and Innovating
Nonaka and Takuechi (1995)	Socialisation, Externalisation, Combination and Internalisation

Source: Developed for the research

Table 2.2 depicts the evolution of KM processes throughout the years from 1995 to 2009. Back in 1995, Nonaka and Takeuchi described the four modes of knowledge conversion and in 2009, KM was divided into six processes which are acquisition, creation, storage, distribution, use and maintenance (Fong & Choi, 2009).

In our study, we have decided to adopt the KM processes proposed by Darroch and McNaughton (2003) as well as Despres and Chauvel (1999) which brought about a combined adaptation of KM process which are knowledge acquisition, dissemination and application. These KM processes are a consistently emerging concept and is promoted as an essential corner stone for companies to remain the forefront of excellence in its industry (Gharakhani & Mousakhani, 2012). They also link antecedents and consequences of KM behaviour and practices to innovation and firm performance (Darroch, 2003).

KA focuses on how a firm obtains its knowledge from different sources (Darroch, 2005). Several terms have been used to illustrate the acquisition process such as acquiring, creating and capturing which holds the same meaning as accumulation of

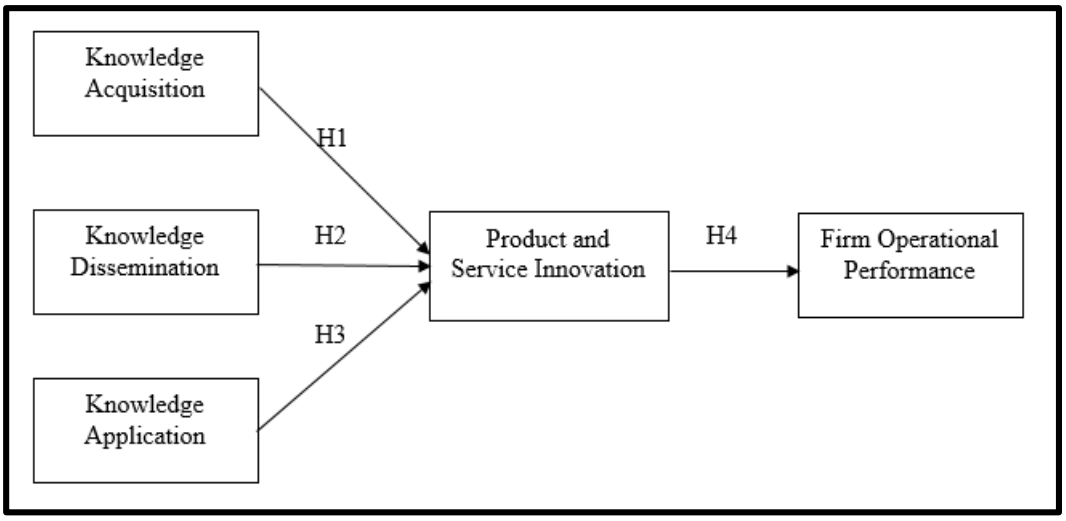
knowledge (Gold et al., 2001). KA is vital as it facilitates accumulation of knowledge (Darroch, 2005). According to Yang (2008), the ability of a firm to identify knowledge is very significant to its operations which can bring about innovation and in doing so boost firms' performance.

KD is defined as availing the knowledge acquired to others (Tan, 2011). Individuals, groups and organisations that converse and discover knowledge from one another is also a form of knowledge sharing. KD practice also includes procedures to distribute knowledge across the organisation, through formal and informal ways, in order to ease the application of knowledge (Alegre, Sengupta, & Lapiedra, 2011). Knowledge dissemination is vital for the success of a firm because different departments of the organisation can utilise and benefit from it (Tan, 2011). Therefore it is imperative to disseminate knowledge throughout the organisation.

KP interprets how process is oriented towards the use of knowledge (Gold et al., 2001). In other words, it relates how a firm uses the knowledge gained to enhance its operations. KP is often aided by KD. The purpose of KP is to create value within the company as it is vital in enhancing firms' performance in which knowledge is able to be effectively converted into action (Alavi & Leidner, 2001). A good example would be, correct KP in the organisation has the potential to innovate solution to meet customers' requirements at a faster rate which results in customer satisfaction and therefore, enhancing firm's performance.

2.3 Proposed Theoretical / Conceptual Framework

Figure 2.1: Proposed Conceptual Framework



Adapted from: Ling, T. C., & Nasurdin, A. M. (2010). The influence of knowledge management effectiveness on administrative innovation among Malaysian manufacturing firms. *Asian Academy of Management Journal*, *15*(1), 63-77; Wang, Z., & Wang, N. (2012). Knowledge sharing, innovation and firm performance. *Expert Systems with Applications*, *39*(10), 8899-8908.

Figure 2.1 examines the effects of the three processes of KM which are KA, KD and KP on a firm's innovation which ultimately affects firm performance.

2.4 Hypotheses Development

H1: Knowledge acquisition positively affects innovation.

H2: Knowledge dissemination positively affects innovation.

H4: Knowledge application positively affects innovation.

H5: Innovation positively affects firm performance.

2.5 Conclusion

All in all, past researches and studies supports the research project and the research model and the hypotheses were developed from that basis. The methodologies used to test the proposed framework will be discussed in the following chapter.

CHAPTER 3: METHODOLOGY

3.0 Introduction

After introducing the proposed conceptual framework, Chapter 3 illustrates the research design, data collection method, variables and measurement and the data analysis technique.

3.1 Research Design

This research is a quantitative research as the methodology of this research takes into consideration the measurement and quantification of data. Different types of measurement skills and statistical analysis is also applied in this research (Bryman, 2006). The purpose of this research is to examine the contribution of KM in Malaysia SMEs on firm operational performance via product and service innovation.

The research adopts the cross-sectional method instead due to time constraint as the data is collected at a single point of time (Saunders, Lewis, & Thornhill, 2012). This method is also quicker and cheaper and the study can be conducted with limited resources (Zikmund, 2003).

Adopted questionnaires from past researches were used in this research instead of self-administered questionnaires which takes time and thought and will contain pre-assumption on the part of researcher of the information retrieved (Bourque & Fielder, 2003).

Target respondents are SMEs in the manufacturing and service industry as SMEs are the backbone of the nation's industrial development and are vital to economic growth (Tan, 2011). KM practices and its implications have also yet to be tested in SMEs in Malaysia.

3.2 Data Collection Method

Data was collected by distributing survey questionnaire as information regarding a large population can be determined through the survey sampling process with a recognized level of accuracy (Rea & Parker, 2005). It is also easier, faster, affordable and more accurate to capture information compared to other mediums (Alreck & Settle, 2004).

3.2.1 Primary Data

Data used in this study was primary data. Adopted survey questionnaires were distributed and collected via e-mails and on-site visitations from 1st October 2013 to 9th January 2014. Visitations was done by formally meeting the managers in the selected SMEs.

3.3 Sampling Design

To survey every individual in a population, using the census method, is too costly in terms of time, funds and human resource (Alreck & Settle, 2004). Therefore, sampling was adopted in this research. Sampling merely means taking a fraction of the population to represent the whole population. Conducting a sample survey requires substantially less cost and time than those involved with canvasing the entire population (Rea & Parker, 2005).

3.3.1 Target Population

Target population is namely a population that possess the information needed and sought after for the purpose of a research (Saunders et al., 2012). For this research, the targeted population is SMEs in the manufacturing and services industry.

3.3.2 Sampling Frame and Sampling Location

The sampling frame adopted in this research is from a directory entitled SMI / SME Business Directory 2013. Adopted survey questionnaires were distributed to SMEs selected from the directory for the states of Selangor, Wilayah Persekutuan, Johor and Perak wherein most SME firms are located. Selangor represents 19.5% (125,802 firms) of overall SMEs in Malaysia while Wilayah Persekutuan, Johor and Perak follow with 13.1% (84,513 firms), 10.7% (69,030 firms) and 9.3% (59,998 firms) respectively (Malaysia Department of Statistics, 2011).

3.3.3 Sampling Elements

The respondents of this survey were management team working in SMEs in the manufacturing and services sector in Selangor, Wilayah Persekutuan, Johor and Perak. Only employees of managerial level and above (senior management) were able to fill the survey. This is because for most companies, the senior management level are more aware of the processes and procedures of the company.

3.3.4 Sampling Technique

The sampling technique used is probability sampling because the opportunity of being selected from the population is known and is usually equal which makes it possible to approximate the characteristics of the population from the sample statistically (Saunders et al., 2012). The systematic random sampling method was selected as it involves selecting samples at regular intervals which allows the probability of inclusion of respondents to be equal and known to the researcher (Alreck & Settle, 2004). The samples were chosen at regular intervals of every 10^{th} firm.

3.3.5 Sampling Size

Based on Malaysia Department of Statistics (2011), the number of manufacturing and services firms in Selangor, Wilayah Persekutuan, Johor and Perak comes to a total of 323,915 firms. Since the registered number of SMEs is more than 100,000, therefore a minimum of 384 samples is aimed (Krejcie & Morgan, 1970). To obtain at least 384 samples, survey questionnaires that need to be sent out are estimated to be 1,800 surveys as response rate is assumed to be 21% (Dey, 1997).

3.4 Research Instrument

Adopted survey questionnaires was administered to individuals who hold managerial positions such as executive managers, senior managers, chief executive officers, managing directors and owners in the company because they possess knowledge of the firm, have access to information pertaining to management of the company and are familiar with the operation processes (Wang & Wang, 2012). Questionnaires were distributed via e-mails and on-site visitations in October 2013 to January 2014.

Before proceeding with further research, a pilot test was conducted on a group of 53 SMEs in order to ensure that the companies were able to understand the questionnaires that were being distributed out. The test was also conducted to enable any ambiguity or misperception to be improved in order to ensure errors from real questionnaires are at minimal (Zikmund, 2003).

