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TITLE PAGE

UNIVERSITI TEKNOLOGI PETRONAS

Critical Success Factors for the Implementation of Knowledge Management in Small and
Medium Enterprises – Malaysia and Pakistan Perspective

By

Mobashar Rehman

A THESIS

SUBMITTED TO THE POSTGRADUATE STUDIES PROGRAMME

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DEGREE OF MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

KNOWLEDGE MANAGEMENT PROGRAMME

BANDAR SERI ISKANDAR

PERAK

NOVEMBER, 2009

Declaration

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UTP or other institutions.

Signature: _____

Name: Mobashar Rehman

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Dedication

I dedicate this research work to *Holy Prophet PBUH*, my parents (*Mohammad Nazir Malik & Noor Begum*), grandparents (*Haji Mohammad Sulaiman & Hajra Bibi*), sisters (*Naheed Kauser & Fozia Nazir*) and brother (*Hafiz Muddasir Rehman*).

I also dedicate this work to all my friends especially *Leena Malik*, colleagues and teachers who prayed and helped me in the time of difficulties.

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Abstract

Knowledge management is playing a vital role for the success of organizations as it is important to all type of businesses irrespective of their nature and size. Knowledge management has proved its significance at all levels including the individual, organization and country level. In the early days, knowledge management was not considered as much important for SMEs as it was for large organizations. Nevertheless, this misunderstanding has changed and this is the main reason why this research was conducted focusing on knowledge management implementation in SMEs.

This research is the authentication of previous studies done over the years by different researchers and is therefore strengthening the previous work through some modifications to suit the SME environment. This research was conducted on SMEs of Malaysia and Pakistan. Thirty SMEs were approached from each country and were selected using simple random sampling technique. Fourteen CSFs which are important for KM implementation were analyzed and their priority was also checked using the values of 'R', R-square. Based on those CSFs, a framework was recommended for knowledge management implementation in SMEs. Validity of framework was analyzed by using hypothesis testing through linear regression technique using SPSS and the results showed that data gathered was reliable.

Personally administered questionnaire method was used as research instrument with the top management as the target audience. Reliability of data was checked by using Cronbach alpha value. Besides checking the significance of 14 CSFs and proposing a framework for knowledge management implementation, research also analyzed the level of IT implementation in SMEs of Malaysia and Pakistan, years using knowledge management, future of knowledge management, reasons for not implementing knowledge management, benefits received from knowledge management implementation and type of applications used by SMEs of Malaysia and Pakistan. These findings showed that Pakistan has advantage over Malaysia in terms of IT and KM implementation. Impact of knowledge management implementation on financial and non-financial (daily) performance is also among the findings of this research and the results showed that financial and non-financial performance improves after implementation of KM.

This research provides a way forward for other researchers, authors and practitioners to further explore the implementation of knowledge management in SMEs by focusing on issues like developing knowledge friendly culture, availability of financial resources and commitment of top management.

Keywords: Knowledge Management Implementation, Critical Success Factors, Small and Medium Enterprises

Abstrak

Pengurusan pengetahuan memainkan peranan penting bagi kejayaan organisasi kerana ia penting untuk semua jenis perniagaan tanpa mengira jenis dan saiznya. Pengurusan pengetahuan telah membuktikan signifikasinya pada semua peringkat termasuk individu, organisasi mahupun negara. Pada masa lalu, pengetahuan pengurusan tidak dianggap sebagai penting bagi industri kecil dan sederhana (IKS) berbanding organisasi besar. Namun demikian, kini tanggapan sedemikian telah berubah dan ini merupakan alasan utama mengapa kajian ini dilaksanakan dengan penumpuan kepada pelaksanaan pengurusan pengetahuan dalam bidang IKS.

Penyelidikan ini adalah pengesahan bagi kajian terdahulu yang dilakukan selama bertahun-tahun oleh para penyelidik dan dengan itu memperkuat lagi kerja terdahulu melalui beberapa penambahbaikan yang sesuai dengan persekitaran IKS. Penyelidikan ini dilakukan di beberapa buah IKS di Malaysia dan di Pakistan. IKS di setiap negara dipilih menggunakan teknik sampel rawak mudah. CSF yang penting bagi pelaksanaan pengurusan pengetahuan dianalisis dan keutamaan mereka juga dikaji menggunakan maklum balas yang diperolehi daripada responden. Dengan berdasarkan CSF, sebuah rangka kerja telah disyorkan untuk pelaksanaan pengurusan pengetahuan di IKS. Pengesahan kerangka telah dianalisis dengan menggunakan pengujian hipotesis melalui teknik regresi linier menggunakan SPSS.

Kaedah soal selidik yang dikelola secara peribadi ini digunakan sebagai instrumen kajian dengan pengurus atasan sebagai sasaran. Keandalan data telah diperiksa dengan menggunakan Undian Cronbach Alpha. Selain menyemak kepentingan CSF dan mencadangkan sebuah rangka kerja untuk pelaksanaan pengurusan pengetahuan, kajian juga menganalisis tahap implementasi IT di IKS Malaysia dan Pakistan, jangka masa menggunakan pengurusan pengetahuan, pengurusan pengetahuan pada masa depan, alasan untuk tidak melaksanakan pengurusan pengetahuan, faedah yang diterima daripada pelaksanaan pengurusan pengetahuan dan jenis aplikasi yang digunakan oleh IKS Malaysia dan Pakistan. Kesan daripada pelaksanaan pengurusan pengetahuan kewangan dan prestasi bukan kewangan (prestasi harian) juga di antara penemuan-penemuan kajian ini.

Penyelidikan ini memberikan hala tuju kepada penyelidik di masa akan datang, penulis dan pengamal untuk penerokaan dengan lebih lanjut tentang penerapan pengetahuan pengurusan dalam IKS disamping memfokuskan pada isu-isu seperti mengembangkan pengetahuan budaya ramah, ketersediaan sumber kewangan dan komitmen daripada pengurusan atasan dalam pelaksanaan pengurusan pengetahuan.

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CHAPTER 1: INTRODUCTION

1.0 Introduction

Knowledge Management (KM) is playing a vital role for the success of organizations. It is important for all type of businesses irrespective of their nature and size (Okunoye and Karsten, 2002). KM has proved its significance from an individual, organization to country level (Halawi et al., 2006). This is the reason due to which KM is known as a key to success (Call, 2005) and in future KM will be the difference between a well performing organization and a not well performing organization (Neef, 1999). Due to this, recently, people have realized that KM implementation is important for large and small organization as the world economy has moved from industrialization to knowledge base economy. Question is how to implement KM? KM implementation does not mean only IT implementation as IT is one of the key enablers for KM implementation but not whole KM implementation. In fact, successful KM implementation depends on different aspects or factors. These factors are known as Critical Success Factors (CSFs). Work has been done on the CSFs for the implementation of KM but a complete set of CSFs have not been produced so far which can be suited to every organization.

Work done so far on CSFs and implementation of KM is more suitable to large organizations. Small organizations do vary from large organization in financial matters, management perspective and top management approach. Therefore, there is need to produce a list of CSFs for the implementation of KM specifically to Small and Medium Enterprises (SMEs). Although majority of the CSFs can be applied to large organizations and SMEs as well but still there is need to produce CSFs which are more specific to KM implementation in SMEs.

KM implementation is important for SMEs as well as for large organizations. SMEs can benefit from KM implementation (Wong, 2005), especially, when SMEs are in such a huge number that most of the countries have more than 95% of business establishments

under SME categorization. Developed countries have somehow implemented KM in SMEs but not completely. Developing countries like Malaysia and Pakistan, which have more than 97% SMEs (of total business units), are concerned about less KM implementation. Therefore there is a need to see that how much understanding of KM is present in SMEs of developing countries? It is also important to educate SMEs about KM implementation and its benefits.

1.1 Background

In the late 90s, KM was not considered as much important for SMEs as was for large organizations, but this misunderstanding has begun to change in recent years. This was mainly due to the fact that people started to realize that SMEs are also important for economy of a country as are large organizations. Additionally, there was another misunderstanding about KM implementation in SMEs that it can be implemented just like in large organizations with some variations in terms of organization size (Desouza and Awazu, 2006). On the other hand, later studies showed that KM implementation requirements for SMEs differ from large organization on various grounds and it is not right to assume that the only difference between large and small organizations is size of organization (Desouza and Awazu, 2006). Other differences between small and large organizations include non-availability of financial and non-financial resources, top management approach and employee turnover.

Only then researchers and practitioners thought that SMEs should be treated differently from large organizations. Recently, the focus has shifted towards the issues of KM implementation in SMEs. Two of such studies are (Wong, 2005; Wong and Aspinwall, 2004) where they have produced a list of CSFs for the implementation of KM in SMEs. The same authors have also further improved previous work with a more specific set of CSFs. For example earlier HRM was not considered as a CSF but it was included in studies by (Wong, 2005; Wong and Aspinwall, 2004).

1.2 Importance of Knowledge Management for Small and Medium Enterprises

SMEs lack financial (OECD, 2002; Jun and Cai, 2003) as well as some other resources. On the other hand these SMEs have to compete with large organizations that have much more resources as compare to them.

SMEs also suffer from the continuous threat of knowledge loss because their employees are always looking for a new and better opportunity. Due to this when key employee leaves an organization then that organization suffers knowledge loss and in some cases competitive advantage if that person is the key to organizational success.

Due to these disadvantages (less resources and knowledge loss), SMEs should consider a mechanism which can help them to build competitive advantage and at the same time reduce the threat of knowledge loss. This mechanism can be successful KM implementation. KM implementation helps an organization to store its knowledge (codified knowledge) and helps to minimize the effect of knowledge loss. At the same time, knowledge is the basis for competitive advantage (Arnal et al., 2001; Holsapple and Wu, 2008). Therefore, KM can be very helpful for SMEs in order to avoid knowledge loss and to build a competitive advantage.

1.3 Reasons for not Implementing KM in Small and Medium Enterprises

SMEs have not been given that much attention in the area of KM implementation which they should have been. This is mainly due to the misunderstandings mentioned above. This has resulted in KM implementation methods which are primarily concerned with large organizations. There are some other reasons due to which SMEs lack implementation of KM. Among those reasons include misunderstanding that KM is not important for SMEs and due to this the KM is not in the mainstream of SME objectives. Secondly, SMEs also lack the basic understanding of KM that what KM is all about, how SME can benefit by implementing KM (Wong and Aspinwall, 2004).

Another important factor due to which SMEs lack implementation of KM is 'less financial resources' as discussed by (Welsh and White, 1981; Lee and Oakes, 1995; Motwani et al., 1998; OECD, 2002; Jun and Cai, 2003). KM implementation in SMEs is not only ignored by management of SMEs itself rather researchers also ignored it and less literature on KM and SMEs prove this point.

1.4 Problem Area and Statement

Large organizations are benefiting from the implementation of KM whereas most of the SMEs are lacking in this field. There are various reasons due to which SMEs have not implemented KM or they do not want to implement it. Those reasons include lack of financial resources (Welsh and White, 1981; Lee and Oakes, 1995; Motwani et al., 1998; OECD, 2002; Jun and Cai, 2003) and unavailability of required infrastructure. Another reason for not implementing KM is incomplete awareness about its benefits and not handling those areas which are important for the successful implementation of KM (Moffett et al., 2002).

SMEs make majority of the business units of any country. They play a vital role in the development of economy. Countries like Malaysia and Pakistan which are developing need a major boost in their economic development from SME side and at the same time SMEs in these two countries are increasing at a greater pace. On the other hand SMEs can benefit from KM implementation but they have not implemented KM therefore this situation demands that SMEs should be educated about KM, its benefits and how to implement it?

Based on this reason that SMEs lack implementation of KM whereas they play a key role in the development of economies, it is important to know that how KM can be implemented in SMEs?

1.5 Research Questions

1. What is the relationship between proposed CSFs and implementation of KM?
2. What is the relationship between implementation of KM, financial performance and non-financial (daily) performance of a company?
3. What about the past, current and future of KM in Pakistan and Malaysia?

1.6 Research Objectives

1. Identifying CSFs for the implementation of KM among SMEs of Pakistan and Malaysia.
2. Investigating the relationship between financial, non-financial (daily) performance of a company and implementation of KM.
3. Analyzing current and future level of KM implementation in Malaysia and Pakistan based SMEs.

1.7 Methodology

This research is focused on KM implementation and SMEs. The work is the authentication of previous studies done over the years by different authors and is therefore strengthening the previous work with some modifications.

This research was conducted on SMEs of Malaysia and Pakistan because these two countries are considered as very suitable for small business beside some other developing nations and SMEs are growing at a greater pace in these countries. Therefore, attentions should be paid on those issues due to which SMEs can benefit as SME's contribution in these countries towards overall economy is significant. Keeping an eye on this, this research analyzed KM implementation situation in SMEs of Malaysia and Pakistan so that these SMEs should be educated about the benefits of KM and how to implement it?

Personally administered questionnaire method was used as a survey instrument for cost saving and giving more time to respondents to answer the questions as KM is relatively new field for SMEs. Sixty SMEs were chosen by using simple random sampling.

Those factors (areas) were analyzed which are important for the implementation of KM. Fourteen CSFs were analyzed with the help of linear regression and their priority was also checked through the feedback obtained from respondents (top management). Based on those CSFs a framework was recommended for KM implementation in SMEs.

Besides checking the significance of CSFs and proposing a framework for KM implementation, the research also analyzed the level of IT implementation, years using KM, future of KM, reasons for not implementing KM, benefits received from KM implementation and type of KM applications used by SMEs of Malaysia and Pakistan. Impact of KM implementation on financial and non-financial performance (daily performance) is also among the findings of this research work.

So far the discussion was that why KM is important for organizations? The discussion on how KM can be implemented in SMEs will be in the next section focusing on factors which are known as CSFs.

1.8 Defining Critical Success Factors

Implementation of KM in an organization (large or small) is an uphill task. There are various factors or key areas which should be considered carefully while implementing KM. These factors are known as “CSFs” which can be defined in different ways. One of which is “areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization” (Rockart, 1979). Second definition is that those “activities and practices” which are helpful in the implementation of KM are known as CSFs (Wong, 2005). CSFs were also defined as “practices and policies” (Neef, 1999). Generally, CSFs can be defined as components which become crucial for the successful completion of a mission, an organization, project or task. Those matters which

must go properly for the successful accomplishment of mission of an organization are also known as CSFs. Actions which guarantee the success of business are called CSFs. They are also known as Key Success Factors (KSFs) or Key Result Areas (KRAs).

The following CSFs have been analyzed in this research work:

1. Understanding of KM
2. Top management support (Wong, 2005; Skryme and Amidon, 1997; Holsapple and Joshi, 2000)
3. Knowledge friendly culture (Davenport et al., 1998)
4. Financial resources
5. IT infrastructure (Hasanali, 2002)
6. Communication between all levels of management
7. Training and education of employees (Wong, 2005)
8. Hiring and retention of knowledgeable employees
9. Rewards to encourage employees for KM practices (Liebowitz, 1999; Davenport et al., 1998; Wong, 2005)
10. Measuring effectiveness of KM implementation (APQC (b), 1999; Hasanali, 2002; Holsapple and Joshi, 2000)
11. Organizational infrastructure (Wong, 2005; Davenport et al., 1998)
12. Core values of business (Skryme and Amidon, 1997)
13. Strategy for KM implementation (Liebowitz, 1999; APQC (b), 1999)
14. Systematic KM processes and activities (Skryme and Amidon, 1997)

1.9 Contributions of Research Work

This research provides a more specific set of CSFs for the implementation of KM in SMEs. A framework was proposed for KM implementation in SMEs as well. This research also focused on comparison of IT level in Malaysia and Pakistan based SMEs besides discussing reasons for not implementing KM. Other contributions include prioritized list of CSFs for the implementation of KM, benefits of KM implementation to

SMEs, current and future trend of KM implementation and general applications of KM used by SMEs of Malaysia and Pakistan.

1.10 Limitations of the Research

This research is based on only 60 SMEs due to which results may vary if the same research be conducted with more number of SMEs. Only one respondent was selected from each SME and that respondent was from top management, so this research work might contain some biased results although care was taken to avoid biasness by asking general questions instead of specific questions.

1.11 Thesis Formation

Chapter 1: This part of thesis is about the importance of KM for SMEs, purpose of research, objectives and research questions. CSFs studied in the research were mentioned. Chapter also gives an overview of methodology which explains that how research was conducted.

Chapter 2: This part of thesis discusses about SMEs and their categorization. Chapter also discusses KM implementation and organizational performance. CSFs discussed by various authors are also included in the chapter.

Chapter 3: This chapter is related to methodology which includes data collection, data reliability, survey instrument, pilot study and tests used to achieve results. Information about hypotheses, type of questions and respondents is also provided in this chapter. Chapter explains about proposed framework as well.

Chapter 4: This chapter is about the results and analysis. Results of hypotheses, benefits of KM implementation, reasons due to which SMEs do not implement KM and level of IT implementation in SMEs of Pakistan and Malaysia were discussed.

Chapter 5: This part is about discussion that whether the results obtained from this research work are verifying the previous studies or not.

Chapter 6: This chapter summarizes the findings of the research in the form of contributions and future work.

1.12 Summary

This chapter discussed about KM implementation issues in SMEs, problem statement of this research and how research was conducted. The background of this work, objectives and research purpose were also provided, followed by contributions, research limitations and an overview for each chapter.

Next chapter will be about literature review which will give an idea about the work done so far on CSFs for the implementation of KM.

CHAPTER 2 – LITERATURE REVIEW

2.0 Overview

This chapter explains about SMEs of Pakistan, Malaysia and their categorization. Issues of KM implementation and organizational performance will be discussed. KM implementation with respect to CSFs and importance for KM implementation will be overviewed. Impact of KM implementation on financial and non-financial performance of the organization and interdependency of CSFs is also in the chapter.

2.1 Knowledge Management Implementation and Organizational Performance (Large and SMEs)

The shift from industrialization to knowledge based economy has increased the significance of KM, as knowledge has become the basis of competitive advantage for individuals, organizations and even countries (Arnal et al 2001; Holsapple and Wu, 2008). It is clear from the fact that those countries where economy is inclined towards knowledge are more developed or progressing as compare to those countries where KM is not given priority. A study conducted by (Liebowitz, 1999) concludes that knowledge is the most important asset which an organization has and it can not be left unmanaged.

KM is not only involved with the management of knowledge in fact it has an impact on the overall performance of the company. In a study done by (Holsapple and Singh, 2003), it was concluded that those activities which include KM, have an effect on the efficiency, innovation and repute of that organization. KM also affects the performance of an organization as was suggested by (Alavi and Leidner., 2001). This study stated that KM means the collection of knowledge and then using the entire knowledge of an organization to improve its performance.

Earlier, KM was only considered fruitful for private organizations. Importance of KM in current era can be judged from the findings that now public sector organizations are putting their best efforts to implement KM (Wimmer and Traunmüller, 2007).

KM implementation means those techniques and tools through which knowledge can be captured and then used to increase the performance and innovation of an organization. KM implementation has various benefits. It is not only used for the storage of knowledge but can be used for the proper training and education of employees which will help in the career development of employees. Due to this, employees will be able to pursue their career towards KM. Other benefits of KM implementation include reduction in redundancy and consistency both in process and product development. KM is not only important for private organizations but has the same significance for public organizations. It has become so crucial for public organizations that now they should take solid steps towards the implementation of KM (Pee and Kankanhalli, 2008).

KM is being implemented in the public organizations around the globe. For example, in United Kingdom (UK), KM is included in the process of e-government. Storytelling method is used to share the knowledge among various organizations including English Nature (Donaldson, 2003). In Asia and Europe, KM is being used to provide the information regarding the citizens (McAdam and Reid, 2000). KM is also being used by military, educational and intelligence sharing sectors (Desouza and Vanapalli, 2005). It is estimated that KM budget for US will increase by 35 percent.

Among large organizations, 80% have implemented KM (KPMG, 1999). In another study conducted by (Chong, 2006), 58% of Malaysian ICT companies have invested in KM while 21% organizations have planned to implement KM in future. Chong and Choi (2005) stated that those organizations which have implemented KM are among the top fortune 500 companies and smaller top Inc. 100 list.

It is obvious that organizations do benefit from KM implementation and this is the reasons due to which more and more organizations including SMEs are moving towards

KM implementation. Question is how to effectively implement KM? Effective KM implementation means that there are certain factors which should be carefully considered to implement KM because without these factors KM implementation is almost impossible. Those factors are called ‘Critical Success Factors’.

Before going on to define what is meant by CSF and which CSFs are important for the implementation of KM, let’s have a look at what SMEs are and how they are categorized in Pakistan and Malaysia?

2.2 Defining SMEs

Definition of SMEs varies from country to country. Still there are certain parameters which are common among most countries of the world for describing SMEs.

Those parameters include:

- Number of Full Time Employees
- Annual Sales Turnover
- Total Assets

2.2.1 Defining Malaysia Based SMEs

Malaysian SMEs are categorized into three sub-groups namely micro, small and medium depending on the annual sales turnover and number of full time employees. These SMEs are currently operating in three sectors which are manufacturing (including Manufacturing Related Services (MRS)), Service sector (including ICT) and agricultural sector (including Agro-based agriculture).

Table 2-1 gives an idea about how Malaysian SMEs are categorized into micro, small and medium scale depending on the number of employees. Number of people for categorizing SMEs varies from one category to another and even from one sector to another.

Table 2-1: Categorization of SMEs on Number of Employees' Basis

	Primary Agriculture	Manufacturing (including Agro- based) & MRS*	Service Sector (including ICT**)
Micro	Less than 5	Less than 5	Less than 5
Small	Between 5-19	Between 5-50	Between 5-19
Medium	Between 20-50	Between 51-150	Between 20-50

*MRS: Manufacturing-Related Services

**ICT: Information and Communication Technology

Source: <http://www.smeinfo.com.my>

Table 2-2 is about the criteria of differentiating between Malaysian SMEs on the basis of annual sales. Annual sales level varies from one category to another. Similarly, sales level also varies from one sector to another.

Table 2-2: Categorization of SMEs on Annual Sales Turnover Basis (RM: '000)

	Primary Agriculture	Manufacturing (including Agro- based) & MRS*	Service Sector (including ICT**)
Micro	Less than 200	Less than 250	Less than 200
Small	Between 200 - 1,000	Between 250 - 10,000	Between 200 - 1,000
Medium	Between 1,000 - 5,000	Between 10,000 - 25,000	Between 1,000 - 5,000

*MRS: Manufacturing-Related Services

**ICT: Information and Communication Technology

Source: <http://www.smeinfo.com.my>

2.2.2 Defining Pakistan Based SMEs

SMEs in Pakistan are categorized into small and medium level enterprises on the basis of number of employees, annual sales turnover and total assets (excluding land and building). SMEs are further categorized into manufacturing, service and trade sector (source: SMEDA). Table 2-3 provides an outlook on the criteria of categorizing SMEs in Pakistan.

Table 2-3: Categorization of Pakistan Based SMEs

Size	Sector	Employees	Total Assets (Rs. Million) Excluding Land & Building	Annual Sales (Rs. Million)
Small	Manufacturing	Less than or equal to 50	Less than or equal to 30	Less than or equal to 100
	Service	Less than or equal to 50	Less than or equal to 20	Less than or equal to 100
	Trade	Less than or equal to 20	Less than or equal to 20	Less than or equal to 100
Medium	Manufacturing	51-250	30 - 100	100 - 300
	Service	51-250	20 - 50	100 - 300
	Trade	21-50	20 - 50	100 - 300

Source: SMEDA - Ministry of Industries

Besides above discussed criteria, there are many institutes which have their own definition for categorizing SMEs in Pakistan. These institutes include State Bank of Pakistan (SBP), Small and Medium Enterprise Development Authority (SMEDA) and Federal Bureau of Statistics. Each institute is somehow linked with SMEs therefore they have different definition according to the type of relationship they have with SMEs. Table 2-4 shows that how different institutes define SMEs in Pakistan.

Table 2-4: SME Definitions used by Various Institutes in Pakistan

Institution	Small	Medium
SMEDA	10 - 35 employees or productive assets of Rs. 2 - 20 Million	36-99 employees or productive assets of Rs. 20-40 million
SME Bank	Assets of Rs. 20 million	Assets of Rs. 100 million
Federal Bureau of Statistics	< 10 employees	N/A
State Bank of Pakistan (SME Prudential Regulations)	An entity, ideally not being a public limited company, which does not employ more than 250 persons (manufacturing) and 50 persons (service/trade) and also fulfills one of the criteria: 1. A trade/service concern with total assets at cost excluding land and building up to Rs. 50 million. 2. A manufacturing concern with total assets at cost excluding land and building up to Rs. 100 million. Any concern (trade, service or manufacturing) with net sales not exceeding Rs. 300 million as per latest financial statements.	
Sindh Industries Department	Entity engaged in handicrafts or manufacturing of consumer or producer goods with fixed capital investment up to Rs. 10 million including land and building.	
Punjab Industries Department	Fixed assets with Rs. 10 million excluding cost of land.	
Punjab Small Industries Corporation	Fixed investment up to Rs. 20 million excluding land and building.	N/A

Source: www.smepolicy.net.pk/

It has been discussed that what are SMEs and how they are categorized? Chapter also discussed what is KM and why it is important? Now let's discuss about CSFs which are important for KM implementation in SMEs.

2.3 Critical Success Factors

CSFs can be defined as goals set by industry, organization, management or even they can be called as general environmental factors. These factors when tackled carefully, will in return give competitive advantage to an organization (Rockart, 1979). Based on this definition, it can be judged that CSFs provides management an overview about those tasks which should be completed carefully so that organization can successfully operate (Laudon and Laudon, 2004). Saraph et al., (1989) defined CSFs as "important areas of managerial planning and actions that must be practiced in order to achieve effectiveness".

2.3.1 Critical Success Factors in KM

Different authors have suggested different CSFs based on their studies. This portion of chapter will give an overview of those CSFs.

Skryme and Amidon (1997) suggested 7 CSFs in their study. Those CSFs are 'knowledge leadership, knowledge creation and sharing culture, technology infrastructure, strong links to a business imperative, compelling vision and architecture, systematic organizational knowledge processes and continuous learning'. These factors were proposed in a study which involved practices and experiences of leading international companies in KM.

Davenport et al., (1998) conducted a study in which 31 KM related projects in 24 organizations were analyzed. This was an exploratory study and the purpose of study was to find factors associated with effectiveness of projects. From this study 8 CSFs were extracted. Those CSFs are 'senior management support, knowledge-friendly culture, technical and organizational infrastructure, standard and flexible knowledge structure,

clear purpose and language, economic performance or industry value, multiple channels for knowledge transfer and change in motivational practices'.

Liebowitz (1999) emphasized on 6 features which are important for the implementation of KM. Those features include 'need for a KM strategy, support from senior management, a Chief Knowledge Officer (CKO) or equivalent, KM infrastructure, knowledge ontology and repositories, KM systems and tools, incentives to encourage knowledge sharing and a supportive culture'. This study was done on leading KM companies.

American Productivity and Quality Center (APQC (b), 1999) suggested 5 factors including 'leadership, culture, technology, strategy and measurement'. Another effort was made by Holsapple and Joshi, (2000) in which 4 factors were introduced. Those were 'leadership, measurement, control, coordination and resources'.

Three CSFs were identified by Choi (2000). Those were 'commitment from top management/leadership, fewer organizational constraints and information systems infrastructure'. Five CSFs were highlighted by Hasanali (2005). CSFs suggested in that study includes 'leadership, culture, structure, roles and responsibilities, IT infrastructures and measurement'.

Chourides et al., (2003) pointed five functional areas of an organization which contains CSFs. This study was based on current literature on KM and a survey done by financial times on stock exchange of 100 companies. Those areas are 'strategy, Human Resource Management (HRM), IT, Total Quality Management (TQM) and marketing'. (Hung et al., 2005) stated that 'strategy and organizational culture' are important for the successful implementation of KM in an organization.

One of the most important studies was done by (Wong, 2005) because it produced a generalized set of CSFs for SMEs. Eleven CSFs were identified from organizations, practitioners and researchers. Those 11 CSFs are 'management leadership and support, culture, IT, strategy and purpose, measurement, organizational infrastructure, processes

and activities, motivational aids, resources, training and education and HRM'. This study was done on UK based SMEs.

'Management leadership, culture, IT, strategy, measurement, organizational infrastructure, processes, motivation, resources, training and education, HRM and marketing' were identified as CSFs by (Mabrouk, 2006). This study proved above mentioned CSFs with the help of literature on CSFs for KM implementation.

Following section will discuss about those CSFs which are part of this research. This part will also refer to previous studies in which these CSFs were analyzed.

2.3.1.1 Top Management Support

Organizations are lead by management and especially top management. They are the ones who decide what type of goals will be achieved and to achieve those goals, they make strategies. To implement those strategies, top management approves the financial and non-financial budgets. Therefore, the motivation from top management to implement KM is vital. If top management is not convinced, then how can one implement KM in an organization? Ultimately, it is the top management who will say YES or NO for the approval of budgets to implement KM. This CSF was suggested by the following authors: Abell and Oxbrow, 1999; APQC (b), 1999; Civi, 2000; Choi, 2000; Chong and Choi, 2005; Davenport et al., 1998; Dess and Pickens, 2000; Greco, 1999; Hasanali, 2002; Holsapple and Joshi, 2000; Kalling, 2003; Liebowitz, 1999; Moffett et al., 2003; Pemberton et al., 2002; Ryan and Prybutok, 2001; Salleh and Goh, 2002; Skyrme and Amidon, 1997; Ribiere and Sitar, 2003.

2.3.1.2 Knowledge Friendly Culture

Culture of an organization, society or country means, norms or values which are followed over there. What types of rules are made, how strictly rules are followed and who decides what? All these factors make up the culture. Culture of an organization decides how

formal or informal that organization is? Whether employees can easily communicate with each other or not? Rules are forced on them or they also take part in decision making? How often they share new things with each other? What will happen if they do something wrong? Will they be rewarded if they come up with new idea or knowledge? Employees make the culture of an organization. If employees are not motivated or satisfied in the persuasion of a strategy, it becomes difficult to successfully execute that particular strategy. Therefore for the successful implementation of KM, knowledge sharing is considered as a key factor. If employees of an organization do not share their knowledge with each other due to any reason, how new and old knowledge will be disseminated in that organization? Thus culture of an organization plays a vital role in the implementation of KM. Culture was treated as CSF by Amidon, 1997; APQC (b), 1999; Choi, 2000; Chong and Choi, 2005; Davenport et al., 1998; Greco, 1999; Greengard, 1998; Gupta et al., 2000; Jager, 1999; Liebowitz, 1999; McDermott and O'Dell, 2001; Moffett et al., 2003; Ribiere, 2001; Ryan and Prybutok, 2001; Skyrme and Amidon, 1997; Wild et al., 2002.

2.3.1.3 Financial Resources

Money is everything for an organization. Core purpose for the existence of a business is to earn profit by minimizing their cost and making maximum out of it. Obviously, implementation of KM requires financial resources. Therefore, any organization will go for the implementation of KM only if it has more to offer than the investment. Financial resources are also responsible for the availability of other resources because nothing can be purchased without money. This is one of the reasons that why SMEs have less implementation of KM because they lack financial resources (Welsh and White, 1981; Lee and Oakes, 1995; Motwani et al., 1998; OECD, 2002; Jun and Cai, 2003). Previous studies have focused on 'resources' as CSF which includes both financial and non-financial resources. Scope of the CSF in this research is limited to financial resources as far as this particular CSF is concerned. Other resources are treated separately as CSF. Resources were considered as CSF by Davenport and Volpel, 2001; Holsapple and Joshi, 2000; Wong and Aspinwall, 2004.

2.3.1.4 IT Infrastructure

IT is considered as the key enabler for KM implementation. Many people consider IT as the sole responsible for KM implementation, this phenomenon is wrong. Indeed, IT is the key enabler but not the only one. There are other enablers as well which play a vital role in the implementation of KM. Implementation of KM requires tools which IT infrastructure provides. Tools required by KM are used for the purpose of creation, storage and sharing of knowledge. These IT tools are important for KM implementation thus their understanding is also important. This is why IT tools and their understanding is important for KM implementation. IT not only provides basic tools for knowledge creation and sharing but also provides some sophisticated tools which are used for the purpose of decision making. These tools are used for applications like Enterprise Resource Planning (ERP), inventory management and Customer Relationship Management (CRM). IT and Information System (IS) were considered as CSFs by the following authors: Alavi and Leidner, 2001; APQC (b), 1999; Bhatt, 2001; Bontis et al., 2000; Choi, 2000; Chong and Choi, 2005; Davenport et al., 1998; Hasanali, 2002; Kotorov and Hsu, 2001; Liebowitz, 1999; McCampbell et al., 1999; Moffett et al., 2003; Ryan and Prybutok, 2001; Skyrme and Amidon, 1997.

2.3.1.5 Communication Between all Levels of Management

Communication between all levels of management is the key to success. No employee or department can exist in isolation. Each one is dependent on another for the sake of completing tasks and that can not be done without information or knowledge sharing. Communication is important for the purpose of promoting knowledge sharing culture. Thus communication is also another key enabler for KM implementation as it helps in building a KM supportive culture. Besides this, understanding of KM, benefits of KM, how it can positively affect the processes and other KM related matters should be discussed on continuous basis with employees at all levels of management. KM seminars, informal discussions and dinners should be held in order to win the confidence of

employees for the sake of getting support for KM. Communication was treated as CSF by Wong, 2005 but not as a separate CSF. Infact it was used as a dimension of another CSF.

2.3.1.6 Training and Education of Employees

KM is relatively new concept for many organizations. There are many organizations who have implemented KM but still enough number of those especially SMEs lack in this field. For those who do not know about KM (lacks understanding of KM), they should be educated about it. Training and education should be provided in order to motivate employees so that they can pursue careers in the field of KM. Training and education not only in the field of KM but also handling of IT tools should be provided. Because many people lack the understanding of IT tools which is another hindrance in implementing KM, besides this, education about other aspects of KM should also be provided. Following authors considered 'training and education' as CSF: Choi, 2000; Chong and Choi, 2005; Backer and Cohen, 1999; Garavan et al., 2000; Greengard, 1998; Horak, 2001; Hung et al., 2005; Hwang, 2003; Mentzas, 2001; Moffett et al., 2003; Mondy et al., 2002; Salleh and Goh, 2002.

2.3.1.7 Hiring and Retention of Knowledgeable Employees

Employees are the one who are responsible for the success or failure of an organization. Their hiring plays a crucial role for the future of any business. This is why there is a complete separate unit for hiring and related activities named HRM. Their key function is to recruit and retain appropriate employees. Question arises, what is meant by appropriate people? From KM perspective, those people should be hired who love to share their knowledge; they themselves are knowledgeable and can help an organization in achieving goals. These employees should not only be hired but retained in the organization as well. There are various methods to retain employees including extrinsic and intrinsic rewards. Retention of key or knowledgeable employees is important to avoid knowledge loss from the organization. Because knowledge is used as competitive advantage and once knowledge goes outside the organization, it means competitive

advantage also leaves that organization. Therefore, both, hiring of knowledgeable people and then their retention is important for an organization in order to maintain its competitive advantage. Hiring and retention of employees was considered as a key factor by Brelade and Harman, 2000; Wong and Aspinwall, 2004; Salleh and Goh, 2002.

2.3.1.8 Rewards to Encourage Employees for Knowledge Management Practices

Every individual has some way of satisfaction. Some people are satisfied by helping others, some get satisfaction by socialization and others need something in return (material) to get satisfied. One of the major purposes of HRM department is to retain employees and that is done by using various means especially giving rewards. These rewards vary in nature. As discussed earlier, employees are the one who make up the culture of an organization, they are the reason for the success or failure of an organization therefore they should be treated very carefully. It is human nature that it always seeks well or something extra against what it delivers. Therefore, to promote KM related activities, rewards or perks should be provided to employees. Those rewards include extra bonuses, increment in salary, family trip(s), and title of knowledge champion, employee of the week, month or year. These rewards vary from person to person. i.e., they are subjective.

Crucial advancement in the field of satisfying an employee was the Maslow's hierarchy of needs. In which five levels of returns (needs) were identified that humans can expect for satisfaction. Those levels start from very basic needs (shelter, food and clothes) to self recognition and socialization. Following authors treated 'rewards' or 'motivational factors' as CSF: Davenport et al., 1998; Hauschild et al., 2001; Liebowitz, 1999; Salleh and Goh, 2002.

2.3.1.9 Measuring Effectiveness of Knowledge Management Implementation

Whenever a goal (short term or long term) or objective is set by the management of an organization it is considered to be measurable. Reason for this characteristic is that if it is

not measurable then how management can know that whether it was met or not? Same is the case with KM implementation. KM is always implemented in an organization to meet goals and objectives and to increase the performance of that organization. Now this purpose of KM should be measured after it is implemented to see that whether the purpose for which KM was implemented is being fulfilled or not? If that purpose is not being fulfilled then how top management will allocate resource in future for enhancement in KM related activities whereas just investing resources for the implementation of KM without knowing that it is useful or not, is simply the wastage of resources. Therefore, to see whether KM is helpful for achieving the goals of the business, it is important to measure its benefits against its costs. Ahmed et al., 1999; APQC (b), 1999; Bassi and Van Buren, 1999; Beijerse, 2000; Carneiro, 2001; Choi, 2000; Chong and Choi, 2005; Davenport et al., 1998; Gooijer, 2000; Hasanali, 2002; Holsapple and Joshi, 2000; Martinez, 1998; Moffett et al., 2003; Pearson, 1999 considered measurement as a CSF.

2.3.1.10 Organizational Infrastructure

Infrastructure of an organization is important for the successful implementation and maintenance of KM. Infrastructure means required resources including CKO, Chief Information Officer (CIO) or KM department. Many large organizations like Siemens have separate KM departments and their sole responsibility is to manage the knowledge (new and old) by creating, storing and sharing it. These types of infrastructures normally lacks in SMEs due to less financial resources. Almost every large organization has a post for managing knowledge under the category of CKO, CIO or any other title. CKO or CIO is important for an organization in a way that they are the specialized persons in this field and they know how to measure and manage the knowledge of that organization. It has been already discussed that why management and measurement of knowledge is important. This CSF was considered important by Davenport et al., 1998; Hasanali, 2002; Herschel and Nemati, 2000; Liebowitz, 1999.