3.5 Constructs Measurements

KM practices were examined based on three constructs which are KA, KD and KP. These three constructs are a combined adaptation of KM processes from Darroch and McNaughton (2003) as well as Despres and Chauvel (1999). The constructs are

used to test the relationship with product and services innovation which in turn is being observed as how it affects firm operational performance. In order to determine the association between these variables, a sum of 25 questions were adopted in the survey questionnaire, with 5 questions for each construct. For the first construct, KA, questionnaires were taken from Martinez-Canas et al. (2012) and Andreeva and Kianto (2011) while KD and KP from Darroch (2003) and Gold et al. (2001) respectively. Questionnaires pertaining to product and service innovation were adopted from Wang and Wang (2012), Li et al. (2009) and Lopez-Nicolas and Merono-Cerdan (2011) and finally for firm operational performance construct from Wang and Wang (2012). To compute the statements, a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) was used as the mentioned scale is said to be more reliable and consistent compared to a 5-point or 6-point Likert scale (Colman, Norris & Preston, 1997). Information retrieval is also maximized when a 7-point Likert scale is used (Kim, 2010).

3.6 Data Processing

1,575 surveys were sent out and 406 sets were returned from the respondents yielding a response rate of 25.78% with a breakdown of 22.16% via email and 3.62% via on site visitations. Upon collection, each questionnaire was reviewed and sorted according to requirements of this study. Incomplete questionnaires (totalled 20 email surveys) were discarded with 386 remaining usable surveys. Out of the 386, 57 sets (14.77%) were collected via on site visitation and the remaining 329 sets (85.23%) were surveys via email. The accepted surveys were then keyed into the SAS software by first, coding, identifying and assigning a numerical score to descriptive questions. For instance, the number ‘1’ is used to represent ‘10 years and below’ for period of establishment of company and ‘2’ is used to represent ’more than 10 years’.

3.7 Data Analysis

The data collected were further analysed using the Statistical Analytical Software (SAS) system. The system is used to further describe the data through descriptive and inferential analysis.

3.7.1 Descriptive Analysis

A frequency and percentage table was produced to illustrate the demographic data gathered. This table explains the demographic data to provide a thorough representation of the distribution of data (Alreck & Settle, 2004). Data collected was processed to produce a central tendency movement of construct. For each variable (independent, mediating, dependent), the mean, minimum point, maximum point and standard deviation was generated using the Statistical Analytical Software (SAS).

3.7.2 Scale Measurement

All the variables are being tested using the parametric test as the data collected are in the form of a 7-point Likert scale. Normality and reliability test was conducted to ensure data collected can be used and are normally distributed (Saunders et al., 2012).

3.7.3 Inferential Analysis

A multiple linear regression (MLR) analysis was used to test the relationship between KM and innovation while a simple linear regression (SLR) was used for the testing of the association between innovation and firm performance. Both of these regressions are used to gauge the degree and direction of the relationship between the IV and the DV. Besides that, the analysis allows the

significance of the relationship to be determined (Alreck & Settle, 2004). Assumptions for the regression analysis as suggested by Saunders et al. (2012) are to fulfil the normality and linearity tests. The values of the DV (innovation for MLR and firm operational performance for SLR) should follow a normal distribution and the mean of the dependent variable for each independent variable (KA, KD and KP for MLR and Innovation for SLR) should fall along a straight line and their spread should be constant across the range of independent variables. For MLR, the multicollinearity assumption must not exist among the independent variables (Saunders et al., 2012).

3.8 Conclusion

This chapter describes the methodologies and a brief description of data analysis that were generated using the SAS system. The following chapter will provide further analysis on the results obtained from the analysis.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

This chapter records the execution of data collection via distribution of surveys. It discusses the research findings, descriptive analysis and the interpretation of the results of the data analysis.

4.1 Pilot Test

In order to examine the reliability and the normality of the research model, a pilot test was conducted before the actual survey was carried out. This is to identify and avoid any errors or mistakes in order to ensure that the actual survey will be able to take place smoothly (Alreck & Settle, 2004). The effectiveness of the questionnaires developed can also be tested through the pilot test. 53 sets of questionnaires were distributed to 53 randomly selected managers and owners working in SMEs; either in the service or manufacturing sector. The feedback gained from these managers and owners were taken into consideration to further improve the questionnaire.

4.1.1 Normality Test

In order to pass the pilot test, there are a few assumptions that the research model needed to fulfil. Among one of the assumptions included fulfilling the normality test. The normality test is to examine the shape of a set of data distribution and also its correspondence to the normal distribution as normality is the benchmark for statistical analysis (Hair, Black, Babin, & Anderson, 2010). According to Garson (2012), the skewness and kurtosis values should not surpass the range of -2 and +2.

Table 4.1: Normality Test (Pilot Test)

Independent Variable		Skewness	Kurtosis
Knowledge Acquisition (KA)	KA1	-0.506	-0.678
	KA2	-0.265	-0.630
	KA3	-0.001	-0.050
	KA4	0.240	-0.860
	KA5	0.446	-0.443
Knowledge Dissemination (KD)	KD1	-0.487	-0.176
	KD2	0.048	-0.345
	KD3	0.299	-0.083
	KD4	0.163	0.678
	KD5	0.086	-0.563
Knowledge Application (KP)	KP1	-0.554	0.285
	KP2	-0.744	0.262
	KP3	-0.968	1.272
	KP4	-0.550	0.394
	KP5	-0.618	0.700
Product Innovation (IN)	IN1	-0.392	-0.430
	IN2	-0.647	0.068
	IN3	-0.381	-0.014
Services Innovation (IN)	IN4	-0.328	-0.209
	IN5	-0.425	-0.129
	IN6	-0.465	-0.628
Firm Performance (FP)	FP1	-0.657	0.475
	FP2	-0.532	0.065
	FP3	-0.627	-0.147
	FP4	-0.919	0.259
	FP5	-0.764	-0.048

Source: Developed for the research

Based on Table 4.1, the skewness and the kurtosis of the data have met the range of +-2 respectively whereby the range of skewness is -0.001 (smallest)

and 0.086 (largest) while the smallest range for kurtosis is -0.014 and the largest range is 1.272. This indicates that the data is normally distributed.

4.1.2 Reliability Test

Reliability is associated with the ability of a set of data to be measured consistently (Tavakol & Dennick, 2011). Constructs can only be acknowledged to be reliable only when responses received are reliable and stable (Santos, 1999). The reliability results gained from the pilot test is shown in Table 4.2. According to Sekaran (2003), for the Cronbach's Alpha analysis, coefficient ranging between 0.6 and 0.8 are considered to be moderately strong while data ranging above 0.8 is considered to be relatively strong.

Table 4.2: Reliability Test (Pilot Test)

No.	Construct / Variable	Cronbach's Alpha	No. Of Items
1	Knowledge Acquisition (KA)	0.830	5
2	Knowledge Dissemination (KD)	0.871	5
3	Knowledge Application (KP)	0.954	5
4	Innovation (IN)	0.953	6
5	Firm Operational Performance (FP)	0.954	5

Source: Developed for the research

Table 4.2 shows the results of all constructs with values above 0.8, indicating strong reliability.

4.2 Descriptive Analysis

The number of surveys that were sent out from the period of October 2013 to January 2014 totalled to a number of 1,575 sets of surveys. 406 sets of surveys were collected back, however, 20 were not usable due to incomplete response and did not meet the requirement of an enterprise to be considered as an SME. Finally, only 386 sets of survey were usable.

4.2.1 Demographic Profile of Respondents

The demographic profile of the respondents surveyed were projected and described in the following tables. The profile includes respondents' age, education, job position, number of years employed in the company, type of company (manufacturing or services), period of establishment of the company, location of the company and also the number of employees in the company.

Table 4.3: Demographic Profile of Respondents (Education)

Education	No college degree	Diploma/ Advanced Diploma	Bachelor Degree / Professional Qualification	Master / PHD Degree	Others
Frequency	37	134	154	51	10
Percentage	10%	35%	40%	13%	2%

Source: Developed for the research

Based on the results, 40% of the respondents are qualified with Bachelor's Degree or Professional Qualification whereas, 35% and 13% of the

respondents are qualified with Diploma or Advanced Diploma and Masters or PhD Degree respectively. The remaining 10% of the respondents has no college degree. 2% of respondents marked ‘others’ for their education level, explaining they have qualifications like IASC, CIMA and etc.

Table 4.4: Demographic Profile of Respondents (Job Position)

Position Of Respondents	Manager	Senior Manager	Owner	Others
Frequency	130	91	132	33
Percentage	34%	24%	34%	8%

Source: Developed for the research

Next, the results of the surveys portrays that the top two highest positions held by the respondents are owners and managers both with a percentage of 34%. Moving on, 24% of the respondents are senior managers while the lowest percentage of 8% consists of positions other than the stated positions such as Director, General Manager and others.

Table 4.5: Demographic Profile of Respondents (Length of time in Entity)

Years worked by Respondents	Less than 1 year	1-2 years	3-5 years	6-10 years	More than 10 years
Frequency	17	58	115	101	95
Percentage	4%	15%	30%	26%	25%

Source: Developed for the research

Table 4.5 illustrates the number of years served by the respondents in their respective companies. According to the results, 30% of the respondents have worked for their company for 3-5 years. Next, 26% of the respondents have worked for their company for a period of 6-10 years which is then followed closely by the period of more than 10 years at 25%. The figure then slumps down to 15% and 4% for the period of 1-2 years and less than one year respectively.