2.3.1.11 Core Values of Business

Core values mean Vision and Mission Statements (VMS) of an organization. Reason for the existence of any business resides in VMS. These statements vary from nature of business to type of customers. They are mostly build on the competitive advantage of a business. Many organizations give importance to customer care in their VMS; many emphasize on state of the art technology and so on. Organizations will surely emphasis on the importance of KM if it is included in the VMS because it is for outside people to attract them and to tell them about the company. An organization can not deviate from its basic VMS otherwise it will loose its credibility. For example, a company declares in VMS that health safety is its top most priority but its products are not delivering that promise. That company will surely loose its customers because it is not fulfilling the promise which was made through VMS. This CSF was treated as a sub component of another CSF by Wong, 2005.

2.3.1.12 Strategy for Knowledge Management Implementation

Every plan which is to be executed whether in an individual's life, an organization, country or military need a strategy. Plan(s) will fail without proper strategy and strategy will fail without proper implementation. Therefore, careful attention should be paid while implementing KM. Focus should be directed towards purpose of implementing KM, how it will benefit the organization, how costs will be overweight by benefits and how it will affect the outcome? It is important to note here that strategy for KM should be aligned with the key strategy for organization. If both strategies are in opposite direction then desired outputs can never be achieved. Therefore, purpose of KM strategy should be to achieve overall goals and objectives of the organization. Following authors considered strategy as CSF: APQC (b), 1999; Davenport et al., 1998; Liebowitz, 1999; Skyrme and Amidon, 1997; Zack, 1999.

2.3.1.13 Systematic Knowledge Management Processes and Activities

It is important to align KM related activities and processes with daily processes and activities. If KM does not support daily activities then people and organization can not benefit from the implementation of KM. Main goal of the KM implementation is to achieve overall objectives of the organization. This can be done if KM strategy is aligned with organizational strategy and organizational strategy is aligned with departmental strategy, consequently departmental strategy should be aligned with daily processes and activities. Thus, KM plays an important role at every point of various strategies being used by the organization. ‘Processes and activities’ was considered as CSF by Bhatt, 2000; Davenport et al., 1998; Holsapple and Joshi, 2000; Skyrme and Amidon, 1997.

Table 2-5 provides a summary of the CSFs presented in this research work and by previous authors.

Table 2-5: Critical Success Factors

<i>Critical Success Factors Discussed in this Research</i>	<i>Other Studies</i>
Understanding of KM*	
Top Management Support and Leadership	Abell and Oxbrow, 1999; APQC (b) 1999; Civi, 2000; Choi, 2000; Chong and Choi, 2005; Davenport et al., 1998; Dess and Pickens, 2000; Greco, 1999; Hasanali, 2002; Holsapple and Joshi, 2000; Kalling, 2003; Liebowitz, 1999; Moffett et al., 2003; Pemberton et al., 2002; Ryan and Prybutok, 2001; Salleh and Goh, 2002; Skyrme and Amidon, 1997; Ribiere and Sitar, 2003
Knowledge Friendly Culture	Skyrme and Amidon, 1997; APQC (b), 1999; Choi, 2000; Chong and Choi, 2005; Davenport et al., 1998; Greco, 1999; Greengard, 1998; Gupta et al., 2000; Jager, 1999; Liebowitz, 1999; McDermott and O'Dell, 2001; Moffett et al., 2003; Ribiere, 2001; Ryan and Prybutok, 2001; Wild et al., 2002
Financial Resources**	Davenport and Volpel, 2001; Holsapple and Joshi, 2000; Wong and Aspinwall, 2004
IT Infrastructure	Alavi and Leidner, 2001; APQC (b), 1999; Bhatt, 2001; Bontis et al., 2000; Choi, 2000; Chong and Choi, 2005; Davenport et al., 1998; Hasanali, 2002; Kotorov and Hsu, 2001; Liebowitz, 1999; McCampbell et al., 1999; Moffett et al., 2003; Ryan and Prybutok, 2001; Skyrme and Amidon, 1997
Communication Between all Levels of Management*	
Training and Education of Employees	Choi, 2000; Chong and Choi, 2005; Cohen and Backer, 1999; Garavan et al., 2000; Greengard, 1998; Horak, 2001; Hung et al., 2005; Hwang, 2003; Mentzas, 2001; Moffett et al., 2003; Mondy et al., 2002; Salleh and Goh, 2002
Hiring and Retention of Knowledgeable Employees**	Brelade and Harman, 2000; Wong and Aspinwall, 2004; Salleh and Goh, 2002
Rewards to Employees to Encourage Knowledge Management Practices	Davenport et al., 1998; Hauschild et al., 2001; Liebowitz, 1999; Salleh and Goh, 2002
Measuring Effectiveness of Knowledge Management Implementation	Ahmed et al., 1999; APQC (b), 1999; Bassi and Van Buren, 1999; Beijerse, 2000; Carneiro, 2001; Choi, 2000; Chong and Choi, 2005; Davenport et al., 1998; Gooijer, 2000; Hasanali, 2002; Holsapple and Joshi, 2000; Martinez, 1998; Moffett et al., 2003; Pearson, 1999
Organizational Infrastructure	Davenport et al., 1998; Hasanali, 2002; Herschel and Nemati, 2000; Liebowitz, 1999
Core Values of Business*	
Strategy for Knowledge Management Implementation	APQC (b), 1999; Davenport et al., 1998; Liebowitz, 1999; Skyrme and Amidon, 1997; Zack, 1999
Systematic Knowledge Management Processes and Activities	Bhatt, 2000; Davenport et al., 1998; Holsapple and Joshi, 2000; Skyrme and Amidon, 1997

*=Author's Contribution **=Changes in Previous Studies

2.4 Interdependency of CSFs

It can be seen from above discussion that all CSFs are somehow dependent on each other. Therefore attention should be paid while tackling each CSF. For example, top management support is dependent on understanding of KM, if top management does not have understanding of KM then why they will force to implement it? Similarly, other resources are dependent on financial resources. If organization lacks financial resources then other required resources can not be purchased. If top management is not committed they will not allocate financial resources for the implementation of KM.

Top management also helps in building an appropriate culture. For KM implementation, knowledge sharing culture is needed that can not be achieved until and unless there is communication between all levels of management.

Measurement of KM implementation is important to see whether stated goals and objectives of organization are being met or not? Measurement is done by CKO or CIO which is part of organizational infrastructure.

KM implementation should support daily processes and activities in order to successfully implement overall strategy of the organization. This much emphasis is not possible unless KM is part of VMS.

2.5 Knowledge Management Implementation and Financial Performance

Relationship between KM and financial performance is relatively new concept. Very little work has been done on the implementation of KM and its impact on financial performance. At the same time work which has been done shows that there exists a relationship between financial performance and implementation of KM. Financial performance improved during the time when KM was implemented in the projects (Cortada and Woods 1999, p. 298). One of the main objectives of SMEs while implementing KM is to manage resources and increase profit (Chan and Chao, 2008).

2.6 Knowledge Management Implementation and Non-financial (Daily) Performance

Implementation of KM helps an organization to increase its innovation and performance by efficient utilization of resources (Darroch, 2005). Increasing the customer knowledge helps an organization to increase its overall performance. As was the case with HP, they increased the level of their customer's knowledge by providing them access to the required information so that they can directly communicate with the organization (Cortada and Woods 1999, p. 98).

Implementation of KM helps an organization to store its knowledge in codified form. In this case, organization can never suffer knowledge loss plus every employee will have access to that knowledge which will increase the understanding of employees (Cortada and Woods 1999, p. 299). Increase in the understanding of operation(s), product(s), service(s) or processes among employees will help in smooth running of organization.

By increasing the understanding among employees regarding different things and with the help of decision support systems, employees can make effective, efficient and quick decisions (Cortada and Woods 1999, p. 299).

Implementation of KM helps the employees to collaborate with each other (Cortada and Woods 1999, p. 300). This also helps in the smooth running of all the processes of organization because knowledge is shared across the organization not only by databases but also through socialization. In this way, trust of employees on each other increases which is ultimately fruitful for the success of organization.

2.7 Summary

First half of this chapter explained about the KM implementation and organizational performance. In the second half, CSFs which are important for KM implementation were discussed. Impact of KM implementation on financial and non-financial performance of the organization, interdependency of CSFs and previous work done on CSFs was also presented in this chapter.

Next chapter includes research methodology and will explain about survey instruments, respondents, hypotheses developed, reliability analysis and how data was analyzed.

CHAPTER 3 – RESEARCH METHODOLOGY

3.0 Overview

Previous chapters discussed about KM implementation and SMEs. Focus of current chapter will be on how this research was conducted. Research methodology is an important component in the successful completion of a research. If the type of survey instrument, research questions, measurement scaling and test methods are wrong then the desired output or actual output can never be achieved. Therefore careful attention should be paid while considering research methodology phase of a research.

This chapter will discuss time horizon, survey used, framework, hypotheses developed, pilot testing, data collection, sampling technique, results of reliability analysis and data analysis techniques.

3.1 Time Horizon

This research work was cross-sectional (one-shot) in contrast to longitudinal research because data was collected just once as cross-sectional research is more cost effective and time saving (Sekaran 2003, p. 136).

3.2 Sampling and Pilot Study

Before sending the actual questionnaire to SMEs for data collection, a pilot study was conducted to see the accuracy and reliability of questions. Pilot study was conducted on those SMEs which had already implemented KM. This process enhanced the correctness of survey instrument in a way that it was presented to those who were from the same field (KM). A total of 10 SMEs were included in the pilot study, five each from Malaysia and Pakistan. SMEs for actual data collection were selected by using simple random sampling technique so that each SME gets equal chance of selection because SMEs were selected

from a list. Besides this, CSFs and framework proposed in this research were meant to be applicable on all SMEs. Thus focus was more towards generalization and when it comes to generalization, simple random sampling technique is mostly used (Sekaran 2003, p. 279). SMEs listed on www.smeinfo.com and www.smeda.org were the population. Sample size consisted of 100 SMEs. Fifty SMEs were selected from Perak, Malaysia and 50 from Islamabad, Pakistan. SMEs from Pakistan and Malaysia are growing at a rapid pace. Therefore there is a need that these SMEs should be educated about KM implementation so that they can benefit from it. Hence, SMEs from Pakistan and Malaysia were selected. Islamabad and Perak were chosen to represent Pakistan and Malaysia on convenience basis (data collection from Islamabad and Perak was easy for researcher).

Around 500,000 SMEs exist in Malaysia. There are 953 SMEs from all sectors in Perak registered on www.smeinfo.com. Out of these 953 SMEs, 420 are involved in manufacturing including agro based and 64 are related to manufacturing related services. Six are involved in mining and quarrying, 253 in services including ICT and 93 in construction industry. Primary focus of 34 SMEs is agriculture and 83 are in other services.

As far as Pakistan is concerned, there are approximately two million SMEs. Out of these, 400,000 are involved in manufacturing, 600,000 in services and one million in trading (source: <http://www.gallup.com.pk>, retrieved on 23rd July, 2009). Nine hundred and seventy five SMEs exist in Islamabad. Out of these, 560 are involved in service sector, 260 in manufacturing business and 155 in trade.

Total 100 companies (service and manufacturing) were approached out of which 65 responded (response rate of 65 %). Data from 5 companies (5%) was not suitable as it was incomplete and was discarded. Data from 60 companies (60%) was accurate and was included for results.

Companies approached were from service and manufacturing sectors. Following was the composition of 60 companies which were included in this research.

- 30 Malaysia based SMEs (15 from service and manufacturing sector each)
- 30 Pakistan based SMEs (15 from service and manufacturing sector each)

Both types of SME (who have implemented KM and who have not implemented KM) were included in the research so that the results can be generalized. Otherwise, if only those SMEs who have implemented KM were included in the research then the results would have been applied on only KM implemented SMEs (non KM implemented SME's point of view would have not been clear). Therefore, non KM implemented SMEs were asked to respond to questionnaire so that research should contain the feedback from them as well. This helped in generalizing the CSFs from KM implemented and non KM implemented SME's perspective.

3.3 Reasons for Selecting Survey Instrument and the Survey Instrument Itself

In this research, it was predefined that what CSFs were to be measured and how to measure? Therefore when it is known in advance that what to measure and how to measure, questionnaire based data collection method is used (Sekaran 2003, p. 236). Personally administered questionnaire method was used as research instrument in this research. Mainly due to the fact that questions asked for the research needs thinking process and prompt answers could give wrong results. Besides this, SMEs selected for research purpose were from a local (small) area and to get data from local or geographically small area, personally administered questionnaire method is more suitable (Sekaran 2003, p. 236). Plus, SMEs lack KM information; hence, there was a need that respondents should be clarified on those things about which they are unclear. Therefore, effort was made that respondents should have complete understanding and enough response time before and during answering questions which is possible only through questionnaire (personally administered) as compare to telephonic calls, interviews or group discussions.

Therefore researcher personally visited companies and ask the respondents to fill the questionnaire. It was helpful in a way that data was gathered quickly as compare to mailing questionnaire and then waiting for the feedback. Additionally whenever respondents were not clear about something, researcher was personally there and assisted them in clarifying that point (Sekaran 2003, p. 251). This method gave an opportunity to get accurate results.

3.4 Respondents

Top management of the SMEs was asked to provide the feedback. Reason for choosing the top management was that they are in an excellent position to describe what to implement and what not? Which plan(s) or item(s) need financial and other resources and which not? Whether they will implement KM in future or not? These all questions were part of the research work therefore only top management was in a good position to provide the accurate feedback because they provide active entrepreneurial and leadership support to successful KM implementation (Wong and Aspinwall, 2004).

3.5 Type of Questions

Fourteen CSFs were analyzed in total. These factors were analyzed by two methods. First, respondents were asked to simply rank the CSFs from 1-13 based on their experience, where 1 corresponds to the most important and 13 to the least (understanding of KM was not analyzed as a CSF by using this method). Secondly, the importance of every CSF was judged by asking four audit questions for each CSF (this method includes understanding of KM as a CSF). Hence, there were 56 audit questions to analyze the importance of 14 CSFs (using 'R' and R-square values through linear regression).

Besides this, respondents were asked to give feedback on the level of IT implementation in their organization. Levels were categorized from Level 1 to Level 4. Level 1 means no implementation of IT whereas Level 4 means using majority of IT related tools and techniques.

Respondents were also asked to provide feedback about the relationship between implementation of KM and financial performance of KM. This was judged by linking audit questions to KM and financial performance. Respondents also gave feedback on the implementation of KM and daily performance of the company (non-financial performance).

Questionnaire also included questions like how many years KM was implemented in the organization? Whether management is thinking to increase investment in future in KM or not and if yes then how long they will take it to implement KM? They were also asked to mention about the type of application they were using if they have implemented KM and what are the benefits they are getting after implementing KM? Respondents were asked to give reasons as well for not implementing KM so far, if they have not done so.

3.6 Description of Questions

Following were the type of questions which were asked from respondents:

1. Understanding of KM

Importance of IT literacy, importance of KM for SMEs, spending on KM tools, importance of faster access to information

2. Top Management Support

Initiation (Wong and Aspinwall, 2004), suitable environment (Wong and Aspinwall, 2004), encouragement for creation, sharing and use of knowledge, commitment to implement KM by top management (Wong and Aspinwall, 2004)

3. Knowledge Friendly Culture

Toleration of mistakes (Wong and Aspinwall, 2004), trust while sharing knowledge (Wong and Aspinwall, 2004), cooperation among employees (Wong and Aspinwall, 2004), encouragement to employees for exploring new possibilities (Wong and Aspinwall, 2004)

4. Financial Resources

Availability of financial resources (Wong and Aspinwall, 2004), allocation of financial resources (Wong and Aspinwall, 2004), enough financial resources for KM tools (Wong and Aspinwall, 2004), enough manpower to implement and maintain KM (Wong and Aspinwall, 2004)

5. IT Infrastructure

Appropriate KM tools (Wong and Aspinwall, 2004), intranet or internet (Wong and Aspinwall, 2004), user friendly systems (Wong and Aspinwall, 2004), KM systems versus user needs (Wong and Aspinwall, 2004)

6. Communication Between all Levels of Management

Keep talking about KM, knowledge fairs, informal presentations and lunches, writing, telling stories or providing links on internet, or intranet about KM activities

7. Training and Education of Employees

Training and education about KM (Wong and Aspinwall, 2004), training about KM tools (Wong and Aspinwall, 2004), training and educating on choosing KM as career, training for creative thinking, problem solving, communication, soft networking, team building (Wong and Aspinwall, 2004)

8. Hiring and Retention of Knowledgeable Employees

Hiring people who have knowledge about KM and its benefits (Wong and Aspinwall, 2004), hiring people who like knowledge sharing (Wong and Aspinwall, 2004), retain knowledgeable employees (Wong and Aspinwall, 2004), growth opportunities for employees (Wong and Aspinwall, 2004)

9. Rewards to Encourage KM Practices

Incentives to promote KM (Wong and Aspinwall, 2004), encouraging employees to look for new knowledge (Wong and Aspinwall, 2004), give rewards to those who share knowledge (Wong and Aspinwall, 2004), motivational methods and job performance should be linked (Wong and Aspinwall, 2004)

10. Measuring Effectiveness of KM

Measuring the benefits (Wong and Aspinwall, 2004), monitoring the progress (Wong and Aspinwall, 2004), impact of KM on financial performance (Wong and Aspinwall, 2004), KM measurement techniques (Wong and Aspinwall, 2004)

11. Organizational Infrastructure

Knowledge officers in the company (Wong and Aspinwall, 2004), groups or teams of knowledgeable people (Wong and Aspinwall, 2004), roles and responsibilities for performing KM tasks (Wong and Aspinwall, 2004)

12. Strategy for KM Implementation

A common vision (Wong and Aspinwall, 2004), KM strategy with clear objectives and goals (Wong and Aspinwall, 2004), KM strategy and business strategy should be aligned (Wong and Aspinwall, 2004), dependence of core business operation on KM (Wong and Aspinwall, 2004)

13. Core Values of Business

KM in organizational values, organizational values and employee behavior, organizational culture and organizational values, practice of organizational values by top management

14. Systematic KM Processes and Activities

New ideas and knowledge (Wong and Aspinwall, 2004), methods for categorizing, storing and finding knowledge (Wong and Aspinwall, 2004), communication among employees (Wong and Aspinwall, 2004), quality of the shared knowledge (Wong and Aspinwall, 2004)

15. Implementation of KM

Getting right information when needed, knowledge loss due to employee turnover, increase in knowledge sharing normally through internet or intranet, increase of financial resources on IT tools

16. Financial Performance of Company

Increase in 'income per employee', decrease in 'cost per employee', reduction of procurement cost, reduction in operating cost

17. Non-financial (Daily) Performance of Company

Reduction in errors in administration processes, finding best practices in daily operations, saving of time during the processes, increase in efficiency in daily processes and activities

SMEs were asked to provide feedback on the implementation of KM indicated by the following question:

a. Current status of KM implementation:

- YES
- NO
- Do not know

b. If organization has implemented KM then how long it has been implemented in that organization was checked by the following question:

How Long (years)

- 1-3
- 3-5
- >5

c. Does an organization wants to invest more in KM related activities or not was judged by this question:

Plans to enhance investment in KM related tools

- YES
- NO
- Do not know

d. If an organization wants to invest more in KM related activities then how long they will take to increase their investment?

How Long (years)

- 1-3
- 3-5
- >5

d. Following are the different type of benefits of KM Implementation. Respondents were asked to provide feedback on what type of benefits they expect or are getting from KM implementation? This is not a complete list but only few of them are mentioned here.

- Decision making, better response to customers, innovation, improvement in products or services, better management of processes and activities, financial results, time saving, office automation and learning opportunities.

e. Those organizations who have not implemented KM were asked to provide reason(s) for not implementing KM. Following list of reasons was provided to choose from.

- Do not know about the benefits of knowledge management
- Do not know what knowledge management is
- Lack of knowledge oriented people
- Lack of time and human resource
- Less financial and non financial resource
- Less commitment from top management
- Other

Respondents were asked to provide the level of IT tools they were using in their organization. Levels were categorized from 1 – 4. One shows that there is no usage of IT tools meaning there are rare chances of KM implementation and 4 means they are using highly sophisticated tools like ERPs, inventory management systems, decision support systems etc. concluding that these organizations are into KM.

Respondents were also asked to provide feedback on the type of application they were using for managing knowledge. Following was the list of general applications provided to them and they responded by choosing appropriate type of application that was being used by the organization.

- Capture knowledge, share knowledge, publish and access information, building and maintaining employee's expertise and skills, developing strategies, measuring the value of intellectual capital.

3.7 Reliability Analysis and Scaling

Cronbach alpha coefficient was used to see the reliability of the feedback provided and .70 alpha level was used as acceptable level described by (Nunnally, 1978). All the audit items in the questionnaire were scaled from 1-6 (Agree / Disagree and Important / Not important). Six scaling was used to avoid the problem of central value (neither agree nor disagree) because such values are not helpful in giving an accurate picture (Gotzamani and Tsiotras, 2001).

Following scaling was used to measure factors:

1 = completely disagree, 2 = slightly disagree, 3 = moderately disagree, 4 = slightly agree, 5 = moderately agree, 6 = completely agree

1 = not important at all, 2 = slightly important, 3 = moderately important, 4 = important, 5 = very important, 6 = extremely important

3.8 Reliability Analysis (Malaysia and Pakistan)

Reliability of the data was analyzed by using Cronbach and Split-Half tests. Tests were conducted separately for Malaysia and Pakistan data. 'N of cases' represents number of SMEs contacted for data collection. Thirty SMEs were approached from Pakistan and Malaysia each (equal numbers of SMEs were chosen to maintain compatibility for comparison). Therefore, 'N of cases', is 30 from both countries. 'N of items' means number of sub-items (audit questions) to measure 14 CSFs, financial performance, non-financial (daily) performance and implementation of KM. All these aspects were measured with the help of 4 sub-items each, therefore total items were 68 (17*4) which is represented by 'N of items'.

3.8.1 Reliability Test and Analysis for Malaysian Data

Data collected from Malaysia based SMEs was analyzed for reliability through Cronbach and Split-Half.

3.8.1.1 Cronbach Alpha Coefficient

N of Cases = 30.0

N of Items = 68

Alpha = 0.9776

Cronbach alpha was used on data collected from 30 SMEs which were approached from Malaysia and is represented by N. Total 68 factors were analyzed for reliability which is shown by Cronbach alpha reliability coefficient. Value of alpha coefficient is 0.9776 which is greater than .70 thus considered excellent (George and Mallery, 2003). This means that 97.76% data collected was reliable and there were less than 3% chances of errors.

3.8.1.2 Split-Half Test

N of Cases = 30.0

N of Items = 68

34 Items in part 1

34 Items in part 2

Alpha for part 1 = 0.9409

Alpha for part 2 = 0.9684

Besides Cronbach, Split-Half test was also used. Split-Half test equally divides all factors into two groups and then separately checks the reliability for each group. Total 68 items were analyzed and by using Split-Half they were divided into two groups of 34 items each. Alpha value for 1st 34 items was 0.9409. This means that 94.09 % of the data collected for 1st 34 items was accurate and there were less than 6% chances of error. Similarly, alpha value for second half was 0.9684 which means that 96.84 % of the data collected was correct and there were less than 5% chances of error.

From both Cronbach and Split-Half tests, it is clear that data collected from Malaysian SMEs was highly reliable and suitable for further analysis.

3.8.2 Reliability Test and Analysis for Pakistan Data

Just like Malaysian SMEs, data collected from Pakistan based SMEs was also tested for reliability by using Cronbach and Split-Half tests.

3.8.2.1 Cronbach Alpha Coefficient

N of Cases = 30.0 N of Items = 68 Alpha = 0.9778

Total 30 SMEs were approached for data collection from Pakistan which is represented by 'N' in this case. Numbers of items were same as was the case in Malaysian SMEs because same questionnaire was send to all the SMEs. Number of items is presented by 'N of items'. Alpha value for 68 items was 0.9778. This means that data collected was highly reliable and there were less than 3% chances of error as alpha coefficient value is 97.78%.

3.8.2.2 Split-Half Test

N of Cases = 30.0 N of Items = 68

34 Items in part 1 34 Items in part 2

Alpha for part 1 = 0.9450 Alpha for part 2 = 0.9662

Split-Half test was used for testing the reliability of data collected by dividing the data into two groups of equal number of items. Items were divided into two groups called 'part 1' and 'part2'. Alpha value for part 1 was .9450 which shows that data collected was 94.50% accurate and there were less than 5% chances of error. Similarly, alpha value for

part 2 was .9662 which shows that 96.62% data was accurate and less than 4% chances of error exists.

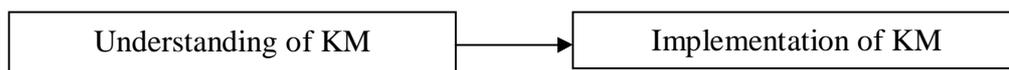
From both Cronbach and Split-Half tests, it can be seen that data collected from Pakistan based SMEs was highly reliable and suitable for further analysis.

3.9 Hypotheses Development

CSFs which were discussed in chapter 1 and 2 were used to formulate hypotheses. As this research attempts to show the importance of CSFs for the implementation of KM, hence each CSF should have an impact while implementing KM. This relationship was tested by formulating hypotheses in a way that each CSF has an impact on implementation of KM and then later these hypotheses were tested by using linear regression.

Following Hypotheses were tested in this research:

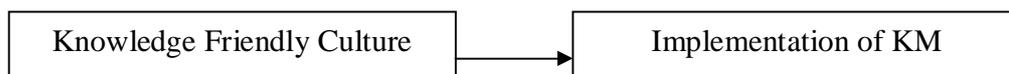
H₁: 'Understanding of KM' has a statistically significant relationship with 'Implementation of KM'.



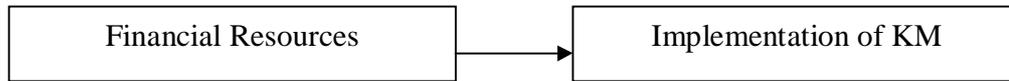
H₂: 'Top Management Support' has a statistically significant relationship with 'Implementation of KM'.



H₃: 'Knowledge Friendly Culture' has a statistically significant relationship with 'Implementation of KM'.



H₄: 'Financial Resources' has a statistically significant relationship with 'Implementation of KM'.



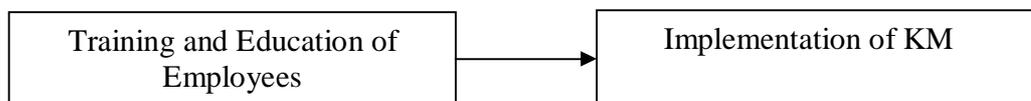
H₅: 'IT Infrastructure' has a statistically significant relationship with 'Implementation of KM'.



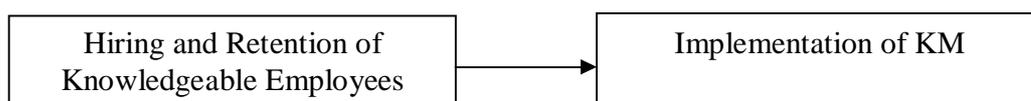
H₆: 'Communication Between all Levels of Management' and 'Implementation of KM' has a statistically significant relationship.



H₇: 'Training and Education of Employees' has a statistically significant relationship with 'Implementation of KM'.



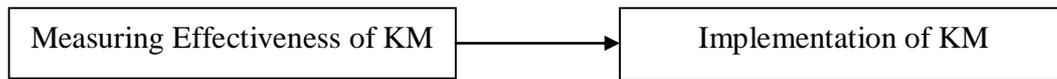
H₈: 'Hiring and Retention of Knowledgeable Employees' has a statistically significant relationship with 'Implementation of KM'.



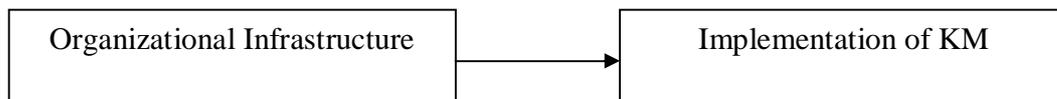
H₉: 'Rewards to Encourage KM Practices' has a statistically significant relationship with 'Implementation of KM'.



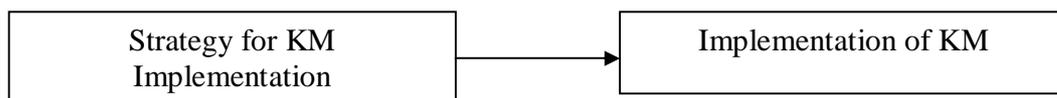
H₁₀: 'Measuring Effectiveness of KM' has a statistically significant relationship with 'Implementation of KM'.



H₁₁: 'Organizational Infrastructure' has a statistically significant relationship with 'Implementation of KM'.



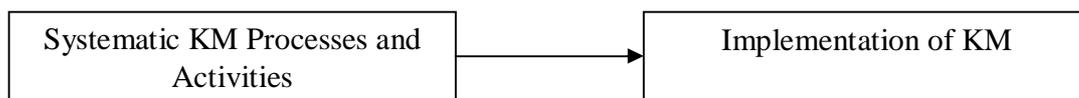
H₁₂: 'Strategy for KM Implementation' has a statistically significant relationship with 'Implementation of KM'.



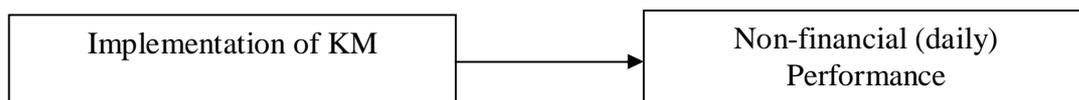
H₁₃: 'Core Values of Business' has a statistically significant relationship with 'Implementation of KM'.



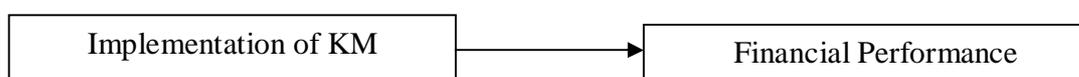
H₁₄: 'Systematic KM Processes and Activities' has a statistically significant relationship with 'Implementation of KM'.



H₁₅: 'Implementation of KM' has a statistically significant relationship with 'Non-financial (daily) Performance of Company'.



H₁₆: 'Implementation of KM' has a statistically significant relationship with 'financial performance of Company'.



3.10 Proposed Framework

Following framework was proposed in this research:

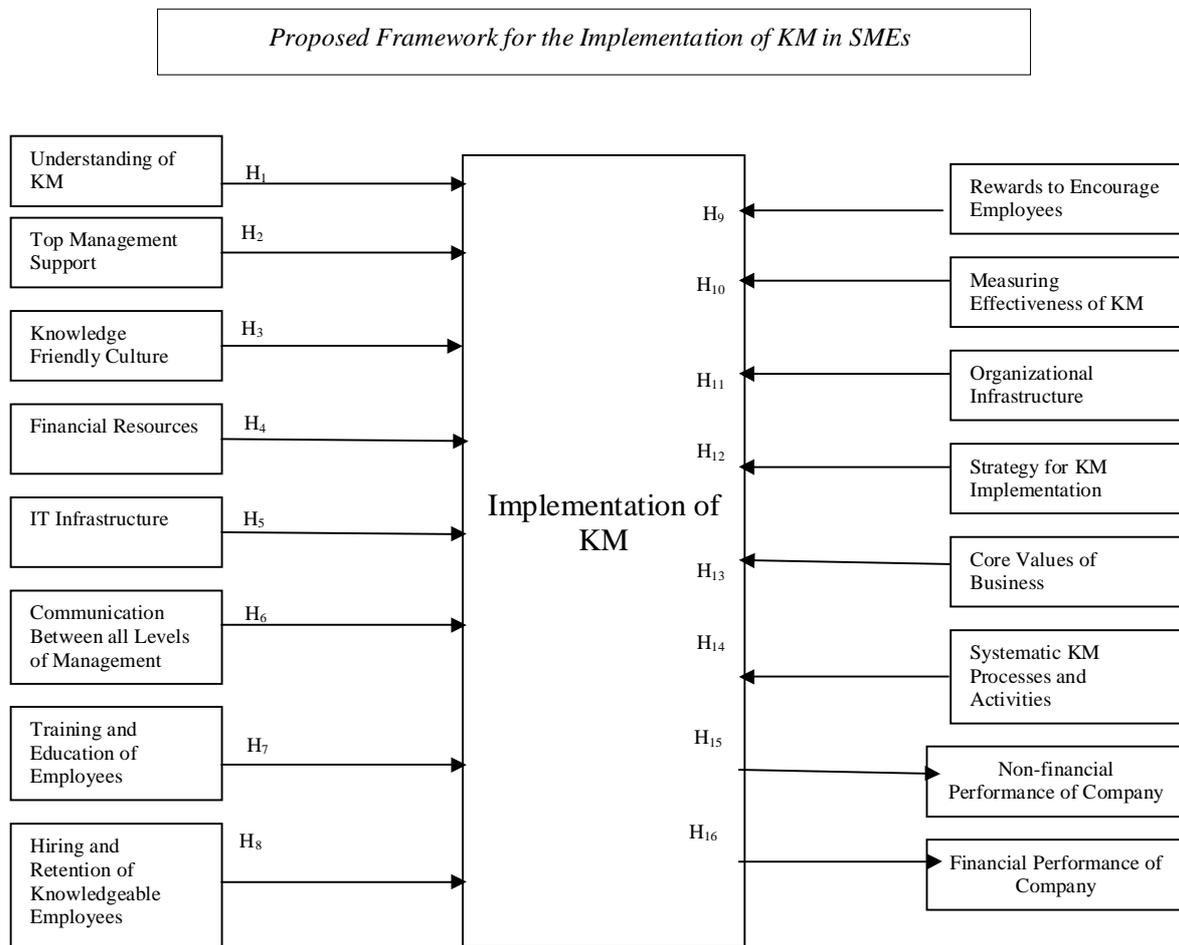


Figure 3-1: Proposed Framework

Above mentioned framework was proposed for the implementation of KM in SMEs. Framework is based on the CSFs discussed in chapter 1 and 2. Each CSF impacts the implementation of KM and implementation of KM has impact on the financial and non-financial (daily) performance of the company.

3.11 Data Analysis

Reliability of the data was checked by using Cronbach alpha coefficient value and Split-Half test. Fourteen CSFs identified in the questionnaire were tested with the help of hypotheses testing using linear regression. Based on the values of 'R' and R-square, identified CSFs were prioritized to see which CSF is more important as compare to others. Prioritization of CSFs was also done by using mean value. Benefits of KM implementation, reasons for KM implementation and general type of KM applications were also analyzed by obtaining the feedback in the form of frequencies (number of SMEs selected that option).

3.12 Diagrammatic View of Research Methodology Phase

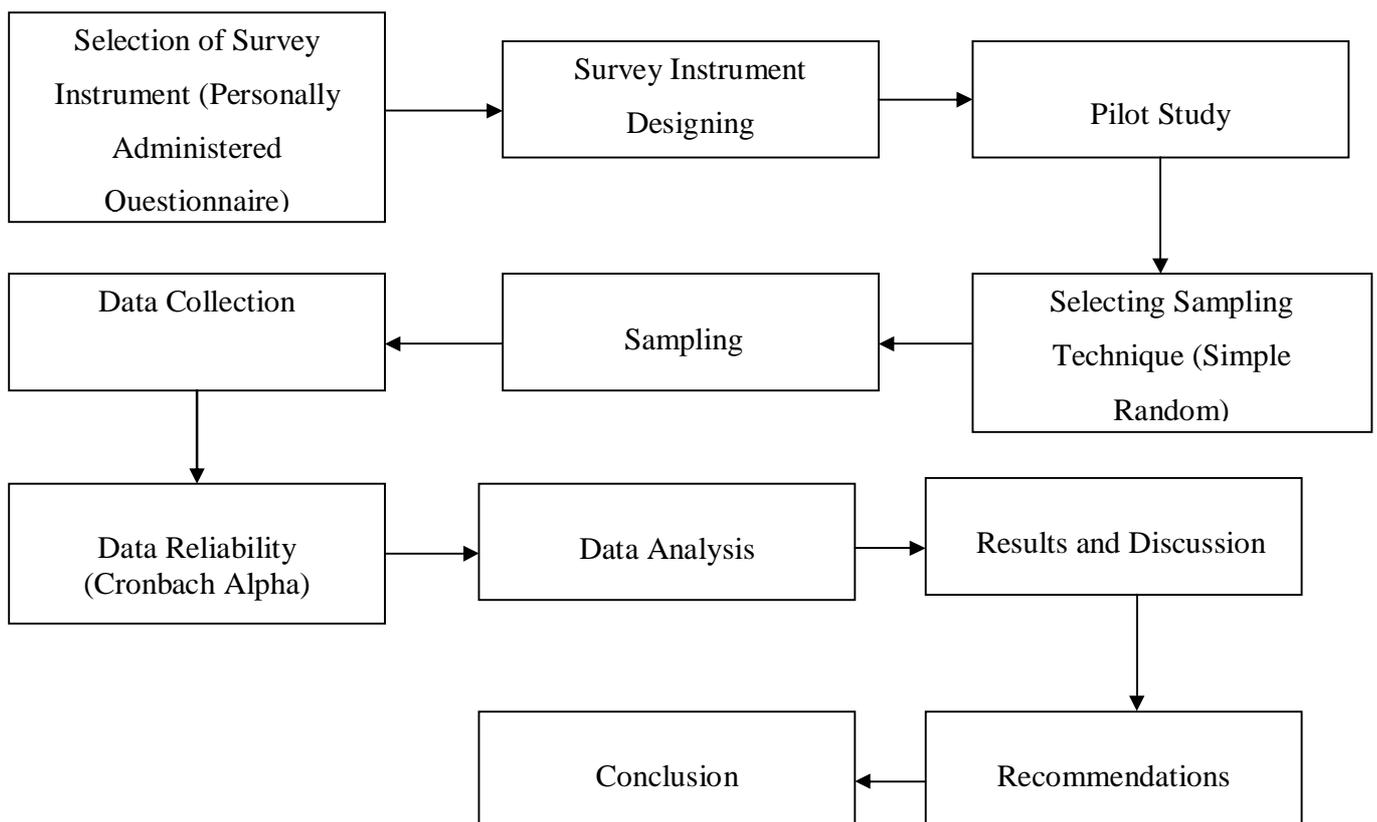


Figure 3-2: Diagrammatic View of Research Methodology Phase

3.13 Summary

Chapter discussed about survey instrument which was used in this research work, type of questions asked, hypotheses which were used to identify CSFs, proposed framework, sampling technique, respondents and description of questions. Chapter also discussed about the results of reliability analysis and how data was analyzed.