Table 4.6: Demographic Profile of Respondents (Type of Company)

Manufacturing						
Type of sector	**Food products**	**Rubber and plastic products**	**Chemicals and chemical products**	**Fabricated metal products**	**Basic machinery**	**Total**
Frequency	41	42	34	20	15	152
Percentage	10.62%	10.88%	8.81%	5.18%	3.89%	39.38%
Services						
Type of sector	**Personal services / Other sectors**	**Transportation and storage**	**Arts, entertainment and recreation**	**Food and beverage services**	**Wholesale and retail trade, repair of MV**	**Total**
Frequency	79	17	18	59	61	234
Percentage	20.47%	4.40%	4.66%	15.29%	15.80%	60.62%

Source: Developed for the research

SMEs targeted for this research are those that are in the manufacturing and service sectors. Among the 386 respondents collected, 60.62% are service companies whereas, 39.38% are manufacturing companies. Put differently, out of 386 respondents, 152 are from manufacturing companies and 234 are from service companies. The manufacturing companies of 39.38% can be further divided into 5 sectors which can be further broken down into rubber and plastic products at 10.88%, food products at 10.62%, chemicals and chemical products at 8.81%, fabricated metal products , except machinery and equipment at 5.18%, and lastly, basic metals at 3.89%. On the other hand, 60.62% of the respondents are working in service companies. Of that percentage it can be further divided into five categories which consist of personal services and other activities which is the highest at 20.47%, followed by wholesale and retail trade, repair of motor vehicles and motorcycles at 15.80%, food and beverage services at 15.29%, arts,

entertainment and recreation at 4.66% and lastly, transportation and storage at 4.40%.

Table 4.7: Demographic Profile of Respondents (Period of Establishment)

Period of establishment of the company	**10 years and below**	**More than 10 years**
Frequency	157	229
Percentage	41%	59%

Source: Developed for the research

Moving on, 59% of the respondents' company are established for more than 10 years whereas 41% of the respondents' company are established 10 years and below.

Table 4.8: Demographic Profile of Respondents (Location of Company)

Location of Respondent's Company	**Selangor**	**Wilayah Persekutuan**	**Johor**	**Perak**	**Others**
Frequency	105	98	73	110	0
Percentage	27%	25%	19%	29%	0%

Source: Developed for the research

The locations of respondents' company were also as per above. According to the results, 29% of the respondents are located in the state of Perak while 27% of the respondents are located in state of Selangor closely followed by the state of Wilayah Persekutuan which is 25%. Lastly, the remaining 19% of the target respondents' company are from Johor. Surveys from other states were rejected as they were not the targeted states.

Table 4.9: Demographic Profile of Respondents (Number of Employees)

Number of Employees in Respondents' Company	**0-5 employees**	**6-75 employees**	**76-200 employees**	**More than 200 employees**
Frequency	66	238	82	0
Percentage	17%	62%	21%	0%

Source: Developed for the research

Lastly, the table depicts the number of employees in the respondents' company which can be categorized into four categories which are 0-5 employees, 6-75 employees, 76-200 employees and more than 200 employees. The results obtained reveals that 62% of respondents' company are from the category of 6-75 employees. This is then followed by the category of 76-200 employees and 0-5 employees which is at 21% and 17% respectively. Entities with more than 200 employees were not included in this research as it is not in line with the definition of SMEs in Malaysia (Malaysia Department of Statistics, 2011).

4.2.2 Central Tendencies Measurement of Construct

Central tendencies measurement of construct analysis includes several aspects which are mean, standard deviation, minimum and maximum. This analysis was generated using the SAS system.

Mean is the most widespread average used to reveal the most typical response from the data collected (Alreck & Settle, 2004). Standard deviation on the other hand is used to measure the extent of data values spreading around the central tendency and report the proportion of respondents (Saunders et al., 2012).

All of the items are measured using 7-point Likert-scale which ranges from ‘strongly disagree’, ‘disagree’, ‘somewhat agree’, ‘neutral’, ‘somewhat agree’, ‘agree’ and ‘strongly agree’. This Likert-scale depicts the minimum as 1.000 and the maximum as 7.000 as portrayed in the tables below.

Table 4.10: Central Tendencies Measurement for KA, KD, KP

Variable	Mean	Standard Deviation	Minimum	Maximum
KA1	4.982	1.326	1.000	7.000
KA2	5.181	1.241	1.000	7.000
KA3	4.995	1.289	1.000	7.000
KA4	4.218	1.556	1.000	7.000
KA5	4.886	1.302	1.000	7.000
KD1	4.679	1.337	1.000	7.000
KD2	5.003	1.284	1.000	7.000
KD3	4.697	1.350	1.000	7.000
KD4	4.728	1.360	1.000	7.000
KD5	4.676	1.376	1.000	7.000
KP1	5.202	1.327	1.000	7.000
KP2	5.329	1.197	1.000	7.000
KP3	5.321	1.230	1.000	7.000
KP4	5.155	1.247	1.000	7.000
KP5	5.174	1.248	1.000	7.000

Source: Developed for the research

According to the table above, for the variable KA, the highest mean is variable KA2 with value of 5.181 (more towards ‘somewhat agree’) and the lowest mean is variable KA4 with value of 4.218 (more towards ‘neutral’). On the other hand, the highest standard deviation for the first variable is KA4 while the lowest is KA2.

For KD, the highest mean is KD2 with value of 5.003 which means, most respondents rated the question with the response ‘somewhat agree’. KD5 results in the lowest mean with value 4.676 indicating that most responses were between ‘neutral’ and ‘somewhat agree’. KD5 has the highest dispersion around the mean with value 1.376 while KD2 has the lowest dispersion with value 1.284.

KP on the other hand has all its responses revolving around the value 5.000 indicating that most responses were 'somewhat agree'. The highest mean value was 5.329 for KP2 and lowest mean value was 5.155 for KP4. The highest standard deviation among the five questions is KP1 (1.327) while the lowest is KP2 (1.197).

Table 4.11: Central Tendencies Measurement for IN

Variable	Mean	Standard Deviation	Minimum	Maximum
IN1	4.982	1.245	1.000	7.000
IN2	4.756	1.270	1.000	7.000
IN3	4.832	1.271	1.000	7.000
IN4	4.904	1.311	1.000	7.000
IN5	4.922	1.227	1.000	7.000
IN6	5.117	1.240	1.000	7.000

Source: Developed for the research

For the mediating variable, innovation of products and services, IN6 stands as the highest mean with value 5.117 while IN2 stands as the lowest mean with value 4.756.

Conversely, for standard deviation, IN4 stands as the highest with value 1.311 while the lowest standard deviation value is 1.227 for IN5.

Table 4.12: Central Tendencies Measurement for FP

Variable	Mean	Standard Deviation	Minimum	Maximum
FP1	5.259	1.149	1.000	7.000
FP2	5.212	1.161	1.000	7.000
FP3	5.101	1.220	1.000	7.000
FP4	5.202	1.236	1.000	7.000
FP5	5.236	1.227	1.000	7.000

Source: Developed for the research

Lastly, the highest mean for firm operational performance is FP1 (5.259) while the lowest mean is FP3 (5.101). In terms of standard deviation on the other hand, 1.236 is the highest value representing FP4 however 1.149 is the lowest value representing FP1.

4.3 Scale Measurement

4.3.1 Normality Analysis

Normality test analysis is conducted to ascertain whether the data obtained is normally distributed in order to fulfil the normality assumption before proceeding with further analysis of the data (Razali & Yap, 2011). Normality will be fulfilled when the range for skewness and kurtosis is within the range of -2 and +2 (Garson, 2012).

Table 4.13: Normality Analysis

Variable		Skewness	Kurtosis
Knowledge Acquisition (KA)	KA1	-0.780	0.163
	KA2	-0.790	0.599
	KA3	-0.663	0.349
	KA4	-0.304	-0.754
	KA5	-0.490	-0.208
Knowledge Dissemination (KD)	KD1	-0.538	0.050
	KD2	-0.663	0.402
	KD3	-0.448	-0.170
	KD4	-0.338	-0.355
	KD5	-0.395	-0.300
Knowledge Application (KP)	KP1	-0.804	0.490
	KP2	-0.821	0.811
	KP3	-0.834	0.785
	KP4	-0.766	0.523
	KP5	-0.606	0.111
Product Innovation (IN)	IN1	-0.501	-0.081
	IN2	-0.398	-0.071
	IN3	-0.444	-0.230
Services Innovation (IN)	IN4	-0.587	0.153
	IN5	-0.462	0.304
	IN6	-0.609	0.193
Firm Operational Performance (FP)	FP1	-0.643	0.495
	FP2	-0.702	0.827
	FP3	-0.634	0.563
	FP4	-0.829	1.013
	FP5	-0.763	0.613

Source: Developed for the research

According to the results shown in Table 4.13, the skewness and kurtosis of all the independent variables satisfies the criteria of range for the skewness and kurtosis of +-2.

4.3.2 Reliability Analysis

To ascertain that the research has a higher validity, the reliability test was conducted. Reliability implies the magnitude to which the measure is consistent and non-bias across time (Sekaran, 2003).

Table 4.14: Cronbach's Coefficient Alpha

Cronbach's Alpha	Strength Of Association
0.80-0.95	Very good reliability
0.70-0.80	Good reliability
0.60-0.70	Fair reliability
Less than 0.60	Poor reliability

Source: Sekaran, U., & Bougie, R. (2010). *Research methods for business*: *A skill building approach* (5th ed.). Chichester West Sussex: John Wiley & Sons Inc.

According to the results gained from Table 4.15 below, all of the constructs satisfies the criteria from Table 4.14 above whereby the Cronbach's Alpha is between the ranges 0.821 to 0.921 which illustrates very good reliability.

Table 4.15: Reliability Analysis

Construct/ Variable	Cronbach's Alpha	No. Of Items
Knowledge Acquisition	0.821	5
Knowledge Dissemination	0.831	5
Knowledge Application	0.910	5
Innovation	0.921	6
Firm Operational Performance	0.903	5

Source: Developed for the research

4.4 Inferential Analysis

Inferential analysis seeks to examine the relationship between variables. From the data collected, inferential analysis can also be used to construe the characteristics of the population of which the data was collected from (Burns & Bush, 2009).

4.4.1 Pearson Correlation Analysis

Correlation analysis is often used to determine if a significant relationship exists between two varying variables (Taylor, 1990) as well as the strength and direction of the relationship. In this instance, as all variables in this research are parametric in nature, a Pearson correlation is being used.

Table 4.16: Pearson Correlation

	KA	KD	KP	IN	FP
KA	1.000	0.720	0.671	0.628	0.603
		<.0001	<.0001	<.0001	<.0001
KD		1.000	0.635	0.614	0.590
			<.0001	<.0001	<.0001
KP			1.000	0.707	0.663
				<.0001	<.0001
IN				1.000	0.699
					<.0001
FP					1.000

Source: Developed for the research.