Next chapter will discuss the results obtained from data collection. It includes results from linear regression, level of IT implementation in Malaysia and Pakistan, benefits of KM implementation and reasons for not implementing KM. Multiple regression was also used to test the overall fitness of proposed framework.

CHAPTER 4 – RESULTS and ANALYSIS

4.0 Overview

This chapter is about the results from data collected. Chapter discusses results of data collected from Pakistan and Malaysia separately. Hypotheses results, prioritization of CSFs, benefits of KM implementation, reasons for not implementing KM, level of IT implementation and results of multiple regression to see the overall fitness of model are discussed.

PART I – HYPOTHESES TESTING

4.1 Analysis of Hypotheses Developed for Malaysian Data

H_1 : 'Understanding of KM' has a statistically significant relationship with 'Implementation of KM'.

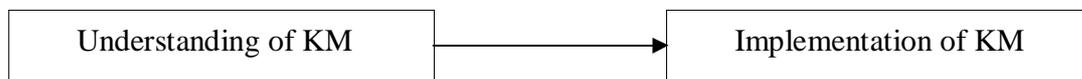


Table 4-1: Hypothesis H_1 Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .950 R ² = .902	.000	Importance of IT literacy	.349	.001
		Importance of KM for SMEs	.121	.159
		Spending on KM tools	.316	.003
		Faster access to information	.346	.001

*P<.05

Hypothesis H_1 states that there is statistically significant relationship between 'understanding of KM' and 'implementation of KM'. 'R' value is .950 which is close to 1 thus correlation is very strong, whereas value of R-square is .902 which shows that 90.2% variance in 'implementation of KM' can be predicted by 'understanding of KM'.

This means that 'understanding of KM' and 'implementation of KM' are highly correlated and is also supported by the p-value in the above table which is .000. i.e., P is less than .05 showing a statistically significant relationship ($R=.950$, $p<.05$) of this CSF with 'implementation of KM'.

Table 4-1 also shows the significance of each item used to measure the relationship. '*Importance of IT literacy*' has a beta value of .349 showing that 34.9% variance was due to this item and its p-value is also less than .05. This means that this item has significance while analyzing the relationship between the two factors (understanding of KM and implementation of KM).

'Importance of KM for SMEs' has the beta value of .121 meaning 12.1% variance was due to this item and its p-value is greater than .05. Therefore it has not much importance and can be discarded.

'Spending on KM tools' has a beta value of .316 which means that 31.6% variance can be predicted by this item and its significance is also high as p-value is less than .05. Therefore this item has significance while measuring the relationship between understanding and implementation of KM.

'Faster access to information' has a beta value of .346 which means that 34.6% of the variance in the relationship can be predicted by this item. P-value is .001 which is less than .05 and hence this is another important item while proving H_1 .

H_2 : *'Top Management Support' has a statistically significant relationship with 'Implementation of KM'.*



Table 4-2: Hypothesis H₂ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .914 R ² = .836	.000	KM initiation	.341	.001
		Providing suitable environment	.353	.001
		Encouraging for creating and sharing knowledge	.175	.029
		Commitment to implement KM	.372	.000

*P<.05

Hypothesis H₂ states that 'top management support' is important for the 'implementation of KM' and it has statistically significant relationship. 'R' value is 0.914 which is close to 1 thus showing that correlation is very strong. Value of R-square from table 4-2 shows that .836 (83.6%) variance in 'implementation of KM' can be predicted by 'top management support'. P-value is .000 which is less than .05 also shows that relationship is significant. Thus statistically significant relationship exists (R=.914, p<.05) between 'top management support' and 'implementation of KM'.

'*KM initiation*' was used as an item to predict the relationship between above two stated variables. Value of beta for this item is .341 which means that 34.1% variance in the dependent variable can be predicted by this item. P-value is .001 which is also less than .05 hence proving its significance.

'*Providing suitable environment*' was used as 2nd item to measure the relationship between dependent and independent variables. Beta value for this item is .353 which shows that 35.3% variance in the dependent variable can be predicted by this item. P-value is .001 which is less than .05. Therefore making it an important item for measuring the relationship between 'top management support' and 'implementation of KM'.

'*Encouraging for creating and sharing knowledge*' was used as 3rd item to measure the relationship. Beta value for this item is .175 which shows that this item can predict the variance in the dependent variable by 17.5% and its p-value is .029 which is less than .05. Hence proves that this item is important while predicting the relationship.

'Commitment to implement KM' was the 4th item used to predict the relationship between independent and dependent variables. Beta value for this item is .372 which means that 37.2% variance in the dependent variable can be predicted by this item and is significant as p-value is also less than .05. P-value for this item is .000 making it an important item for predicting the relationship.

H₃: 'Knowledge Friendly Culture' has a statistically significant relationship with 'Implementation of KM'.



Table 4-3: Hypothesis H₃ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R =.897 R ² =.805	.000	Toleration for mistakes	.302	.005
		Trust for sharing knowledge	.128	.129
		Cooperation among employees	.184	.038
		Encourage to explore new possibilities	.544	.000

*P<.05

Hypothesis H₃ states that 'knowledge friendly culture' and 'implementation of KM' has statistically significant relationship. Value of R-square in table 4-3 suggests that knowledge friendly culture can positively predict 80.5% variance in the implementation of KM. 'R' value is .897 which is close to 1 thus showing that correlation is very strong. P-value is also less than .05 showing the significance of 'knowledge friendly culture' for 'implementation of KM'. Thus based on these figures it can be concluded that statistically significant relationship exists (R=.897, p<.05) between 'knowledge friendly culture' and 'implementation of KM'.

'Toleration for mistakes' was used as 1st item to predict the relationship between knowledge friendly culture and implementation of KM. Beta value for this item is .302 which shows that 30.2% variance in the implementation of KM can be predicted by this

item. P-value (.005) is also less than .05, making it significant for predicting the relationship.

'Trust for sharing knowledge' was used as 2nd item to predict the relationship. Beta value for this item is .128 which means that 12.8% variance in the dependent variable can be predicted due to this item. As this prediction level is not very high so it can be discarded and is verified by the p-value of this item which is .129 greater than .05.

'Cooperation among employees' was the 3rd item to measure the level of relationship between knowledge friendly culture and implementation of KM. Beta value for this item is .184 which is not very high. Only 18.4% variance can be predicted by this item. P-value (.038) is less than .05 level therefore this item does play a role but not too much significant.

'Encourage to explore new possibilities' was the 4th item to predict the relationship between independent and dependent variables. Beta value for this item is .544 which shows that 54.4% of the variance can be predicted by this item thus making it a very critical item while predicting the above mentioned relationship. P-value is .000 which is less than .05 and hence showing its significance.

H₄: 'Financial Resources' has a statistically significant relationship with 'Implementation of KM'.



Table 4-4: Hypothesis H₄ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R =.882 R ² =.778	.000	Availability of financial resources	.341	.009
		Allocation of financial resources	.064	.323
		Investment for IT tools	.424	.007
		Financial resources for manpower	.170	.136

*P<.05

Hypothesis H₄ states that 'financial resources' has statistically significant relationship with 'implementation of KM'. Value of R-square is .778 which shows that 77.8% variance in the dependent variable (implementation of KM) can be predicted by financial resources which is independent variable in this case. 'R' value is .882 which is close to 1 thus showing that correlation is very strong. P-value for this correlation is .000 which is less than .05 and thus suggesting that relationship is statistically significant (R=.882, p<.05).

1st item used to predict the relationship was '*availability of financial resources*'. Beta value for this item is .341 which shows that 34.1% variance can be predicted by this item and p-value is .009 which is less than .05. Therefore this item can be considered as a significant item which can predict the relationship to some extent.

2nd item used to predict the relationship was '*allocation of financial resources*'. Beta value for this item is .064 which shows that only 6.4% variance can be predicted by this item. P-value is .323 which is greater than .05 and thus suggesting that this item is not significant and can be discarded.

'*Investment for IT tools*' was the 3rd item used to measure the relationship between dependent and independent variables. Beta value for this item is .424 which suggests that 42.4% variance in the dependent variable can be predicted by this item. P-value which is .007 shows that it is a significant item as p-value is less than .05.

'Financial resources for manpower' was the 4th item used to predict the variance in the dependent variable. Beta value for this item is .170 which means that only 17.0% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .136 which is greater than .05 and thus making it an insignificant item which can be discarded.

H₅: 'IT Infrastructure' has a statistically significant relationship with 'Implementation of KM'.



Table 4-5: Hypothesis H₅ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .847 R ² = .717	.000	Appropriate tools	.219	.080
		Internet or intranet	.372	.006
		User friendly systems	.386	.011
		KM systems Vs user needs	.062	.357

*P<.05

Hypothesis H₅ states that 'IT infrastructure' has statistically significant relationship with 'implementation of KM'. Value of R-square is .717 which states that 71.7% variance in the implementation of KM can be predicted by IT infrastructure in a positive way. P-value is .000 which is less than .05. Thus it can be concluded that there is statistically significant relationship (R=.847, p<.05) between these two variables as 'R' value is .847 which is close to 1 thus showing that correlation is very strong.

'Appropriate tools' was the 1st item used to predict the relationship between IT infrastructure and implementation of KM. Beta value for this item is .219 which suggests that 21.9% variance in the dependent variable can be predicted by this item. This prediction level is not very high and the p-value which is .080 is also greater than .05 thus suggesting that this item is not much important while predicting the relationship.

'Internet or intranet' was the 2nd item used to predict the relationship between dependent and independent variables. Beta value for this item is .372 which means that 37.2% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value for this item is also less than .05 which shows that this item has significance while predicting the relationship between dependent and independent variable. P-value for this item is .006.

'User friendly systems' was the 3rd item used to predict the relationship in this case. Value of beta for this item is .386 meaning that 38.6% variance can be predicted by this item. P-value is .011 which is less than .05 thus it can be said that it is a significant variable while predicting the relationship between IT infrastructure and implementation of KM.

4th item used to predict the relationship was 'KM systems Vs user needs'. Beta value for this item is .062 which shows that 6.2% variance in the relationship can be predicted by this items which is very small. P-value is also greater than .05 thus making it an insignificant item for predicting the relationship. P-value for this item is .357.

H₆: 'Communication Between all Levels of Management' and 'Implementation of KM' has a statistically significant relationship.

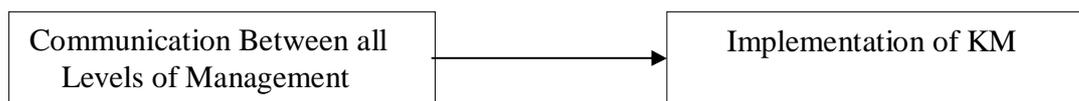


Table 4-6: Hypothesis H₆ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .849 R ² = .720	.000	Keep talking about KM	.372	.020
		Knowledge fairs	.200	.165
		Informal presentations and meetings	.128	.176
		Writing or telling stories	.264	.096

*P<.05

Hypothesis H₆ talks about the statistically significant relationship between 'communication between all levels of management' and 'implementation of KM'. 'R'

value is .849 which is close to 1 thus showing that correlation is very strong. Value of R-square in table 4-6 is .720 which shows that 72.0% variance in the dependent variable (implementation of KM) can be predicted by independent variable. P-value is .000 which also suggests that this relationship is statistically significant ($R=.849, p<.05$).

'*Keep talking about KM*' was the 1st item used to predict the relationship. Beta value for this item is .372 which means that 37.2% variance in the implementation of KM can be predicted by this item. P-value for this item is .020 which is less than .05 and hence making it a significant item to predict the relationship.

Second item used to predict the relationship was '*knowledge fairs*'. Beta value for this item is .200 which means that 20.0% variance in the dependent variable can be predicted by this item. P-value for this item is .165 which is greater than .05 level and thus making it an insignificant item therefore it is discarded.

Third item used to predict the relationship was '*informal presentations and meetings*'. Value of beta for this item is .128 which suggests that only 12.8% variance in the dependent variable (implementation of KM) can be predicted by this item. This is obviously very low level of variance prediction. P-value for this item is .176 which is also greater than .05 and thus this item is insignificant while predicting the relationship between communication and implementation of KM.

Fourth item used to predict the relationship was '*writing or telling stories*'. Beta value for this item is .264 which means that 26.4% variance can be predicted by this item and p-value is .096 which is also higher than .05. Therefore, this item is also not significant for predicting the relationship between communication and implementation of KM.

H₇: 'Training and Education of Employees' has a statistically significant relationship with 'Implementation of KM'.

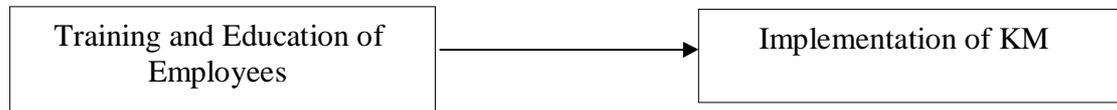


Table 4-7: Hypothesis H₇ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R =.837 R ² =.701	.000	Training and educating about KM	.064	.658
		Training about KM tools	.544	.002
		Training on choosing KM as career	.334	.043
		Training for creative thinking, team building	.001	.995

*P<.05

Hypothesis 7 is about statistically significant relationship between 'training and education of employees' and 'implementation of KM'. Value of R-square is .701 which means that 70.1% variance in the implementation of KM can be measured by training and education of employees. P-value is .000 which is less than .05 thus relationship is statistically significant (R=.837, p<.05). 'R' value is .837 which is close to 1 which also shows that correlation is very strong.

'Training and educating about KM' was the 1st item used to predict the relationship between training and education and implementation of KM. Beta value for this item is .064 which means that this item can predict only 6.4% variance in the dependent variable and its significance level is also very low as p-value which is .658 is greater than .05.

'Training about KM tools' was the 2nd item used to predict the relationship. Beta value for this item is .544 which means that 54.4% variance can be predicted by this item. P-value is .002 which is less than .05 thus making it a significant item for the prediction of implementation of KM.

'Training on choosing KM as career' was the 3rd item used to predict the relationship between training and education of employees and implementation of KM. Beta value for item is .334 which shows that 33.4% variance can be predicted by this item. P-value is .043 which is less than .05 thus making it a significant item for the prediction of this relationship.

'Training for creative thinking, team building' was the 4th item used to predict the relationship. Beta value for this item is .001 which means that it can predict the relationship between 'training and education of employees' and 'implementation of KM' to only .1%, thus making it a very insignificant item. P-value for this item is .995 which is also greater than .05 and thus it can be discarded.

H₈: 'Hiring and Retention of Knowledgeable Employees' has a statistically significant relationship with 'Implementation of KM'.



Table 4-8: Hypothesis H₈ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .832 R ² = .693	.000	Hiring people who have KM aptitude	.484	.003
		Hiring people who like knowledge sharing	.127	.207
		Retaining knowledgeable employees	.237	.059
		Growth opportunities for knowledgeable employees	.131	.224

*P<.05

Hypothesis 8 suggests that 'hiring and retention of knowledgeable employees' has a statistically significant relationship with 'implementation of KM'. Value of R-square for this relationship is .693 which shows that 69.3% variance in the dependent variable can be predicted by independent variable. 'R' value is .832 which is close to 1 thus showing that correlation is very strong. P-value is .000 which is less than .05 and thus making it a statistically significant relationship (R=.832, p<.05).

'Hiring people who have KM aptitude' was the first item used to predict the relationship between hiring and retention of knowledgeable employees and implementation of KM. Beta value for this item is .484 which shows that 48.4% variance in the implementation of KM can be predicted by this item. P-value is .003 which is less than .05 thus making it a significant item for the prediction of this relationship.

'Hiring people who like knowledge sharing' was the second item used to predict the relationship between hiring and retention of knowledgeable employees and implementation of KM. Beta value for this item is .127 which shows that only 12.7% variance in the dependent variable can be predicted by this item which is not very high variance prediction level. P-value for this item is .207 which is greater than .05 and thus this item is insignificant therefore it should be discarded.

'Retaining knowledgeable employees' was the third item used for the prediction of relationship. Value of beta for this item is .237. This means that 23.7% variance in the dependent variable (implementation of KM) can be predicted by this item. Although this prediction level is not very high but still this is relatively high as compare to other two items. P-value for this item is .059 which is greater .05 thus making it insignificant for predicting the relationship between independent and dependent variable.

'Growth opportunities for knowledgeable employees' was the last item used to predict the relationship between independent and dependent variables. Beta value for this item is .131 which shows that variance in the dependent variable can be 13.1% predicted by this item. This prediction level is very small and the p-value of this item is .224 which is greater than .05 thus making it an insignificant item.

H₉: 'Rewards to Encourage KM Practices' has a statistically significant relationship with 'Implementation of KM'.

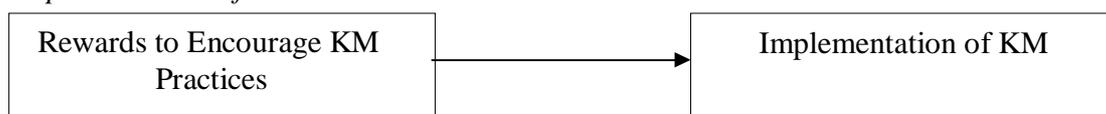


Table 4-9: Hypothesis H₉ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .828 R ² = .685	.000	Incentives to promote KM	.127	.163
		Encouraging employees to look for new knowledge	-.043	.354
		Rewards to those who share knowledge	.369	.002
		Link between knowledge sharing and motivational methods	.566	.000

*P<.05

Hypothesis H₉ states that ‘rewards to encourage KM practices’ have statistically significant relationship with ‘implementation of KM’. Value of R-square is .685 which shows that 68.5% variance in the implementation of KM can be predicted by rewards for employees to encourage KM practices. ‘R’ value is .828 which is close to 1 thus showing that correlation is very strong. P-value is .000 which is less than .05 thus suggests that this relationship is statistically significant (R=.828, p<.05).

‘*Incentives to promote KM*’ was used as an item to predict the relationship between rewards and implementation of KM. Value of beta for this item is .127 which shows that 12.7% variance in the dependent variable can be predicted by this item. P-value is .163 which is greater than .05 thus showing that this item is insignificant.

‘*Encouraging employees to look for new knowledge*’ was also used to predict the relationship between above stated independent and dependent variables. Beta value for this item is -.043 which shows that this item negatively impacts the relationship and can measure the prediction level by only 4.3% which is very low. P-value for this item is .354. This p-value is greater than .05 thus making it as insignificant item to predict the significance of relationship.