According to Taylor (1990), KA (r = 0.628) and KD (r = 0.614) has a moderate positive correlation with IN. On the other hand, KP (r = 0.707)

holds a strong positive correlation with IN while IN (r = 0.699) also holds a strong positive relationship with FP.

Based on the table above, all the p-values are less than 0.05. Therefore, there exists a significant relationship between KA, KD, and KP with IN as well as IN with FP.

The highest collinearity among the independent variables (KA, KD, KP) is 0.720 and the lowest 0.635. Multicollinearity problem therefore does not exist among the three variables as there is no high correlation (r > 0.9).

4.4.2 Multiple Linear Regression

A multiple linear regression (MLR) analysis is used to test the relationship between more than one independent variable (IV) and one dependent variable (DV) (Slinker & Glantz, 2008). However before this analysis can be used, there are three assumptions that need to be fulfilled which are normality, linearity and multicollinearity.

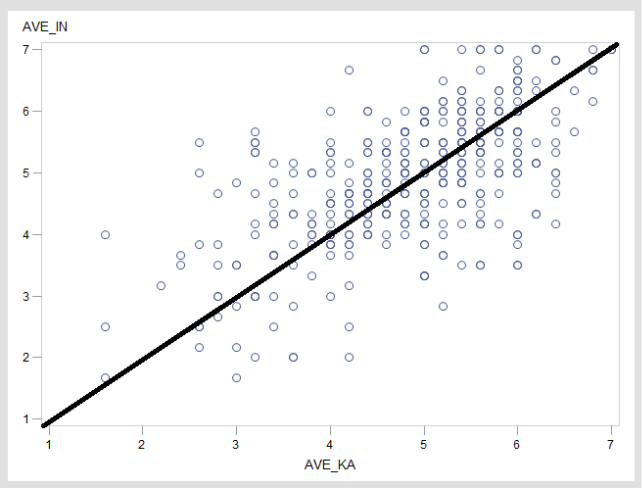
4.4.2.1 MLR Assumption - Normality

MLR assumes that the DV should be normally distributed and have equal variance across the IV (Slinker & Glantz, 2008). The highest value for skewness is -0.304 (KA4) and lowest being -0.834 (KP3) while the highest value for kurtosis is 0.811 (KP2) and lowest being -0.754 (KA4). The results therefore fulfil the normality assumption as it is between +-2 for both skewness and kurtosis (Garson, 2012).

4.4.2.2 MLR Assumption - Linearity

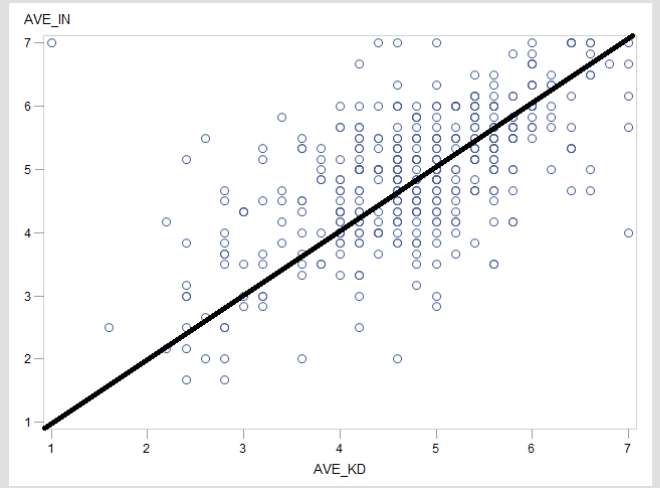
The linearity assumption specifies that each IV is related linearly to the DV (Saunders et al., 2012) through its regression coefficient (the slope).

Figure 4.1: Scatter Plot Depicting Linearity between KA and IN



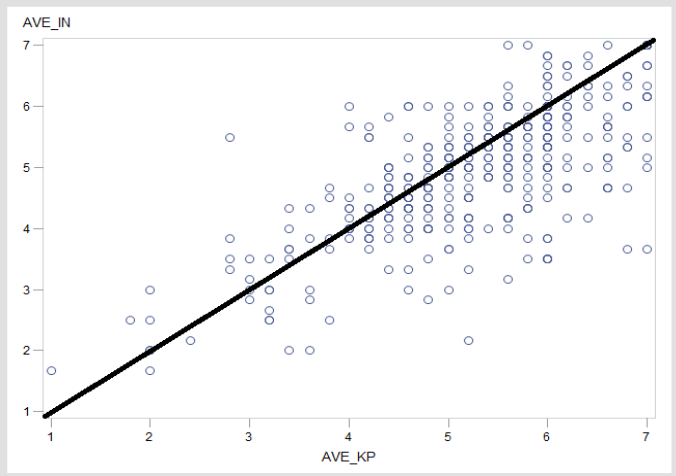
Source: Developed for the research

Figure 4.2: Scatter Plot Depicting Linearity between KD and IN



Source: Developed for the research

Figure 4.3: Scatter Plot Depicting Linearity between KP and IN



Source: Developed for the research.

Figure 4.1, 4.2 and 4.3 shows the scatter plot of KA vs IN, KD vs IN and KP vs IN respectively. All scatter plots show the best-fit regression line.

In a nutshell, as KA, KD and KP increase, IN also increases.

4.4.2.3 MLR Assumption - Multicollinearity

According to Wheeler & Tiefelsdorf (2005), a multicollinearity problem which results in high correlation among the IVs reduces the precision of the estimates and therefore causing the independent effect of a single IV to be less certain. Multicollinearity will not exist if the values of the correlation coefficients are not more than 0.9. The problem can also be avoided provided that the optimal value for tolerance is above 0.10 and that the value of VIF is below 10 (Hair, Money, Samuel, & Babin 2003).

Table 4.17: Tolerance & VIF

	Tolerance	VIF
KA	0.404	2.473
KD	0.439	2.276
KP	0.502	1.994

Source: Developed for the research

The results indicates that a multicollinearity problem does not exists among the IVs (KA, KD, KP).

4.4.2.4 MLR Interpretations

Table 4.18: MLR Model Summary

Model	R Square	Analysis of Variance	
		(Pr > F)	F Value
1	0.559	<.0001	161.090

Source: Developed for the research

R-square implies the percentage or the extent to which an IV can explain the outcome of the DV. Based on the table above, the R-square achieved in this research is 0.559. This proves that 55.9% of the variation in the DV (IN) can be explained by the IVs (KA, KD and KP). However, there is still 44.1% (100% - 55.9%) of the variation in the DV that is unexplained. In other words, there still exist other additional variables in explaining innovation that have not been included in this research.

Analysis of variance is used to determine if a research model is fit. From the model summary above, the F-value (161.09) is large and that the p-value equals to <.0001 is less than 0.05. This means that at least one of the IVs (KA, KD and KP) can be used to model the DV (IN), portraying that this research model is fit.

Table 4.19: MLR Parameter Estimates

	Parameter Estimates	Pr > |t|	Standardized Estimate
Intercept	0.659	0.001	0
KA	0.184	0.001	0.177
KD	0.195	0.0003	0.189
KP	0.466	<.0001	0.468

Source: Developed for the research.

In the Pr > |t| column above, note that the p-values are less than 0.05. This indicates that all the IVs (KA, KD and KP) are significant predictors of the DV (Innovation).

According to the Parameter Estimates table, the regression equation is written as:

$Y = a + B_1(X_1) + B_2(X_2) + B_3(X_3) + e$

Where,

X_1 = IV 1

X_2 = IV 2

X_3 = IV 3

Thus, the equation employed for this research model is:

IN = 0.659 + 0.184 (KA) + 0.195 (KD) + 0.466 (KP)

4.4.3 Simple Linear Regression

A simple linear regression (SLR) analysis is used to quantify and explain the relationship between a single numerical DV and a single IV (Saunders et al., 2012). For this analysis to be feasible, there are two assumptions that need to be fulfilled first which are the normality and linearity assumptions.

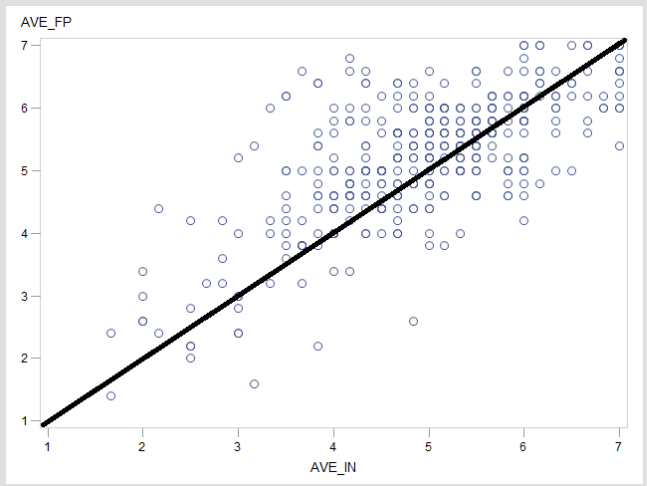
4.4.3.1 SLR Assumption - Normality

Under this SLR assumption, for each value of IV, the value of the DV should follow a normal distribution (Alreck & Settle, 2004). The highest value for skewness is -0.398 (IN2) and lowest being -0.829 (FP4) while the highest value for kurtosis is 0.827 (FP2) and lowest being -0.230 (IN3). The results therefore fulfil the normality assumption as the date ranges between -2 and +2 for both skewness and kurtosis (Garson, 2012).

4.4.3.2 SLR Assumption - Linearity

The linearity assumption denotes that the mean of the DV for each IV should fall along a straight line and the spread should be constant across the range of the IV (Slinker & Glantz, 2008). Besides that, an examination of a normal plot allows the linearity assumption to be tested.

Figure 4.4: Scatter Plot Depicting Linearity between IN and FP



Source: Developed for the research.

Figure 4.4 portrays the scatter plot of IN vs FP as well as the best-fit regression line.

It can be said that as IN increases, FP also increases.

4.4.3.3 SLR Interpretations

Table 4.20: SLR Model Summary

Model	R Square	Analysis of Variance	
		(Pr > F)	F Value
1	0.488	<.0001	366.560

Source: Developed for the research.

From Table 4.20, the R-square achieved in this research is 0.488 which denotes that 48.8% of innovation can explain changes in firm operational performance. A remaining of 51.2% (100% - 48.8%) of the variation in the DV (FP) is unexplained. That being said, there are additional variables that can explain the variation in the DV that is not covered in this research.

In the analysis of variance, the p-value attained in this analysis is <.0001 which is (<0.05) indicates that innovation can explain the outcome of firm operational performance. This exhibits that the IV (IN) can be used to model the DV (FP), thus presenting that this research model is fit. The F-value achieved from this analysis is large with value of 366.560 and so increases the overall significance of the research model.

Table 4.21: SLR Parameter Estimates

	Parameter Estimates	**Pr > |t|**	**Standardized Estimate**
Intercept	1.924	<.0001	0
IN	0.666	<.0001	0.699

Source: Developed for the research.

From the table above, it is displayed that all the p-values are (<0.05). This indicates that the IV (IN) in this model is a substantial predictor of the DV (FP).

According to the Parameter Estimates table above, the regression equation is written as:

$Y = a + B_1(X_1) + e$

Where,

X_1 = IV 1

Thus, the equation employed for this research model is:

FP = 1.924 + 0.666 (IN)

4.5 Conclusion

The results generated further supports the hypotheses of KM dimensions having a positive relationship with firm operational performance via the innovation of products and services component. The next chapter concludes this research project.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

This chapter summarizes the research findings and analysis generated using the SAS software in Chapter 4. It details the summary of statistical analysis in a concise manner and discusses the major findings of the research. Besides that, it also acknowledges the implication of the study as well as the limitations and recommendations to provide a platform for future studies.

5.1 Summary of Statistical Analysis

5.1.1 Descriptive Analysis

Out of 1575 surveys distributed, a total of 406 respondents took part in this research survey however, only 386 were found to be usable, thus, yielding a respond rate of 25.78%. The findings portrayed that the highest level of education pursued by most respondents is Bachelor's Degree or Professional Qualification (40%) and the least having no college degree (10%). Most respondents held the position as owners (34%) and managers (34%) while other positions such as directors and general managers (8%) is held by the least number of respondents. The highest period of years that most respondents have served in the company was between 3-5 years (30%) and lowest less than 1 year (4%). 68.62% companies are in the services sector and 39.38% are in the manufacturing sector. Besides that, 59% of the respondents' companies were established for more than 10 years while 41% were established for less than 10 years. In terms of location, majority of the

respondents' establishments were located in Perak (29%) and the lowest in Johor (19%). Lastly, majority companies have 6-75 employees (62%) while minority companies have 0-5 employees (17%).

Based on the data analysis, the mean values of the three IV (KA, KD, KP) are within the range of 4.218 to 5.329. On the other hand, the mean values of the MV (IN) and the DV (FP) are between the ranges of 4.756 to 5.117 and 5.101 to 5.259 respectively. Notably, the standard deviation derived from this research ranges from 1.161 as the lowest to 1.556 (highest), signifying that the data values are fairly spread around the central tendency.

In the pilot test conducted before the distribution of surveys for the final testing of the data, the normality analysis satisfied the set scale of +-2 for skewness and kurtosis (Garson, 2012) as well as Cronbach's Alpha results for reliability analysis as it is more than 0.700 (Sekaran, 2003).

The final set of data findings also meet the normality benchmark of +-2 for skewness and kurtosis (Garson, 2012). Cronbach's Alpha results ranging between 0.821 and 0.921 achieved the reliability assumption proving that the results shows very good reliability (Sekaran & Bougie, 2010). Also, the highest correlation among the IVs (KA, KD and KP) is 0.720, between KA and KD, conveying the absence of multicollinearity problem ($r > 0.9$).

5.1.2 Inferential Analysis

Deducing results based on the Pearson correlation analysis, there is a positive correlation among the IV (KA, KD, KP), the MV (IN) and the DV (FP). The results also depicts that KP holds the strongest positive correlation with IN ($r = 0.707$). In contrast, the weakest positive correlation is the relationship between KD and IN ($r = 0.614$). Moving on, the p-values of all the variables are less than 0.05 proving that there is a significant relationship between KA, KD, and KP with IN as well as IN with FP.

According to the results of the MLR analysis, 55.9% (R-square = 0.559) of the variation in the DV (IN) can be described by the IVs (KA, KD, KP). Based on the analysis of the variance results, the research model is deemed to be fit as the F-value (161.09) is large and the p-value (<.0001) is less than 0.05. Thus, this shows that at least one of the IVs (KA, KD, KP) is significantly associated to the DV (IN).

The results of SLR states that 48.8% of the IV (IN) can explain changes in the DV (FP). P-value of this analysis (<.0001) is less than 0.05 and a large F-value (366.56) indicates that IN can explain the outcome of FP and that the model is fit.

5.2 Discussions of Major Findings

5.2.1 Relationship between KA and IN

Based on the results obtained in Chapter 4, KA was found to have a positive relationship with product and service innovation. The p-value (<.0001) whereby it is less than 0.05 and standardized estimate of 0.177 indicates that there is a significant relationship. This result is aligned with the research of Liao et al. (2010) which supports KA, with the help of alliance characteristics, having a significant relationship with firm's innovation. Furthermore, other researches such as Jiang and Li (2009) also proved that adopting KM practices (KA in specific) positively affects innovation in the financial and manufacturing industries. A firm's capability to identify knowledge is vital to its operations as proposed by Yang (2008) as new knowledge contributes to new ways of carrying out task and coming out with new products which are, in order words, innovation. This research thus proves that KA affects innovation capabilities not just in the manufacturing sector but also the services sector and in the absence of alliance characteristics.

The findings thus proof that KA positively affects innovation.

5.2.2 Relationship between KD and IN

The research also depicts that KD holds a significant and moderate positive relationship with product and service innovation whereby the p-value (<.0001) is less than 0.05 and the standardized estimate is 0.189. Knowledge dissemination is imperative to a firm's accomplishment as knowledge is available for others to utilise and benefit from it (Tan, 2011). According to Hu et al. (2009), KD possesses an influence on service innovation in tourism industry. Besides that, in 2002, Darroch and McNaughton has also proven that KD is vital in promoting innovation that are incremental, changes consumers' behaviour and destroys business competencies. Findings of this research state that KD plays and essential role in promoting innovation in terms of products and services in the manufacturing as well as services industries.

The findings thus proof that KD positively affects innovation.

5.2.3 Relationship between KP and IN

The results generated from the analysis portrays a significant and strong positive relationship between KP and IN whereby p-value (<.0001) is less than 0.05 and standardized estimate is 0.468. This indicates that KP has the highest influence on IN among the three variables. This is comparable to the findings of Jyoti et al. (2011) proving that KP affects a firm's innovative capabilities in the telecommunication sector. Knowledge application enables an organization to enhance its operations by implementing the knowledge gained (Gold et al., 2001). Evidently other researches such as Li et al. (2009) have also explained that KP affects the innovation in the presence of entrepreneurial orientation in China's transition economy. This research thus

verifies that KP is inevitable in promoting innovation in Malaysian SMEs in the manufacturing and services sectors.

The findings thus proof that KP positively affects innovation.

5.2.4 Relationship between IN and FP

From the results, IN have also been proven to have a significant and strong positive relationship with firm performance because the p-value (<.0005) is evidently less than 0.05 and standardized estimate being 0.699. Innovation can bring about firm performance as new inventive ideas give companies a competitive advantage (Lopez-Nicolas & Merono-Cerdan, 2011). Past researches such as Wang and Wang (2012) also proved that innovative quality positively affects a firm's financial performance for high-technology firms in the company of explicit knowledge sharing. In addition, the findings generated by Ferraresi et al. (2012) also support the above hypothesis whereby innovation and strategic orientation contributes to improved firm performance in Brazilian companies. Findings of this research confirm that innovation alone plays a role in affecting firm performance in manufacturing and services firms.

The findings thus proof that innovation positively affects firm performance.

5.3 Implications of the Study

5.3.1 Managerial Implications

This dissertation is useful to SMEs as it provides useful insight to the management team of the companies in ensuring that knowledge can be distributed equally to all its employees. In a research conducted by the

Department of Statistics Malaysia in 2011, the research proved that SMEs in Malaysia only make up 32.5% of the national GDP. So this study aims to help Malaysian SMEs to increase their firm performance via implementation of KM and innovative products and services to boost their total contribution to the country.

From the empirical results, this research is able to conclude that KM practices does contribute to better firm operational performance through the product and service innovation and with this better understanding, managers can effectively employ these KM practices in the operations of the company. Managers often have a misconception that implementing a new practice such as KM into the company would be 'cost not well spent' however, effective KM makes a positive contribution to innovation and firm performance. Likert-scales from the survey provides a checklist for companies to self-evaluate as to which extent the implementation of KM exist in the company.

Implementing KM in the organization furnishes the organization with a distinctive edge as it has knowledge deposited which is useful in terms of innovating its products and services. Continuous development, transfer and protection of knowledge enable life-long learning in the organization thus turning the organization into an institutional mechanism filled with varieties of organizational memory and with variety, leading to array of improved products and services innovation.

Based on the findings, it is important that managers are aware that the establishment of KM practices is able to act as a mechanism to develop incremental product and service innovation. When managers truly understand the influence that KM practices can bring to the entity, it is then that the entity is able to create something that is of value and unique in its product and services, which brings out the true essence of innovation.

5.3.2 Theoretical Implications

This study examines a broad set of relationships that connects KM to products and services innovation and the latter to firm operational performance. Unlike past studies which focuses only on KM with innovation or innovation with firm operational performance, this study takes into consideration the direct relationship between innovation and firm operational performance. The strong and significant relationship between product and service innovation with KM as well as firm operational performance suggests that innovation plays an important role for KM to effectively yield better firm operational performance.