Third item used to predict the relationship was ‘*rewards to those who share knowledge*’. This item has the beta value equivalent to .369 which suggests that 36.9% variance can be predicted by this item. P-value is .002 which is smaller than .05 thus making it a significant item.

Fourth item used for the prediction of significance of relationship was '*link between knowledge sharing and motivational methods*'. Beta value for this item is .566 which shows that 56.6% variance in the dependent variable (implementation of KM) can be predicted by this item. This prediction level is very high and is supported by p-value which is .000. The p-value is also less than .05 thus it is concluded that this item is significant for predicting the significance of relationship.

H₁₀: 'Measuring Effectiveness of KM' has a statistically significant relationship with 'Implementation of KM'.

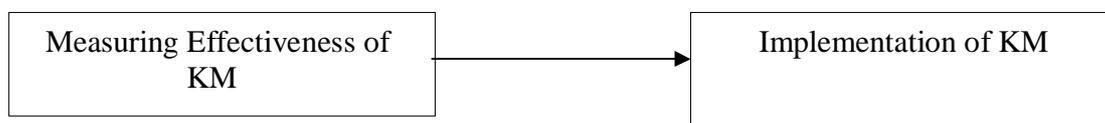


Table 4-10: Hypothesis H₁₀ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R =.820 R ² =.672	.000	Measuring the benefits	.558	.000
		Monitoring the progress	.010	.467
		Impact of KM on performance	-.009	.472
		KM measurement techniques	.554	.000

*P<.05

R-square value for analyzing the relationship between 'measuring effectiveness of KM' and 'implementation of KM' is .672. This shows that 67.2% variance in dependent variable can be predicted by independent variable (measuring effectiveness of KM). 'R' value is .820 which is close to 1 thus showing that correlation is very strong. P-value is .000 which is less than .05 thus showing that relationship is statistically significant (R=.820, p<.05).

'*Measuring the benefits*' was the first item used to predict the relationship between independent (measuring effectiveness of KM) and dependent (implementation of KM) variables. Beta value for this item is .558 which means that 55.8% variance in the dependent variable can be predicted by this item. This prediction level is quite high thus

makes it as one of the significant items. P-value for this item is .000 which is less than .05. Therefore the significance of this item is proved from both beta and p-values.

'*Monitoring the progress*' was another item used for the measuring the prediction level. Value of beta for this item is .010 which shows that only 1% variance in the dependent variable can be predicted by this item. P-value is .467 which is greater than .05. Therefore this item is insignificant while predicting the level of relationship between independent and dependent variables.

Third item used to predict the level of relationship was '*impact of KM on performance*'. The beta value of this item is negative meaning that it negatively affects the relationship between independent and dependent variables. Beta value is -.009 which shows that this item affects the relationship by only .9% and therefore is an insignificant item. P-value of this item also shows that it is not significant as p-value is .472 which is greater than .05 level thus this item was discarded.

'*KM measurement techniques*' was the 4th item used to predict the relationship. Beta value for this item is .554 which means that 55.4% variance can be predicted by this item thus making it a significant item. P-value also shows that the item is highly significant as it is .000 which is less than .05.

H₁₁: 'Organizational Infrastructure' has a statistically significant relationship with 'Implementation of KM'.

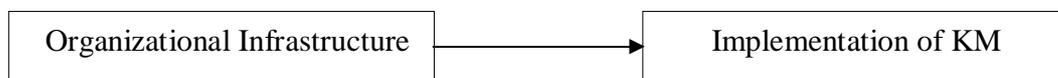


Table 4-11: Hypothesis H₁₁ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R =.780 R ² =.608	.000	Knowledge officers	.280	.077
		Groups or teams of knowledgeable people	-.143	.394
		Roles and responsibilities for KM tasks	.446	.009
		Number of PCs or laptops per employee	.490	.001

*P<.05

Hypothesis 11 states about the statistically significant relationship between ‘organizational infrastructure’ and ‘implementation of KM’. ‘R’ value is .780 which is close to 1 thus showing that correlation is strong. Value of R-square is .608 which means that 60.8% variance in the dependent variable can be predicted by organizational infrastructure. P-value for this relationship is .000 which is less than .05 thus making it a statistically significant relationship (R=.780, p<.05).

‘*Appointment of knowledge officers*’ was one of the items used to predict the level of significance. Beta value for this item is .280 which means that 28.0% variance in the dependent variable can be predicted by this item. P-value is .077 which is greater than .05 thus making it an insignificant item.

‘*Groups or teams of knowledgeable people*’ was the second item used to predict the significance level. Value of beta for this item is -.143 which means that 14.3% variance in the dependent variable can be predicted by this item but in negative direction. This prediction level is not very high and there is no significance for this item as well because p-value is .394 which is greater than .05 thus it is discarded.

‘*Roles and responsibilities for KM tasks*’ was the third item used to predict the significance level. Beta value for this item is .446 which shows that 44.6% variance in the significance of relationship can be predicted by this item. This prediction level is quite high. P-value for this item is .009 which is less than .05 thus making it a significant item.

Another item used to measure the prediction level was ‘*number of PCs or laptops per employee*’. Value of beta for this item is .490 which means that 49.0% variance can be predicted by this item thus making it an important item. P-value is .001 which is less than .05 hence this item is important for predicting the significance of relationship between ‘organizational infrastructure’ and ‘implementation of KM’.

H_{12} : ‘*Strategy for KM Implementation*’ has a statistically significant relationship with ‘*Implementation of KM*’.

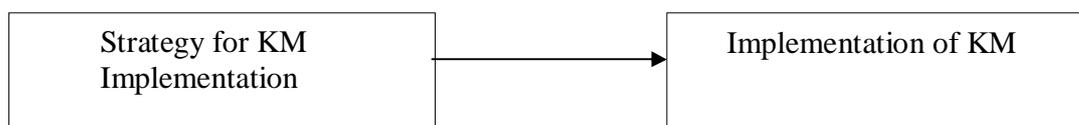


Table 4-12: Hypothesis H_{12} Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .755 R ² = .570	.000	Common vision	.260	.040
		Objectives and goals	.395	.012
		KM strategy Vs business strategy	-.075	.333
		Dependence of core business on KM	.518	.000

*P<.05

Hypothesis H_{12} talks about statistically significant relationship between ‘strategy for KM’ and ‘implementation of KM’. Value of R-square is .570 which shows that 57.0% variance of the dependent variable can be predicted by independent variable. P-value is .000 which is less than .05 and thus suggests that relationship is statistically significant (R=.755, p<.05). ‘R’ value is .755 which is close to 1 thus showing that correlation is strong.

‘*Common vision*’ was used as first item to predict the level of significance. Value of beta for this item is .260 which means that 26.0% variance can be predicted by this item. P-value is .040 which is less than .05 thus showing that ‘common vision’ is an important item for measuring the significance of relationship between strategy and implementation of KM.

'Objectives and goals' was another item used to predict the significance level. Beta value for this item is .395 which shows that 39.5% variance in the dependent variable can be predicted by this item. This prediction level is quite high and is confirmed by p-value of this item. P-value is .012 which is less than .05 therefore this item plays a significant role while predicting the significance level between strategy and KM implementation.

'KM strategy Vs business strategy' was the third item used to predict the level of significance. Beta value for this item is -.075 which shows that this item affects the relationship negatively but only 7.5% therefore is not of much importance. P-value for this item is .333 which is greater than .05 thus making it as an insignificant item.

'Dependence of core business on KM' was the 4th item used to predict the relationship between strategy for KM and implementation of KM. Beta value for this item is .518 which shows that 51.8% variance in the dependent variable can be predicted by this item. This prediction level is quite high and is supported by p-value of the item. P-value is .000 which is less than .05 thus making it a significant item for predicting the relationship between independent and dependent variables.

H₁₃: 'Core Values of Business' has a statistically significant relationship with 'Implementation of KM'.

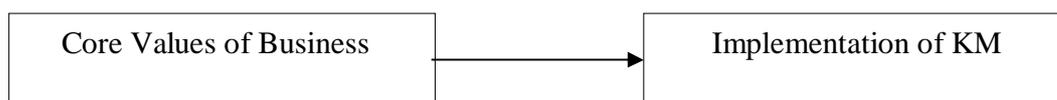


Table 4-13: Hypothesis H₁₃ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R =.771 R ² =.594	.000	KM in organizational values	.490	.004
		Org. values and employee behavior	.226	.222
		Org. culture	-.028	.869
		Practice by top management	.215	.253

*P<.05

Hypothesis 13 states that 'core values of businesses have statistically significant relationship with 'implementation of KM'. 'R' value is .771 which is close to 1 thus showing that correlation is strong. Value of R-square is .594 which shows that 59.4% of the variance in the dependent variable (implementation of KM) can be predicted by independent variable which is core values of the business. P-value is .000 which is less than .05 thus making the relationship statistically significant ($R=.771, p<.05$).

'*KM in organizational values*' was one of the four items used to predict the relationship between core values of a business and implementation of KM. Beta value for this item is .490 which shows that 49.0% variance in the dependent variable can be predicted by this item. P-value is .004 which is less than .05 thus making it a significant item.

'*Organizational values and employee behavior*' was another item used to predict the significance level between independent and dependent variables. Beta value for this item is .226 which means that 22.6% variance in the dependent variable (implementation of KM) can be predicted by this item. This prediction level is not very high and is conformed by p-value which is .222. The p-value is greater than .05 thus making it an insignificant item.

'*Organizational culture*' was used to measure the relationship between 'core values of businesses and 'implementation of KM'. Value of beta for this item is -.028 showing that 2.8% variance can be predicted due to this item and in negative direction. P-value for this item is .869 which is higher than .05. Therefore this item is also insignificant.

'*Practice by top management*' was also used to predict the significance of relationship between independent and dependent variables. Beta value for this item is .215 which shows that 21.5% variance can be predicted due to this item. P-value is .253 which is greater than .05 thus it is another insignificant item.

H_{14} : 'Systematic KM Processes and Activities' has a statistically significant relationship with 'Implementation of KM'.



Table 4-14: Hypothesis H_{14} Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .738 R ² = .545	.000	Ideas and knowledge	.266	.038
		Methods for categorizing knowledge	.123	.194
		Communication among employees	.238	.050
		Quality of shared knowledge	.476	.001

*P<.05

Hypothesis H_{14} states that 'systematic KM processes and activities' have statistically significant relationship with 'implementation of KM'. 'R' value is .738 which is close to 1 thus showing that correlation is strong. R-square value is .545 which shows that 54.5% variance in the dependent variable (implementation of KM) can be predicted by independent variable (systematic KM processes and activities). P-value is .000 which is less than .05. Thus hypothesis 14 is supported at $R=.738$, $p<.05$.

'Ideas and knowledge' was the 1st item used to predict the relationship between systematic KM processes and implementation of KM. Beta value for this item is .266 which shows that 26.6% variance in the dependent variable can be predicted by this item. P-value is .038 which is less than .05 thus making it a significant item.

'Methods for categorizing knowledge' was used to measure the relationship between independent and dependent variables. Beta value for this item is .123 which means that 12.3% variance in the dependent variable can be predicted by this item. P-value is .194 which is greater than .05 thus an insignificant item.

Another item used to predict the significance of relationship between systematic KM processes and activities was ‘*communication among employees*’. Beta value for this item is .238 which means that 23.8% variance can be predicted by this item. P-value for this item is .050 which is equal to .05 thus significance can be decided on the basis of beta value. In contrast to other items, it is clear that this item has some sort of significant therefore it is an important item.

‘*Quality of shared knowledge*’ was the last item used to measure the level of relationship. Beta value for this item is .476 which shows that 47.6% variance in the implementation of KM can be predicted by this item. P-value is .001 which is less than .05 therefore this item is significant.

H₁₅: ‘Implementation of KM’ has a statistically significant relationship with ‘Non-financial (daily) Performance of Company’.

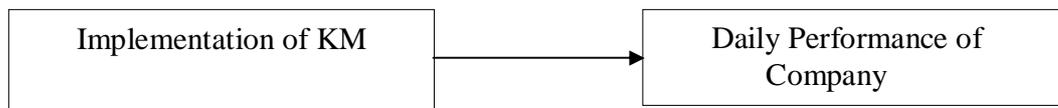


Table 4-15: Hypothesis H₁₅ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R =.779 R ² =.606	.000	Less administrative errors	.148	.204
		Finding best practices	.699	.000
		Time saving	-.031	.429
		Efficiency in daily performance	.004	.488

*P<.05

Hypothesis 15 states that ‘implementation of KM’ has a statistically significant relationship with ‘non-financial (daily) performance of the company’. ‘R’ value is .779 which is close to 1 thus showing that correlation is strong. Value of R-square is .606 which means that 60.6% variance in the dependent variable can be predicted by this independent variable. P-value is .000 which is less than .05 thus it can be concluded that this relationship is statistically significant (R=.779, p<.05).

'*Less administrative errors*' was the first item used to predict the relationship between independent and dependent variables. Beta value for this item is .148 which shows that 14.8% variance in the dependent variable (daily performance of company) can be predicted by this item. P-value is .204 which is greater than .05 thus making it an insignificant item.

Another item used to predict the relationship between implementation of KM and non-financial (daily) performance of company was '*finding best practices*'. Beta value for this item is .699 which means that 69.9% variance in the dependent variable can be predicted by this item. P-value is .000 which is less than .05 thus making it a significant item.

'*Time saving*' was the third item used to predict the relationship. Beta value for this item is -.031. This means that this item negatively impacts the daily performance of company and that too only 3.1% thus has a very small significance. P-value for this item is .429 which is greater than .05 therefore an insignificant item.

'*Efficiency in daily performance*' was also used to predict the relationship. Beta value for this item is .004 which means that .04% of the variance in the dependent variable can be predicted by this item which surely is very low level of prediction. P-value for this item is .488 which is greater than .05 thus another insignificant item.

H₁₆: 'Implementation of KM' has a statistically significant relationship with 'Financial Performance of Company'.

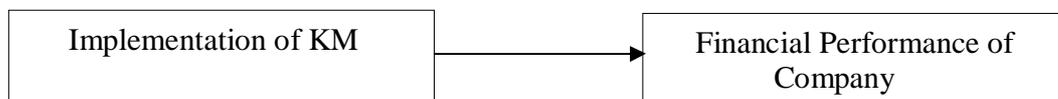


Table 4-16: Hypothesis H₁₆ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R =.887 R ² =.788	.000	Income per employee	.360	.010
		Cost per employee	.323	.012
		Procurement cost	.193	.135
		Operating cost	.254	.020

*P<.05

H₁₆ states about the statistically significance relationship between ‘implementation of KM’ and ‘financial performance of the company’. Value of R-square is .788 which means that 78.8% variance in the dependent variable (financial performance of the company) can be predicted by this independent variable. ‘R’ value is .887 which is close to 1 thus showing that correlation is strong. P-value is .000 which is less than .05 thus making it a statistically significant relationship (R=.887, p<.05).

First item used to predict the level of relationship between implementation of KM and financial performance was ‘*income per employee*’. Beta value for this item is .360 which shows that 36.0% variance in the dependent variable (financial performance of the company) can be predicted by this item. P-value is .010 which is less than .05 thus this item is significant for predicting the relationship between implementation of KM and financial performance of the company.

‘*Cost per employee*’ was also used to measure the relationship between dependent and independent variables. Beta value for this item is .323 which means that 32.3% variance in the financial performance of the company can be predicted by this item. P-value is .012 which is less than .05 thus this item is also significant while predicting the level of relationship.

Another item used to predict the relationship was ‘*procurement cost*’. Value of beta for this item is .193 which shows that 19.3% variance in the dependent variable can be predicted by this item. P-value is .135 which is greater than .05 thus making it an insignificant item.

'*Operating cost*' was another item used to predict the significance of relationship between implementation of KM and financial performance of the company. Beta value for this item is .254 which shows that 25.4% variance in the financial performance of the company can be predicted by this item. P-value is .020 which is less than .05 thus this item is significant.

4.2 Analysis of Hypotheses Developed for Pakistan Data

H_1 : '*Understanding of KM*' has a statistically significant relationship with '*Implementation of KM*'.



Table 4-17: Hypothesis H_1 Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .893 R ² = .798	.000	Importance of IT literacy	.454	.003
		Importance of KM for SMEs	-.039	.765
		Spending on KM tools	.254	.060
		Faster access to information	.344	.017

*P<.05

Hypothesis H_1 is about the statistically significant relationship between 'understanding of KM' as independent variable and 'implementation of KM' as dependent variable. 'R' value is .893 which is close to 1 thus showing that correlation is very strong. Value of R-square is .798 which means that 79.8% variance in the dependent variable (implementation of KM) can be predicted by independent variable (understanding of KM). P-value is .000 which is less than .05 thus statistically significant relationship exists (R=.893, p<.05) between implementation of KM and understanding of KM.

'*Importance of IT literacy*' was the first item used to measure the relationship. Beta value for this item is .454 which shows that 45.4% variance in the dependent variable

(implementation of KM) can be predicted by this single item. P-value (.003) for this item is less than .05 thus making it a significant item.

'*Importance of KM for SMEs*' was the 2nd item used to predict the relationship between understanding of KM and implementation of KM. Beta value for this item is -.039. This shows that this item negatively affects the relationship but only 3.9% which is very small. P-value is .765 which is greater than .05 thus this item is not significant.

Another item used to predict the relationship was '*spending on KM tools*'. Beta value for this item is .254 which means that 25.4% variance in the dependent variable can be predicted by this item. P-value is .060 which is greater than .05 thus this item is insignificant.

Fourth item used to predict the relationship between independent and dependent variables was '*faster access to information*'. Beta value for this item is .344 which shows that 34.4% variance in the dependent variable can be predicted by this item. P-value is .017 which is less than .05 thus this item is significant while measuring the relationship.

H₂: 'Top Management Support' has a statistically significant relationship with 'Implementation of KM'.

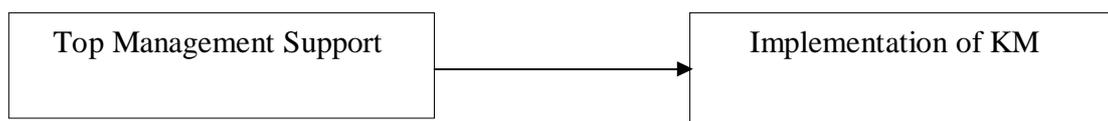


Table 4-18: Hypothesis H₂ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .905 R ² = .819	.000	KM initiation	.217	.019
		Providing suitable environment	.510	.000
		Encouraging for creating and sharing knowledge	.430	.000
		Commitment to implement KM	.183	.063

*P<.05

Hypothesis 2 states that 'top management support' has a statistically significant relationship with 'implementation of KM'. R-square value is .819 which suggests that 81.9% prediction in the dependent variable can be predicted due to independent variable (top management support). 'R' value is .905 which is close to 1 thus showing that correlation is very strong. P-value is .000 which is less than .05 thus relationship is statistically significant ($R=.905, p<.05$).

Item 1 used to predict this relationship was '*KM initiation*'. Beta value for this item is .217 which means that 21.7% variance can be predicted by this item. P-value is .019 which is less than .05 thus making it a significant item.

Item 2 used to measure the prediction level was '*providing suitable environment*'. Beta value for this item is .510 which shows that 51.0% prediction in the relationship can be predicted by this item. This prediction level is quite high and is supported by p-value of this item which is .000 and is less than .05 thus concluding that it is a significant item.

'*Encouraging for creating and sharing knowledge*' was the third item used to predict the relationship. Beta value for this item is .430 which means that 43.0% variance can be predicted by this item. P-value for this item is .000 which is less than .05. Thus both beta and p-value are suggesting that this item is important.

Fourth item used to measure the relationship was '*commitment to implement KM*'. Beta value for this item is .183 which shows that 18.3% prediction can be made due to this item. P-value for this item is .063 which is greater than .05 thus this item is not significant.

H₃: 'Knowledge Friendly Culture' has a statistically significant relationship with 'Implementation of KM'.



Table 4-19: Hypothesis H₃ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R =.837 R ² =.701	.000	Toleration for mistakes	.492	.000
		Trust for sharing knowledge	-.022	.441
		Cooperation among employees	.282	.018
		Encourage to explore new possibilities	.352	.012

*P<.05

This hypothesis states that 'knowledge friendly culture' has a statistically significant relationship with 'implementation of KM'. 'R' value is .837 which is close to 1 thus showing that correlation is very strong. Value of R-square is .701 which shows that 70.1% variance in the dependent variable (implementation of KM) can be predicted by independent variable which is knowledge friendly culture in this case. Thus a strong relationship between these two variables exists. P-value is .000 which is less than .05 thus concluding that relationship is statistically significant (R=.837, p<.05).

First item used to predict the relationship was '*toleration for mistakes*'. Beta value for this item is .492. This beta value means that 49.2% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value for the same item is .000 which is less than .05 thus showing it a significant item while predicting the relationship.

Second item used to predict the relationship was '*trust for sharing knowledge*'. Beta value for this item is negative which means that this item has negative effect on the relationship. Beta value for this item is -.022 which shows that this item can predict the dependent variable (implementation of KM) to only 2.2% but in negative direction. P-value for this item is .441 which is greater than .05 thus making it an insignificant item.

Third item used to measure the relation was '*cooperation among employees*'. Beta value for this item is .282 which means that 28.2% variance in the dependent variable can be predicted by this item. P-value is .018 which is less than .05 thus making it a significant item.

Fourth item used to predict the relationship was '*encourage to exploring new possibilities*'. Beta value for this item is .352 which means that 35.2 % chances are there that the variance in the dependent variable (implementation of KM) is due to this item. P-value for this item is .012 which is less than .05 thus making it a significant item.

H₄: 'Financial Resources' has a statistically significant relationship with 'Implementation of KM'.

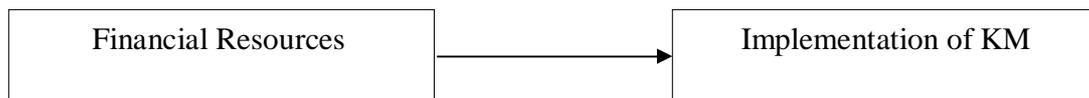


Table 4-20: Hypothesis H₄ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .876 R ² = .768	.000	Availability of financial resources	.205	.048
		Allocation of financial resources	.226	.073
		Investment for IT tools	.155	.150
		Financial resources for manpower	.454	.001

*P<.05

Hypothesis H₄ states that 'financial resources' and 'implementation of KM' has a statistically significant relationship. Value of R-square is .768 which means that 76.8 % variance in the dependent variable (implementation of KM) can be predicted by this variable. 'R' value is .876 which is close to 1 thus showing that correlation is very strong. P-value for this relationship is .000 which is less than .05 thus suggesting that the relationship is statistically significant (R=.876, p<.05).

'*Availability of financial resources*' was the first item used to predict the relationship. Beta value for this item is .205 which means that 20.5% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .048 which is less than .05 thus suggesting this item is important.

'*Allocation of financial resources*' was another item used to predict the relationship. Beta value for this item is .226. This means that 22.6% variance in the dependent variable can

be predicted by this item. P-value is .073 which is greater than .05 thus this item is not significant.

'Investment for IT tool' was the third item used to predict the relationship. Beta value for this item is .155 which means that 15.5% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .150 which is greater than .05 thus making it an insignificant item.

'Financial resources for manpower' was the fourth item used to predict the relationship. Beta value for this item is .454 which means that 45.4% chances are there that the variance can be predicted by this item. P-value is .001 which is less than .05 thus making it a significant item.

H₅: 'IT Infrastructure' has a statistically significant relationship with 'Implementation of KM'.

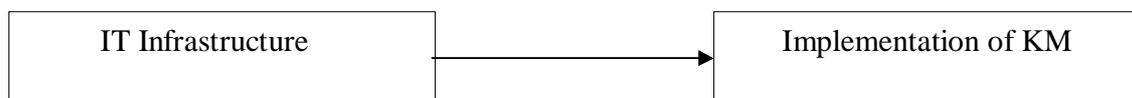


Table 4-21: Hypothesis H₅ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .869 R ² = .756	.000	Appropriate tools	.105	.191
		Internet or intranet	.161	.092
		User friendly systems	.528	.001
		KM systems Vs user needs	.243	.076

*P<.05

Hypothesis 5 states that 'IT infrastructure' has a statistically significant relationship with 'implementation of KM'. R-square value for this relationship is .756 which means that 75.6% variance in implementation of KM can be predicted by IT infrastructure. P-value is .000 which is less than .05 thus a statistically significant relationship exists (R=.869, p<.05). 'R' value is .869 which is close to 1 thus showing that correlation is very strong.

First item used to predict the relationship was '*appropriate tools*'. Beta value for this item is .105 which means that 10.5% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value for this item is .191 which is greater than .05 thus making it an insignificant item.

'*Internet or intranet*' was the second item used to predict the relationship. Beta value for this item is .161 which means that 16.1% variance in the implementation of KM can be predicted by this item. P-value is .092 which is greater than .05 thus this item is insignificant.

'*User friendly systems*' was also used to predict the relationship. Beta value for this item is .528 which means that 52.8% variance in the dependent variable (implementation of KM) can be predicted due to this item. This prediction level is quite high. P-value for this item is .001 which is less than .05 thus making it a significant item.

Fourth item used was '*KM systems Vs user needs*'. Beta value for this item is .243 which means that 24.3% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .076 which is greater than .05 thus making it an insignificant item.

H₆: 'Communication Between all Levels of Management' and 'Implementation of KM' has a statistically significant relationship.

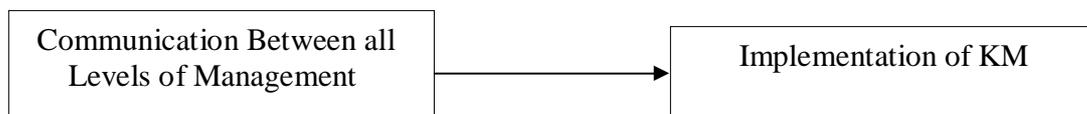


Table 4-22: Hypothesis H₆ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .830 R ² = .689	.000	Keep talking about KM	.147	.212
		Knowledge fairs	.337	.062
		Informal presentations and meetings	.118	.206
		Writing or telling stories	.332	.062

*P<.05

Hypothesis 6 is about statistically significant relationship between 'communication' and 'implementation of KM'. R-square value is .689 which means that 68.9% variance in the dependent variable (implementation of KM) can be predicted by independent variable (communication between all levels of management). 'R' value is .830 which is close to 1 thus showing that correlation is very strong. P-value for this relationship is .000 which is less than .05 thus a statistically significant relationship exists ($R=.830$, $p<.05$) between these two variables. This hypothesis is supported irrespective of all items having insignificant p-values. Reason is that '*knowledge fairs*' and '*writing or telling stories*' have major contribution for predicting the relationship and these two items are insignificant with a minor difference with $p<.05$.

'*Keep talking about KM*' was among the four items used to predict the relationship between communication and implementation of KM. Beta value for this item is .147 which means that 14.7% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .212 which is greater than .05 thus this item is not significant.

Another item used to predict the relationship was '*knowledge fairs*'. Beta value for this item is .337 which shows that 33.7% prediction is done by this item. P-value is .062 which is greater than .05 thus making it an insignificant item.

'*Informal presentations and meetings*' was the third item used to predict the relationship. Beta value for this item was .118 which means that 11.8% prediction of variance in the dependent variable is by this item. P-value is .206 which is greater than .05 thus it is an insignificant item.

Last item used to predict the relationship was '*writing or telling stories*'. Beta value for this item is .332 which shows that 33.2% variance can be predicted by this item. P-value for this item is .062 which is greater than .05 thus another insignificant item.

H₇: 'Training and Education of Employees' has a statistically significant relationship with 'Implementation of KM'.

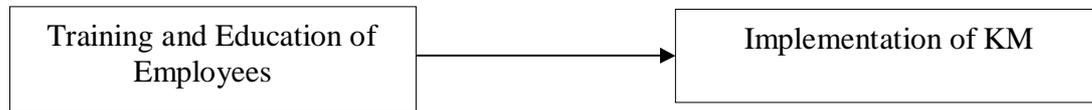


Table 4-23: Hypothesis H₇ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .826 R ² = .683	.000	Training and educating about KM	.421	.006
		Training about KM tools	.369	.008
		Training on choosing KM as career	.150	.299
		Training for creative thinking, team building	.184	.137

*P<.05

Hypothesis 7 was about the statistically significant relationship between ‘training and education of employees’ and ‘implementation of KM’. R-square value for this item is .683 which shows that 68.3% variance in the dependent variable (implementation of KM) can be predicted by independent variable (training and education of employees). ‘R’ value is .826 which is close to 1 thus showing that correlation is very strong. P-value for this relationship is .000 which is less than .05 thus making it a statistically significant relationship (R=.826, p<.05).

'Training and educating about KM' was the first item used to predict the relationship. Beta value for this item is .421 which shows that 42.1% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .006 which is less than .05 thus this item is significant.

'Training about KM tools' was another item used to predict the relationship. Beta value for this item is .369 which means that 36.9% variance in the dependent variable can be predicted by this item. P-value for this item is .008 which is less than .05 thus the item is significant while predicting the relationship.

Third item used to predict the relationship was '*training on choosing KM as career*'. Beta value for this item is .150 which means that 15.0% variance in the implementation of KM can be predicted by this item. At the same time p-value for this item is .299 which is greater than .05 thus an insignificant item.

Last item used to predict the relationship between dependent (implementation of KM) and independent variable (training and education of employees) was '*training for creative thinking, team building*'. Beta value for this item is .184 which means that 18.4% variance in the dependent variable can be predicted by this item. P-value is .137 which is greater than .05 therefore this is an insignificant item.

H₈: 'Hiring and Retention of Knowledgeable Employees' has a statistically significant relationship with 'Implementation of KM'.

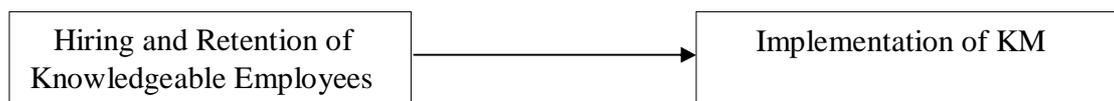


Table 4-24: Hypothesis H₈ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .858 R ² = .737	.000	Hiring people who have KM aptitude	.523	.001
		Hiring people who like knowledge sharing	.092	.263
		Retaining knowledgeable employees	.253	.040
		Growth opportunities for knowledgeable employees	.119	.238

*P<.05

Hypothesis 8 is about the statistically significant relationship between 'hiring and retention of knowledgeable people' and 'implementation of KM'. 'R' value is .858 which is close to 1 thus showing that correlation is very strong. Value of R-square is .737 which shows that 73.7% variance in the dependent variable (implementation of KM) can be predicted by independent variable (hiring and retention of knowledgeable employees). P-value is .000 which is less than .05 thus suggesting that this relationship is statistically significant (R=.858, p<.05).

'Hiring people who have KM aptitude' was the first item used to predict the relationship. Beta value for this item is .523 which shows that 52.3% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .001 which is less than .05 thus suggesting it a significant item.

'Hiring people who like knowledge sharing' was the second item used to predict the relationship between independent and dependent variables. Beta value for this item is .092 which shows that 9.2% variance in the dependent variable can be predicted by this item. P-value for this item is .263 which is greater than .05 thus this item is insignificant.

Third item used to predict the relationship was 'retaining knowledgeable employees'. Beta value for this item is .253 which means that 25.3% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .040 which is less than .05 thus this item can be considered as significant item.

Last item used to predict the relationship was 'growth opportunities for knowledgeable employees'. Value of beta for this item is .119 which means that 11.9% variance in the dependent variable can be predicted by this item. P-value is .238 which is greater than .05 thus this item is insignificant.

H₉: 'Rewards to Encourage KM Practices' has a statistically significant relationship with 'Implementation of KM'.

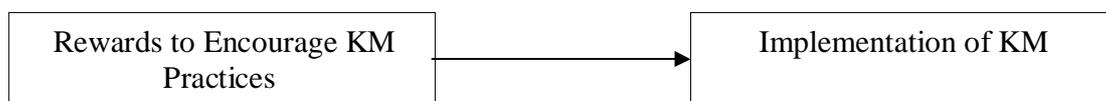


Table 4-25: Hypothesis H₉ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .816 R ² = .665	.000	Incentives to promote KM	.207	.062
		Encouraging employees to look for new knowledge	.268	.020
		Rewards to those who share knowledge	.165	.116
		Link between knowledge sharing and motivational methods	.542	.000

*P<.05

Hypothesis H₉ is about statistically significant relationship between ‘rewards to encourage KM practices’ and ‘implementation of KM’. R-square value for this relationship is .665 which shows that 66.5% variance in the dependent variable (implementation of KM) can be predicted by independent variable (rewards to encourage KM practices). ‘R’ value is .816 which is close to 1 thus showing that correlation is very strong. P-value for this relationship is .000 which is less than .05 thus it can be said that relationship is statistically significant (R=.816, p<.05).

‘Incentives to promote KM’ was used as an item to predict the relationship. Beta value for this item is .207 which means that 20.7% variance in the dependent variable can be predicted by this item. P-value is .062 which is greater than .05 thus this item is insignificant.

‘Encouraging employees to look for new knowledge’ was used as second item to predict the relationship between rewards and implementation of KM. Value of beta for this item is .268 which shows that 26.8% variance can be predicted by this item. P-value is .020 which is less than .05 thus it can be concluded that this item is significant.

‘Rewards to those who share knowledge’ was used as third item to predict the relationship. Value of beta for this item is .165 which means that 16.5% variance in the dependent variable can be predicted by this item. P-value for the same item is .116 which is greater than .05 thus making it an insignificant item.

Fourth item used for relationship prediction was *‘link between knowledge sharing and motivational methods’*. Beta value for this item is .542 which shows that 54.2% variance in the dependent variable can be predicted by this item. P-value is .000 which is less than .05 thus this item is significant.

H₁₀: ‘Measuring Effectiveness of KM’ has a statistically significant relationship with ‘Implementation of KM’.

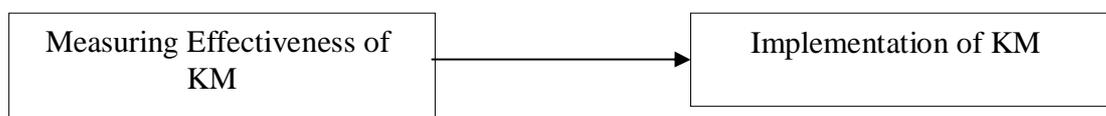


Table 4-26: Hypothesis H₁₀ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R =.819 R ² =.670	.000	Measuring the benefits	.479	.001
		Monitoring the progress	-.067	.306
		Impact of KM on performance	.186	.079
		KM measurement techniques	.602	.000

*P<.05

Hypothesis H₁₀ is about the statistically significant relationship between 'measuring effectiveness of KM' and 'implementation of KM'. 'R' value is .819 which is close to 1 thus showing that correlation is very strong. R-square value is .670 which means that 67.0% variance in the dependent variable (implementation of KM) can be predicted by independent variable (measuring effectiveness of KM). P-value is .000 which is less than .05 thus suggesting that relationship is statistically significant (R=.819, p<.05).

First item used to predict the relationship was '*measuring the benefits*'. Beta value for this item is .479 which shows that 47.9% variance in the dependent variable can be predicted by this item. P-value for the same item is .001 which is less than .05 thus suggesting that this item is significant.

Second item was '*monitoring the progress*'. Beta value for this item is -.067. This shows that this item negatively affects the dependent variable. This item can predict variance in dependent variable (implementation of KM) by 6.7%. P-value is .306 which is greater than .05 thus an insignificant item.

Third item used to predict the relationship was '*impact of KM on performance*'. Beta value for this item is .186 which shows that 18.6% variance in the dependent variable can be predicted by this item. P-value is .079 which is greater than .05 thus this item will be considered as insignificant item.

Fourth and last item used to predict the relationship was '*KM measurement techniques*'. Value of beta for this item is .602 which means that 60.2% variance in the dependent

variable can be predicted by this item. P-value is .000 which is less than .05 thus this item is significant.

H₁₁: 'Organizational Infrastructure' has a statistically significant relationship with 'Implementation of KM'.



Table 4-27: Hypothesis H₁₁ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .809 R ² = .654	.000	Knowledge officers	.174	.235
		Groups or teams of knowledgeable people	.277	.073
		Roles and responsibilities for KM tasks	.257	.091
		Number of PCs or laptops per employee	.360	.013

*P<.05

Hypothesis H₁₁ is about the statistically significant relationship between 'organizational infrastructure' and 'implementation of KM'. Value of R-square is .654 which shows that 65.4% variance in the dependent variable (implementation of KM) can be predicted by independent variable (organizational infrastructure). 'R' value is .809 which is close to 1 thus showing that correlation is very strong. P-value for this relationship is .000 which is less than .05 thus it can be concluded that this relationship is statistically significant (R=.809, p<.05).

'*Knowledge officers*' was the 1st item used to predict the relationship. Beta value for this item is .174 which means that 17.4% variance in the dependent variable can be predicted by this item. P-value is .235 which is greater than .05 thus an insignificant item.

'*Groups or team of knowledgeable people*' was the 2nd item used to predict the relationship. Value of beta for this item is .277 which shows that 27.7% variance in the dependent variable can be predicted by this item. P-value is .073 which is greater than .05 hence an insignificant item.

'Roles and responsibilities for KM tasks' was the 3rd item used to predict the relationship. Beta value for this item is .257 which means that 25.7% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .091 which is greater than .05, thus an insignificant item.

'Number of PCs or laptops per employee' was the 4th and last item used to predict the relationship between dependent and independent variables. Beta value for this item is .360 which means that 36.0% variance can be predicted by this item. P-value is .013 which is less than .05 thus a significant item.

H₁₂: 'Strategy for KM Implementation' has a statistically significant relationship with 'Implementation of KM'.



Table 4-28: Hypothesis H₁₂ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .783 R ² = .613	.000	Common vision	.124	.174
		Objectives and goals	.094	.282
		KM strategy Vs business strategy	.204	.105
		Dependence of core business on KM	.635	.000

*P<.05

Hypothesis 12 is about statistically significant relationship between 'strategy for KM implementation' and 'implementation of KM'. Value of R-square is .613 which means that 61.3% variance in the dependent variable (implementation of KM) can be predicted by independent variable (strategy for KM implementation). 'R' value is .783 which is close to 1 thus showing that correlation is strong. P-value is .000 which is less than .05 thus a statistically significant relationship exists between two variables (R=.783, p<.05).