The research highlights the numerous measures of KM in its contribution to innovation, specifically in products and services. These measures are classified in to three variables, KA, KD and KP, to investigate the importance of these variables in determining KM's contribution to innovation. The framework model of this study emphasizes how innovation is affected by proper implementation of KM factors. To successfully contribute to innovative products and services, KM must first be implemented effectively.

The research results prove that the classification is acceptable and none of the variables overlaps with one another. Future studies can therefore refer to the proposed framework to facilitate their research.

It is possible to deduce that effective KM has a positive contribution to innovation with the application of capturing, disseminating and sharing knowledge, leading to the development of firm intelligence and therefore its translation to improved products and services. Other than that, the research also verifies that effective KM affects firm operational performance only when mediated by innovativeness. This suggests the existence of interactions involving the variables for KM to give a contribution to firms in Malaysia.

All in all, this study proves that proper implementation of KM gives a positive relationship to innovation which in turn contributes to better firm

performance. That being said, the proposed model can be used as a reference for future studies.

5.4 Limitations of the Study

During the course of this research, a number of limitations were acknowledged and noted so that future researchers can further improve in the future.

This research is constrained to studying only 386 SMEs from four states of Malaysia to represent the total population of 645,136 SMEs operating in Malaysia. According to Krejcie & Morgan (1970), the sample size has met the proposed minimum requirement (384 samples), however the results obtain may not accurately represent the total population of SMEs in Malaysia. Having said that, the research is not affected significantly, as the four states that the research was conducted represents the highest number of SMEs in Malaysia in terms of location.

Moving on, this research was done on a cross-sectional basis, whereby it was conducted within a limited timeframe. Due to time constraint, this research is limited only to SMEs. In the absence of time constraints, the research will be able to focus on multinational organizations as well because KM practices are not merely limited to SMEs.

Survey questionnaires that were sent out via email contain bias responses as it is difficult to gauge the extent of truth of the surveys that were answered by the respondents. To a certain extent, respondents are able to falsify the responses as there is no obligation to answer the surveys truthfully. This will cause the validity and reliability of the surveys to be questionable.

Next, adopted questionnaires with close ended questions were distributed for this research. Close ended questions are simple hence easier to understand, free from ambiguity and can be completed in a short time. However, close-ended questions does not provide room to capture comments and opinions from respondents to further explain or clarify their thoughts on KM practices. Nevertheless, this limitation does not distort the research findings.

Lastly, this research only tested three KM practices (KA, KD, KP). However, there are other numerous KM practices that was not tested in this research. For example, the KM processes proposed by Despres and Chauvel (1999), such as Mapping, Creating, Storing, Applying and Innovating were not tested. There are therefore, other dimensions and perspective of KM practices that are absent in this research. Nonetheless, this does not affect the significance of the research.

Although limitations are acknowledge in this research, however, it does not diminish the significance of the findings of this research.

5.5 Recommendations of the Study

A couple of recommendations have been noted down for future researchers to take into consideration.

According to Saunders et al (2012), larger sample size has been said to be more representative as the sample mean is more prone to be equal to the population mean. Thus, it is suggested that a larger sample size should be drawn by future researchers as there would be less sampling error and greater reliability (Alreck & Settle, 2004). Additionally, samples from numerous geographical locations in Malaysia and possibly other countries should be drawn in the Asia-Pacific region given that different KM implication varies among countries.

Furthermore, it is recommended that a longitudinal research is to be conducted by future researchers to further observe the KM implications in SMEs over time. This enables researchers to gain more valuable data which will boost the understanding of KM implementations. In addition, future research should also consider looking into multinational organizations as well instead of just SMEs.

Besides that, administrative works can be performed on surveys collected via emails. These works can include telephone calls to the companies whereby the responses were received from in order to ensure that responses were not falsified. If responses were found to falsified, the responses can then be discarded.

Interviews can also be conducted in the future instead of just distributing adopted questionnaires with close-ended questions. By conducting interviews, it creates a better platform for the researchers to gain more valuable and detailed information from the respondents. According to Wimmer & Dominick (1997), misunderstandings can be clarified by the interviewers while the questionnaires are being administered and therefore the data is more valid. Besides that, telephone interview is also recommended as it provides access to a wider geographical area.

Future researchers are also recommended to apply and test other dimensions of KM process and should not only limit the research to only KA, KD and KP. By examining other dimensions of KM processes, researchers may gain different results and understanding as the different dimensions of KM processes differ from one another thus providing a wider and larger picture of the KM implications.

5.6 Conclusion

Knowledge management factors that are related to product and service innovation encompass knowledge acquisition, knowledge dissemination and knowledge application. Each of the factors has a positive linkage influencing product and service innovation. Innovation on the other hand has a positive relationship with firm operational performance.

Correct KM implementation brings about better firm operational performance via product and service innovation in the manufacturing and services sectors in Malaysian SMEs.

Henceforth, SMEs should place more emphasis in ensuring that these KM fundamentals are being practiced throughout the organization in order to improve firm operational performance.

Notably, this research contributes to both the managerial and theoretical aspects despite possessing some limitations.

In a nutshell, the research objectives of this study were met.

REFERENCES

Alavi, M., & Leidner, D. E. (2001). Knowledge management and knowledge management systems: Conceptual foundation and research issues. *Management Information Systems, 25*(1), 107-136.

Alegre, J., Sengupta, K., & Lapiedra, R. (2011). Knowledge management and innovation performance in a high tech SMEs industry. *International Small Business Journal, 31*(4), 454-470.

Alreck, P. M., & Settle, R. B. (2004). *The survey research handbook*. (3rd ed.). New York: McGraw-Hill.

Andreeva, T., & Kianto, A. (2011). Knowledge processes, knowledge-intensity and innovation: A moderated analysis. *Journal of Knowledge Management, 15*(6), 1016-1034.

Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. *Management Decision, 47*(8), 1323-1339.

Borque, L. B., & Fielder, E. P. (2003). *How to conduct self administered and mail surveys.* (2nd rev. ed.). Thousand Oaks: SAGE Publications Inc.

Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done. *Qualitative Research, 6*(1), 97-113.

Chong, C. W., Chong, S. C., & Gan, G. C. (2011). The KM processes in Malaysian SMEs: An empirical validation. *Knowledge Management Research & Practice, 9*, 185-196.

Colman, A. M., Norris, C. E., & Preston, C. C. (1997). Comparing rating scales of different lengths: Equivalence of scores from 5-point and 7-point scales. *Psychological Reports, 80*, 355-362.

Darroch, J. (2003). Developing a measure of knowledge management behaviours and practices. *Journal of Knowledge Management, 7*(5), 41-54.

Darroch, J. (2005). Knowledge management, innovation and firm performance. *Journal of Knowledge Management, 9*(5), 101-115.

Darroch, J., & McNaughton, R. (2002). Examining the link between knowledge management practices and types of innovation. *Journal of Intellectual Capital, 3*(3), 210-222.

Darroch, J. & McNaughton, R. (2003). Beyond market orientation: Knowledge management and the innovativeness of New Zealand firms. *European Journal of Marketing, 37*(4), 572-593.

Dasgupta, M., & Gupta, R. K. (2009). Innovation in organizations a review of the role of organizational learning and knowledge management. *Global Business Review, 10*(2), 203-224.

Department of Statistics Malaysia. (2012). Census report on SMEs 2011 [Press release]. Retrieved from http://www.statistics.gov.my/portal/images/stories/files/LatestReleases/BE/BI/BE2011_SMEsBI.pdf

Despres, C., & Chauvel, D. (1999). Knowledge management(s). *Journal of Knowledge Management, 3*(2), 110-120.

Dey, E. L. (1997). Working with low survey response rates: The efficacy of weighting adjustments. *Research in Higher Education, 38*(2), 215-227.

Doran, J., & Ryan, G. (2012). Regulation and firm perception, eco-innovation and firm performance. *European Journal of Innovation Management, 15*(4), 421-441.

Ferraresi, A. A., Quandt, C. O., Santos, S. A. D., & Frega, J. R. (2012). Knowledge management and strategic orientation: Leveraging innovativeness and performance. *Journal of Knowledge Management, 16*(5), 688-701.

Fischer, A. (2011). Recognizing opportunities: Initiating service innovation in PSFs. *Journal of Knowledge Management, 15*(6), 915-927.

Fong, P. S. W., & Choi, S. K. Y. (2009). The processes of knowledge management in professional services firm in the construction industry: A critical assessment of both theory and practice. *Journal of Knowledge Management, 13*(2), 110-126.

Garson, G. D. (2012). *Testing Statistical Assumptions.* Glenn Drive Asheboro: David Garson and Statistical Associates Publishing.

Gharakhani, D., & Mousakhani, M. (2012). Knowledge management capabilities and SMEs' organizational performance. *Journal of Chinese Entrepreneurship, 4*(1), 35-49.

Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems, 18*(1), 185-214.

Guchait, P., Namasivayam, K., & Lei, P. W. (2011). Knowledge management in service encounters: Impact on customers' satisfaction evaluations. Journal of *Knowledge Management, 15*(3), 513-527.

Hair, J. F., Black W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis: A global perspective* (7th ed.). New Jersey: Pearson Education, Inc.

Hair, J. F., Money, A. H., Samuel, P., & Babin, B. (2003). *Essentials of business research methods*. Australia: John Wiley & Sons, Inc.

Hu, M. L. M., Horng, J. S., & Sun, Y. H. C. (2009). Hospitality teams: Knowledge sharing and service innovation performance. *Tourism Management, 30*, 41-50.

Hurmelinna-Laukkanen, P. (2011). Enabling collaborative innovation – knowledge protection for knowledge sharing. *European Journal of Innovation, 14*(3), 303-321.

Jiang, X., & Li, Y. (2009). An empirical investigation of knowledge management and innovative performance: The case of alliances. *Research Policy, 38*, 358-368.

Jyoti, J., Gupta P., & Kotwal, S. (2011). Impact of knowledge management practices on innovative capacity: a study of telecommunication sector. *The Journal of Business Perspective, 15*(4), 315-330.

Kim, S. (2010). The influence of likert scale format on response result, validity and reliability of scale – using scales measuring economic shopping orientation. *Journal of Korean Society of Clothing and Textiles, 34*(6), 913-927.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*, 607-610.

Lee, C. S., Goh, D. H. L., & Chua, A. Y. K. (2010). An analysis of knowledge management mechanisms in healthcare portals. *Journal of Librarianship and Information Science, 42*(1), 20-44.

Li, Y., Liu, X., Wang, L., Li, M., & Guo, H. (2009). How entrepreneurial orientation moderates the effects of knowledge management on innovation. *Systems Research and Behavioral Science, 26*, 645-660.

Liao, S. H., Wu, C.C., Hu, D.C., & Tsui K. A. (2010). Relationships between knowledge acquisition, absorptive capacity and innovation capability: An empirical study on Taiwan's financial and manufacturing industries. *Journal of Information Science, 36*(1), 19-35.

Ling, T. C., & Nasurdin, A. M. (2010). The influence of knowledge management effectiveness on administrative innovation among Malaysian manufacturing firms. *Asian Academy of Management Journal*, *15*(1), 63-77.

Lytras, M. D., Poulodi, A., & Poulymenakou, A. (2002). Knowledge management convergence – expanding learning frontiers, *Journal of Knowledge Management, 6*(1), 40-51.

Lopez-Nicolas, C., & Merono-Cerdan, A. L. (2011). Strategic knowledge management, innovation and performance. *International Journal of Information Management*, *31*, 502-509.

Malaysia Department of Statistics. (2011). *Profile of Small and Medium Enterprise.* Retrieved June 3, 2013 from http://www.statistics.gov.my/portal/index.php?option=com_content&id=1721&Itemid=111&lang=en.

Martinez-Canas, R., Saez-Martinez, F. J., & Ruiz-Palomino, P. (2012). Knowledge acqusition's mediation of social capital-firm innovation. *Journal of Knowledge Management, 16*(1), 61-76.

Mehta, N. (2008). Successful knowledge management implementation in the global software companies. *Journal of Knowledge Management, 12*(2), 42-56.

Mishra, B., & Bhaskar, A. U. (2011). Knowledge management process in two learning organisations. *Journal of Knowledge Management, 15*(2), 344-359.

Nonaka, I., Toyama, R., & Nagata, A. (2000). A firm as a knowledge-creating entity: A new perspective on the theory of the firm. *Industrial and corporate change*, *9*(1), 1-20.

Nonaka, I., & Takeuchi, H. (1995). *The knowledge creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford University Press.

Palacios, D., Gil, I., & Garrigos, F. (2009). The impact of knowledge management on innovation and entrepreneurship in the biotechnology and telecommunications industries. *Small Business Economics*, *32*(3), 291-301.

Penrose, E. (1995). *The theory of the growth of the firm*. (2nd ed.). Great Britain: Biddles Ltd.

Plessis, M. D. (2007). The role of knowledge management innovation. *Journal of Knowledge Management, 11*(4), 20-29.

Racherla, P., & Hu, C. (2009), A framework for knowledge-based crisis management in the hospitality and tourism industry. *Cornell Hospitality Quarterly, 50*(4), 561-577.

Rasula, J., Vuksic, V. B., & Stemberger, M. I. (2012). The impact of knowledge management on organisational performance. *Economic and Business Review*, *14*(2), 147-168.

Razali, N. M., & Wah, Y. B. (2011). Power comparisons of Shapiro-Wilk, Kolmogorov- Smirnov, Lilliefors and Anderson-Darling tests. *Journal of Statistical Modeling and Analytics, 2*(1), 21-33.

Rea L. M., & Parker, R. A. (2005). *Survey research: a comprehensive guide*. (3rd ed.). San Francisco: Jossey-Bass.

Santos, J. R. A. (1999). Cronbach's Alpha: A tool for assessing the reliability of scales. *Journal of Extension, 37*(2).

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research methods for business students.* (6th ed.). Harlow: Pearson.

Sekaran, U. (2003). *Research methods for business*: *A skill building approach* (4th ed.). New York: John Wiley & Sons, Inc.

Sekaran, U., & Bougie, R. (2010). *Research methods for business*: *A skill building approach* (5th ed.). Chichester West Sussex: John Wiley & Sons Inc.

Slinker, B. K., & Glantz, S. A. (2008). Multiple linear regression: Accounting for multiple simultaneous determinants of a continuous dependent variable. *Journal of The American Heart Association, 117,* 1732-1737.

Tan, C. N. L. (2011). Knowledge management acceptance: success factors amongst small and medium-size enterprises. *American Journal of Economics and Business Administration, 3*(1), 73-80.

Tavakol, M., Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education, 2*, 53-55.

Taylor, R. (1990). Interpretation of the correlation coefficient: A basic review. *Journal of Diagnostic Medical Sonography, 1,* 35-39.

Wang, Z., & Wang, N. (2012). Knowledge sharing, innovation and firm performance. *Expert Systems with Applications*, *39*(10), 8899-8908.

Wei, C. C., Choy, C. S., & Chew, G. G. (2011). The KM processes in Malaysian SMEs: An empirical validation. *Knowledge Management Research & Practice*, *9*(2), 185-196.

Wheeler, D., & Tiefelsdorf, M. (2005). Multicollinearity and correlation among local regression coefficients in geographically weighted regression. *Journal of Geographical System, 7,* 161-187.

Wimmer, R. D., & Dominick, J. R. (1997). *Mass Media Research: An Introduction.* Belmont, MA: Wadsworth.

Wong, K. Y., & Aspinwall, E. (2004). Characterizing knowledge management in the small business environment. *Journal of Knowledge Management*, *8*(3), 44-61.

Yang, J. (2008). Managing knowledge for quality assurance: An empirical study. *International Journal of Quality & Reliability Management, 25*(2), 109-124.

Zikmund, W. G. (2003). *Business Research Methods* (7th ed.). Indiana University: Thomson / South-Western.

APPENDICES

Appendix A: Summary of Past Empirical Studies

Knowledge Acquisition - Innovation			
Study	**Country**	**Data**	**Major Findings**
Liao, Wu, Hu & Tsui, 2010	Taiwan	362 surveys were collected from firms in the financial and manufacturing industries.	Knowledge acquisition holds a positive relationship to a firm's innovation capability.
Martinez-Canas, Saez-Martinez & Ruiz-Palomino, 2012	Spain	214 mails and email surveys were collected from CEOs of firms in the science and technology parks.	Knowledge acquisition fully mediates the relationship between social capital and firm innovation.
Jiang & Li, 2009	Germany	127 surveys were collected from German firms that had been engaged in strategic alliances.	Knowledge creation contributes positively to innovation.

Knowledge Dissemination - Innovation			
Study	**Country**	**Data**	**Major Findings**
Darroch & McNaughton, 2002	New Zealand	443 mail surveys were collected from firms with 50 or more employees.	Knowledge dissemination was concluded to be part of a strategic architecture of a firm and provides support to outcomes such as innovation.
Hu, Horng & Sun, 2009	Taiwan	621 surveys were collected from employees of international tourist hotels.	Relationship between and among knowledge sharing and service innovation are substantial and strong.
Hurmelinna-Laukkanen, 2011	Finland	242 mail surveys were collected from Finnish companies which were involved in R&D collaboration in Finland.	Knowledge sharing is positively related to innovation performance and there is also a positive relationship between the two variables.

Knowledge Application - Innovation			
Study	**Country**	**Data**	**Major Findings**
Li, Liu, Wang, Li & Guo, 2009	China	607 questionnaire surveys were collected from Chinese firms via interview.	A positive relationship exists between intra firm knowledge sharing and a firm's innovation is mediated by knowledge application.
Jyoti, Gupta & Kotwal, 2011	India	331 surveys were collected from employees working in private telecommunication organisations in Jammu.	A significant relationship does exists between knowledge management and innovation and that knowledge utilization, the strongest determinant affects technical and non-technical innovation.
Darroch, 2005	New Zealand	443 mail surveys were collected from CEOs representing firms with 50 or more employees from a cross-section of industries.	Responsiveness to knowledge positively affects innovation.

Product – Service Innovation – Firm Operational Performance			
Study	**Country**	**Data**	**Major Findings**
Doran & Ryan, 2012	Ireland	2,181 postal surveys were collected from the Irish Community Survey 2006-2008.	Eco-innovation is more important than non-eco innovation in determining firm performance.
Ferraresi, Quandt, Santos & Frega, 2012	Brazil	241 web-based questionnaires were collected from Brazilian companies.	KM did not have a direct effect on firm performance unless it is being mediated by strategic orientation and innovation.
Wang & Wang, 2012	China	89 mail surveys were collected from high technology firms in the Jiangsu Province.	Innovation quality has no direct effect on operational performance, however, it positively affects financial performance.

Source: Developed for the research

Appendix B – Variables and Measurement

Operationalization of the model variables.

Knowledge Acquisition (KA)		
Item	**Description**	**References**
KA1	Your organisation is able to obtain a tremendous amount of market knowledge.	Canas, Martinez and Palomino, 2012
KA2	Your organisation gets most of your valuable information on customers' needs and trends.	Canas, Martinez and Palomino, 2012
KA3	Your organisation regularly captures knowledge of your competitors.	Andreeva and Kianto, 2011
KA4	Your organisation regularly captures knowledge obtained from public research institutions including universities and government laboratories.	Andreeva and Kianto, 2011
KA5	Your organisation regularly captures knowledge obtained from other industry sources such as industrial associations, competitors, clients and suppliers.	Andreeva and Kianto, 2011

Knowledge Dissemination (KD)		
Item	**Description**	**References**
KD1	Market information pertaining to your organisation's industry is freely disseminated.	Darroch, 2003
KD2	Knowledge is disseminated on-the-job in your organisation.	Darroch, 2003
KD3	Your organisation uses specific techniques to disseminate knowledge.	Darroch, 2003
KD4	Your organisation uses technology to disseminate knowledge.	Darroch, 2003
KD5	Your organisation prefers written communication.	Darroch, 2003

Knowledge Application (KP)		
Item	**Description**	**References**
KP1	Your organisation uses knowledge in development of new products / services.	Gold, Malhotra and Segars, 2001
KP2	Your organisation uses knowledge to solve new problems.	Gold, Malhotra and Segars, 2001

KP3	Your organisation uses knowledge to improve efficiency.	Gold, Malhotra and Segars, 2001
KP4	Your organisation uses knowledge to adjust strategic direction of your organisation.	Gold, Malhotra and Segars, 2001
KP5	Your organisation quickly applies knowledge to critical competitive needs.	Gold, Malhotra and Segars, 2001

Product and Service Innovation (IN)		
Item	**Description**	**References**
IN1	Your organisation introduces new thoughts into the product development process.	Li, Liu, Wang, Li and Guo, 2009
IN2	Your organisation is quick in new product launching as compared to key competitors.	Wang and Wang, 2012
IN3	Your organisation is quick in current product development as compared to key competitors.	Wang and Wang, 2012
IN4	The number of new or improved services launched to the market by your organisation is superior to the average in your industry.	Lopez-Nicolas and Merono-Cerdan, 2011
IN5	Your organisation is quick in coming up with novel ideas as compared to key competitors.	Wang and Wang, 2012
IN6	Your organisation is quick in problem solving as compared to key competitors.	Wang and Wang, 2012

Firm Operational Performance (FP)		
Item	**Description**	**References**
FP1	Customer satisfaction in your organisation is better compared to key competitors.	Wang and Wang, 2012
FP2	Quality development of your organisation is better compared to key competitors.	Wang and Wang, 2012
FP3	Cost management of your organisation is better compared to key competitors.	Wang and Wang, 2012
FP4	Responsiveness of your organisation is better compared to key competitors.	Wang and Wang, 2012
FP5	Productivity of your organisation is better compared to key competitors.	Wang and Wang, 2012

Source: Developed for the research

Appendix C – Survey Questionnaire

UNIVERSITI TUNKU ABDUL RAHMAN

Faculty of Business and Finance

BACHELOR OF COMMERCE (HONS) ACCOUNTING

FINAL YEAR PROJECT

KNOWLEDGE MANAGEMENT SUCCESS: A New Dimension In Malaysia SMEs

Survey Questionnaire

Dear respondent,

I am a final year undergraduate student of Bachelor of Commerce (Hons) Accounting, from Universiti Tunku Abdul Rahman (UTAR). The purpose of this survey is to conduct a research on the knowledge management processes affecting innovation which in turn brings about improved firm operational performance.

Thank you for your participation.

Instructions:

1) There are **TWO** (2) sections in this questionnaire. Please answer ALL questions in ALL sections.

2) Completion of this form will take you approximately 10 to 15 minutes.

Section A: Demographic Profile

Please place a tick '√' for each of the following:

1. Age:
   - □ 25 years or less
   - □ 26 – 35 years
   - □ 36 – 45 years
   - □ 46 years or greater

2. Highest education completed:
   - □ No college Degree
   - □ Diploma / Advanced Diploma
   - □ Bachelor Degree / Professional Qualification
   - □ Master / PhD Degree
   - □ Others: _____

3. Position in the company:
   - □ Executive
   - □ Manager
   - □ Senior manager
   - □ Owner
   - □ Others: _____

4. Period of time in your company:
   - □ Less than 1 year
   - □ 1 – 2 years
   - □ 3 – 5 years
   - □ 6 – 10 years

- ☐ More than 10 years

5. Type of company:
   Manufacturing

   - ☐ Food products
   - ☐ Rubber and plastic products
   - ☐ Chemicals and chemical products
   - ☐ Fabricated metal products, except machinery and equipment
   - ☐ Basic metals

   Services

   - ☐ Personal services and other activities
   - ☐ Transportation and storage
   - ☐ Arts, entertainment and recreation
   - ☐ Food and beverage services
   - ☐ Wholesale and retail trade, repair of motor vehicles and motorcycles

6. Period of establishment of your company:
   - ☐ 10 years and below
   - ☐ More than 10 years

7. Location of establishment:
   - ☐ Selangor
   - ☐ Wilayah Persekutuan (KL)
   - ☐ Johor
   - ☐ Perak
   - ☐ Others: _____

8. Number of employees in your company:
   - ☐ 0 – 5 employees
   - ☐ 6 – 75 employees
   - ☐ 76 – 200 employees
   - ☐ More than 200 employees

Section B:

Please circle your answer for each statement using 7-point Likert scale.

[(1) = strongly disagree; (2) = disagree; (3) = somewhat disagree; (4) = neutral; (5) = somewhat agree; (6) = agree; (7) strongly agree]

This section is seeking your opinion regarding the Knowledge Management (KM) practices in your company.

No.	Questions	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
1	Your company is able to obtain a tremendous amount of market knowledge.	1	2	3	4	5	6	7
2	Your company gets most of your valuable information on customer's needs and trends.	1	2	3	4	5	6	7
3	Your company regularly captures knowledge of the competitors.	1	2	3	4	5	6	7
4	Your company regularly captures knowledge obtained from public research institutions including universities and government laboratories.	1	2	3	4	5	6	7

5	Your company regularly captures knowledge obtained from other industry sources such as industrial associations, competitors, clients and suppliers.	1	2	3	4	5	6	7

Knowledge dissemination

No.	Questions	Strongly disagree	Disagree	Somehwat disagree	Neutral	Somewhat agree	Agree	Strongly agree
1	Market information pertaining to your company's industry is freely disseminated.	1	2	3	4	5	6	7
2	Knowledge is disseminated on-the-job in your company.	1	2	3	4	5	6	7
3	Your company uses specific techniques to disseminate knowledge.	1	2	3	4	5	6	7
4	Your company uses technology to disseminate knowledge.	1	2	3	4	5	6	7
5	Your company prefers written communication.	1	2	3	4	5	6	7

Knowledge application

No.	Questions	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
1	Your company uses knowledge in development of new products / services.	1	2	3	4	5	6	7
2	Your company uses knowledge to solve new problems.	1	2	3	4	5	6	7
3	Your company uses knowledge to improve efficiency.	1	2	3	4	5	6	7
4	Your company uses knowledge to adjust the strategic direction your company.	1	2	3	4	5	6	7
5	Your organisation quickly applies knowledge to critical competitive needs.	1	2	3	4	5	6	7

Innovation

This section is seeking your opinion regarding the product and services innovation in your company.

No.	Questions	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
Product Innovation								
1	Your company introduces new thoughts into the product development process.	1	2	3	4	5	6	7
2	Your company is quick in new product launching as compared to key competitors.	1	2	3	4	5	6	7
3	Your company is quick in current product development as compared to key competitors.	1	2	3	4	5	6	7
Service Innovation								
4	The number of new or improved products launched to the market by your company is superior to the average in your industry.	1	2	3	4	5	6	7

5	Your company is quick in coming up with novel ideas as compared to key competitors.	1	2	3	4	5	6	7
6	Your organisation is quick in problem solving as compared to key competitors.	1	2	3	4	5	6	7

Firm operational performance

This section is seeking your opinion regarding the firm operational performance in your company.

No.	**Questions**	**Strongly disagree**	**Disagree**	**Somewhat disagree**	**Neutral**	**Somewhat agree**	**Agree**	**Strongly agree**
1	Customer satisfaction in your company is better compared to key competitors.	1	2	3	4	5	6	7
2	Quality development in your company is better compared to key competitors.	1	2	3	4	5	6	7
3	Cost management in your company is better compared to key competitors.	1	2	3	4	5	6	7

4	Responsiveness of your company is better compared to key competitors.	1	2	3	4	5	6	7
5	Productivity of your company is better compared to key competitors.	1	2	3	4	5	6	7

Thank you for your participation.

Appendix D: Measurement of Each Variable

Variable		Measurement	Scale of Measurement
Demographic Profile	Education	Ordinal	
	Job position	Ordinal	
	Length of time in entity	Ordinal	
	Type of company	Ordinal	
	Period of establishment	Nominal	
	Location of company	Ordinal	
	Number of Employees	Nominal	
Independent variable	Knowledge acquisition	Interval	7-point Likert scale
	Knowledge dissemination	Interval	7-point Likert scale
	Knowledge application	Interval	7-point Likert scale
	Product and service innovation	Interval	7-point Likert scale
Dependent variable	Firm operational performance	Interval	7-point Likert scale

Source: Developed for the research

Appendix E: Permission Letter to Conduct Survey

UNIVERSITI TUNKU ABDUL RAHMAN
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12th August 2013

To Whom It May Concern

Dear Sir/Madam

Permission to Conduct Survey

This is to confirm that the following students are currently pursuing their *Bachelor of Commerce (HONS) Accounting* program at the Faculty of Business and Finance, Universiti Tunku Abdul Rahman (UTAR) Perak Campus.

I would be most grateful if you could assist them by allowing them to conduct their research at your institution. All information collected will be kept confidential and used only for academic purposes.

The students are as follows:

Name of Student	Student ID
ADELINE TAN KEAN SIM	10ABB06792
CARMEN LAI KAH MUN	10ABB07108
LAI WAI SENG	10ABB03552
NOREEN ANN A/P JUDE MANGALAM	10ABB03847

If you need further verification, please do not hesitate to contact me.

Thank you.

Yours sincerely

.....
Mr Mahendra Kumar a/l Chelliah
Head of Department,
Faculty of Business and Finance
Email: mahendra@utar.edu.my

.....
Ms Lee Voon Hsien
Supervisor,
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Address: 9, Jalan Bersatu 13/4, 46200 Petaling Jaya, Selangor Darul Ehsan, Malaysia **Postal Address:** P O Box 11384, 50744 Kuala Lumpur, Malaysia
Tel: (603)7958 2628 **Fax:** (603) 7956 1923 **Homepage:** http://www.utar.edu.my