First item used to predict the relationship was 'common vision'. Value of beta is .124 which shows that 12.4% variance in the dependent variable (implementation of KM) can

be predicted by this item. P-value is .174 which is greater than .05 thus an insignificant item.

Second item was '*objectives and goals*'. Value of beta for this item is .094 which shows that 9.4% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .282 which is greater than .05 thus an insignificant item.

Third item used in predicting the relationship was '*KM strategy Vs business strategy*'. Beta value for this item is .204 which means that 20.4% variance in the dependent variable can be predicted by this item. P-value is .105 which is greater than .05 thus an insignificant item.

Fourth item used to predict the relationship was '*dependence of core business on KM*'. Beta value for this item is .635 which shows that 63.5% variance in the implementation of KM (dependent variable) can be predicted by this item. P-value is .000 which is less than .05, hence significant item.

H₁₃: 'Core Values of Business' has a statistically significant relationship with 'Implementation of KM'.

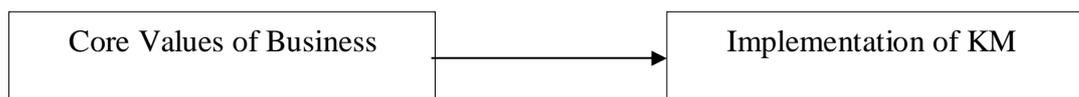


Table 4-29: Hypothesis H₁₃ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .800 R ² = .639	.000	KM in organizational values	.522	.002
		Org. values and employee behavior	.077	.664
		Org. culture	.046	.806
		Practice by top management	.289	.160

*P<.05

Hypothesis H₁₃ is about statistically significant relationship between 'core values of business' (independent variable) and 'implementation of KM' (dependent variable).

Value of R-square is .639 which means that 63.9% variance in the dependent variable can be predicted by independent variable (core values of business). 'R' value is .800 which is close to 1 thus showing that correlation is very strong. P-value is .000 which is less than .05 and thus a statistically significant relationship exists ($R=.800$, $p<.05$) between core values of a business and implementation of KM.

'*KM in organizational values*' was the 1st item used to predict the relationship. Beta value for this item is .522 which shows that 52.2% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value for the same item is .002 which is less than .05 thus a significant item.

'*Organizational values and employee behavior*' was the 2nd item used to predict the relationship between independent and dependent variables. Beta value for this item is .077 which means that 7.7% variance in the dependent variable can be predicted by this item. P-value is .664 which is greater than .05 thus an insignificant item.

'*Organizational culture*' was the 3rd item used to measure the relationship. Beta value is .046 which shows that 4.6% variance in implementation of KM (dependent variable) can be predicted by organizational culture. P-value for this item is .806 which is greater than .05 thus this item is insignificant.

'*Practice by top management*' was the 4th item used to predict the relationship between core values of business and implementation of KM. Value of beta for this item is .289 which means that 28.9% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .160 which is greater than .05 thus an insignificant item.

H_{14} : '*Systematic KM Processes and Activities*' has a statistically significant relationship with '*Implementation of KM*'.

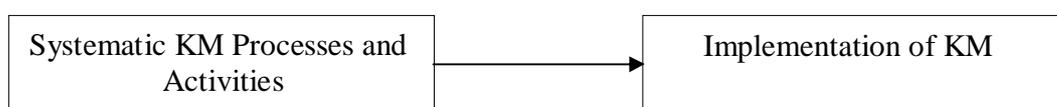


Table 4-30: Hypothesis H₁₄ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R =.773 R ² =.597	.000	Ideas and knowledge	.347	.011
		Methods for categorizing knowledge	.157	.121
		Communication among employees	.196	.074
		Quality of shared knowledge	.419	.004

*P<.05

Hypothesis 14 is about statistically significant relationship between ‘systematic KM processes and activities’ and ‘implementation of KM’. Value of R-square is .597 which shows that 59.7% variance in the dependent variable (implementation of KM) can be predicted by independent variable (systematic KM processes and activities). ‘R’ value is .773 which is close to 1 thus showing that correlation is strong. P-value is .000 which is less than .05 thus showing that relationship is statistically significant (R=.773, p<.05).

First item used to predict the relationship was ‘*ideas and knowledge*’. Value of beta for this item is .347 which shows that 34.7% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .011 which is less than .05 thus a significant item.

Second item used was ‘*methods for categorizing knowledge*’. Beta value for this item is .157 which means that 15.7% variance in the dependent variable can be predicted by this item. P-value is .121 which is greater than .05 thus an insignificant item.

Third item used was ‘*communication among employees*’. Value of beta for this item is .196 which shows that 19.6% variance in the dependent variable can be predicted by this item. P-value is .074 which is greater than .05 thus an insignificant item.

Fourth item was ‘*quality of shared knowledge*’. Beta value for this item is .419 which shows that 41.9% variance in the dependent variable (implementation of KM) can be predicted by this item. P-value is .004 which is less than .05 thus a significant item.

H_{15} : 'Implementation of KM' has a statistically significant relationship with 'Non-financial (daily) Performance of a Company'.

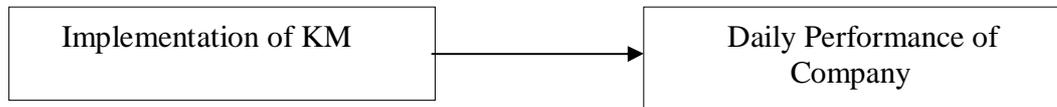


Table 4-31: Hypothesis H_{15} Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .807 R ² = .651	.000	Getting right information when needed	.054	.360
		Knowledge loss due to employee turnover	.797	.000
		Increase in knowledge sharing via internet/intranet	-.019	.448
		Increase of financial resources on IT tools	-.010	.471

*P<.05

Hypothesis 15 states about statistically significant relationship between 'implementation of KM' and 'non-financial (daily) performance of company'. 'R' value is .807 which is close to 1 thus showing that correlation is very strong. Value of R-square is .651 which means that 65.1% variance in the dependent variable (daily performance of the company) can be predicted by independent variable (implementation of KM). P-value is .000 which is less than .05 thus showing a statistically significant relationship (R=.807, p<.05).

'Getting right information when needed' was the first item used to measure the relationship. Value of beta for this item is .054 which means that 5.4% variance in the dependent variable can be predicted by this item. P-value is .360 which is greater than .05 thus an insignificant item.

'Knowledge loss due to employee turnover' was another item used to predict the relationship. Beta value is .797 which shows that 79.7% variance in the dependent variable can be predicted by this item. P-value is .000 which is less than .05 thus a significant item.

'Increase in knowledge sharing via internet/intranet' was the third item used to predict the relationship. Beta value for this item is -.019. This item has a negative relationship with the dependent variable but has very little impact (only 1.9%). P-value is .448 which is greater than .05 thus an insignificant item.

'Increase of financial resources on IT tools' was the fourth item used to predict the relationship. Beta value is -.010 which shows that this item negatively predicts the dependent variable. Prediction level is 1% which is very small. P-value is .471, greater than .05 thus an insignificant item.

H₁₆: 'Implementation of KM' has a statistically significant relationship with 'Financial Performance of Company'.



Table 4-32: Hypothesis H₁₆ Analysis

R & R-Square	*P-value	Item	Beta	*P-value
R = .840 R ² = .705	.000	Income per employee	.162	.249
		Cost per employee	.218	.110
		Procurement cost	.280	.050
		Operating cost	.426	.003

*P<.05

Hypothesis H₁₆ states that there is a statistically significant relationship between 'implementation of KM' and 'financial performance of company'. Value of R-square is .705 which means that 70.5% variance in the dependent variable (financial performance of company) can be predicted by independent variable (implementation of KM). P-value is .000 which is less than .05. 'R' value is .840 which is close to 1 thus showing that correlation is very strong. Therefore statistically significant relationship exists between two variables (R=.840, p<.05).

First item used to measure the prediction level was '*income per employee*'. Beta value for this item is .162 and shows that 16.2% variance in the dependent variable (financial performance of company) can be predicted by this item. P-value is .249 which is greater than .05 thus an insignificant item.

Second item was '*cost per employee*'. Value of beta is .218 which means that 21.8% variance in the dependent variable can be predicted by this item. P-value is .110 which is greater than .05 thus an insignificant item.

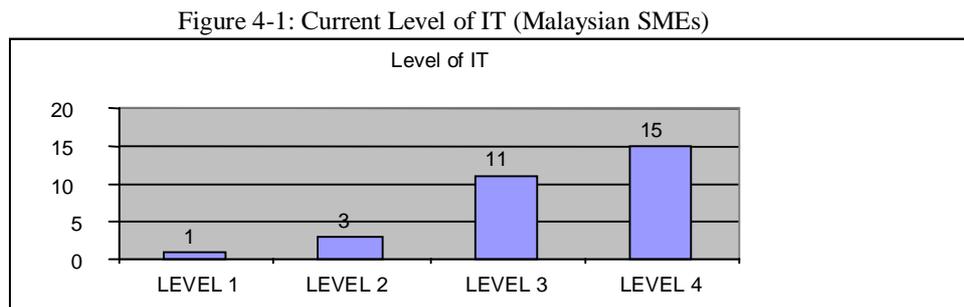
Another item used was '*procurement cost*'. Value of beta for this item is .280 which means that 28.0% variance in the dependent variable can be predicted by this item. P-value is .050 which is equivalent to .05 so it can be considered as moderately significant item.

Last item used to predict the relationship was '*operating cost*'. Value of beta for this item is .426 which shows that 42.6% variance in the dependent variable (financial performance of company) can be predicted by this item. P-value is .003 which is less than .05 thus a significant item.

PART II – HISTORY and FUTURE of KM IMPLEMENTATION PLUS CURRENT LEVEL of IT (MALAYSIA and PAKISTAN)

4.3 History and Future of KM Implementation plus Current Level of IT in Malaysia Based SMEs

4.3.1 Current Level of IT (Malaysian SMEs)

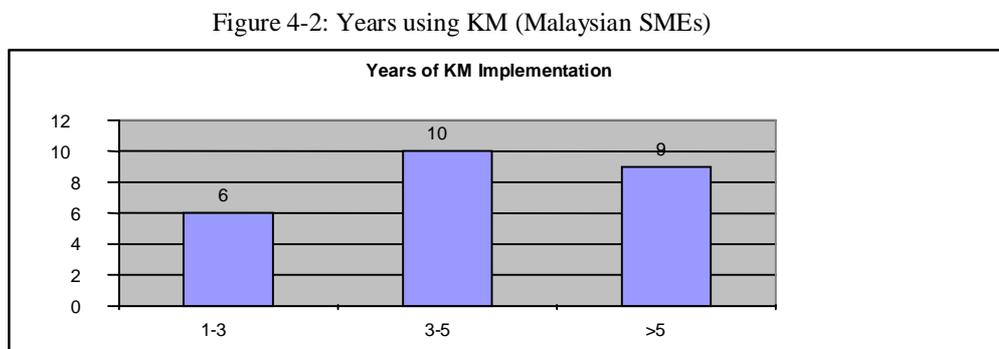


X-axis = Level of IT, Y-axis = Number of SMEs

Level of IT implementation was categorized into 4 categories. Those categories are level 1 (land line or mobile phones), level 2 (PCs and applications like Microsoft Office), level 3 (any database for knowledge sharing, internet or intranet, emails, web browsing) and level 4 (decision support systems, inventory management, CRM and ERP).

Based on this classification, 1 Malaysian SME out of 30 who participated in the research had level 1 IT implementation, 3 SMEs had level 2 implementation, 11 companies had level 3 implementation and 15 companies had level 4 IT implementation.

4.3.2 Years using KM (Malaysian SMEs)

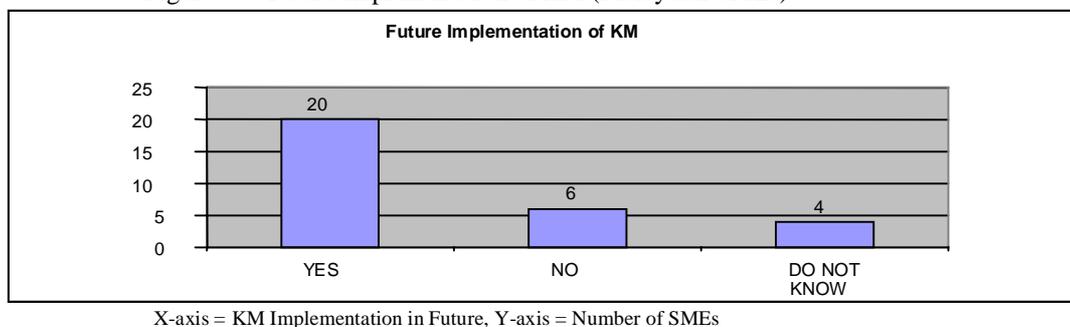


X-axis = Years of KM Implementation, Y-axis = Number of SMEs

A total of 6 Malaysian SMEs had implemented KM for the last 1-3 years, 10 had implemented KM from 3-5 years and 9 companies had implemented it from more than 5 years. Out of thirty SMEs, only 25 had implemented KM therefore only those companies were included in this graph that had implemented KM. Five companies were not involved in KM implementation and therefore not included in the above graph but these companies participated in the research so that their perspective about KM is should also be presented in the research.

4.3.3 Future of KM (Malaysian SMEs)

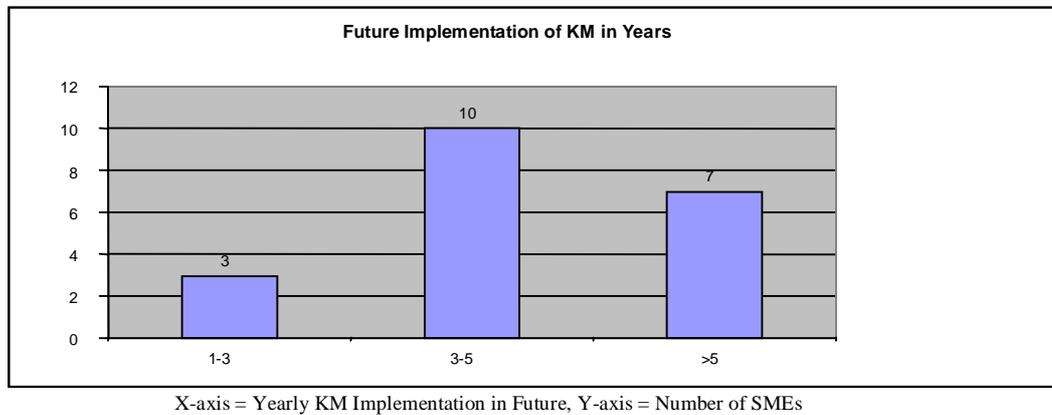
Figure 4-3: Future Implementation of KM (Malaysian SMEs)



Respondents were asked to provide feedback about enhancement of investment in KM through question number 13. Twenty SMEs said that they would like to enhance their investment in KM in future, while 6 said that they will not implement KM and 4 SMEs have not decided yet.

4.3.4 Future of KM Implementation in Number of Years (Malaysian SMEs)

Figure 4-4: Future of KM Implementation in Years (Malaysian SMEs)

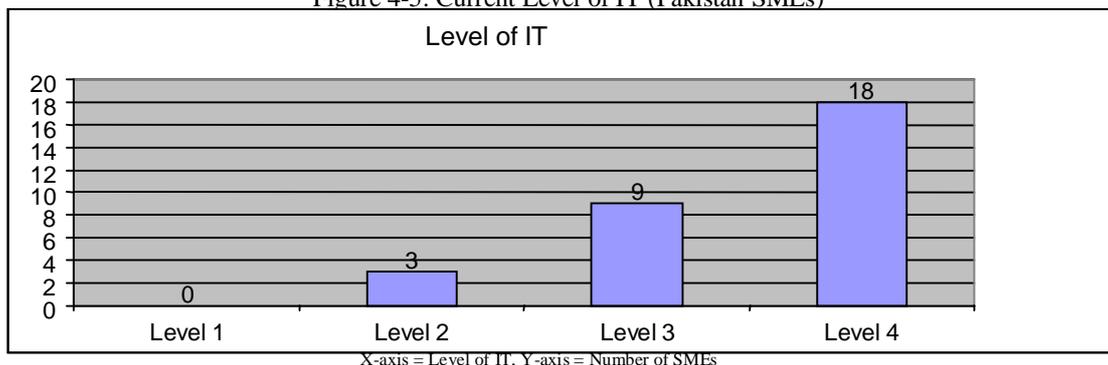


Out of those 20 SMEs who would like to invest or enhance their investment in KM, 3 SMEs responded that they would like to investment in next 1-3 years. Ten companies will invest in 3-5 years and 7 companies will take more than 5 years to invest more in KM. This analysis was done based on the feedback obtained from question number 14.

4.4 History and Future of KM Implementation plus Current Level of IT in Pakistan Based SMEs

4.4.1 Current Level of IT (Pakistan Based SMEs)

Figure 4-5: Current Level of IT (Pakistan SMEs)

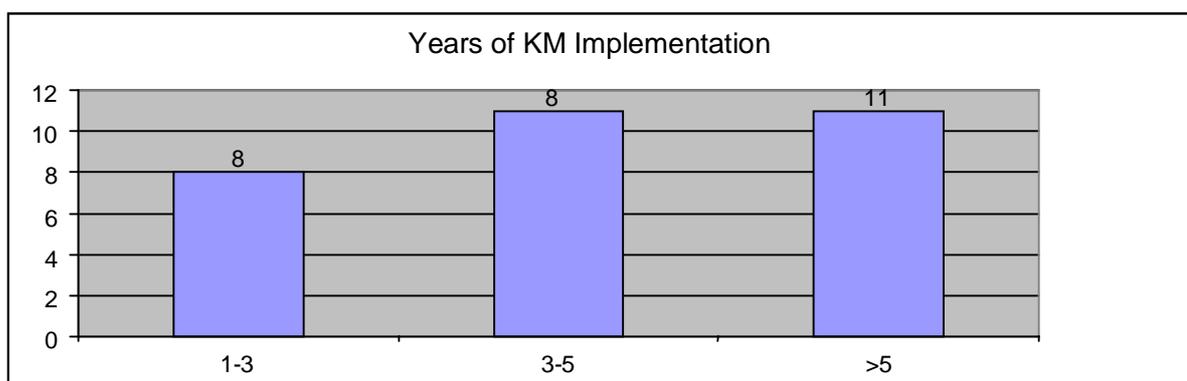


Out of 30 SMEs who were included in the research, none was at level 1 (land line or mobile phones) of IT implementation. Three SMEs were at level 2 (PCs and applications

like Microsoft Office) IT implementation, 9 companies were using level 3 (some sort of database for information sharing, internet or intranet, emails, web browsing) IT implementation and 18 SMEs had level 4 (decision support systems, inventory management, CRM and ERP systems) of IT implementation.

4.4.2 Years using KM (Pakistan Based SMEs)

Figure 4-6: Years of KM Implementation (Pakistan SMEs)

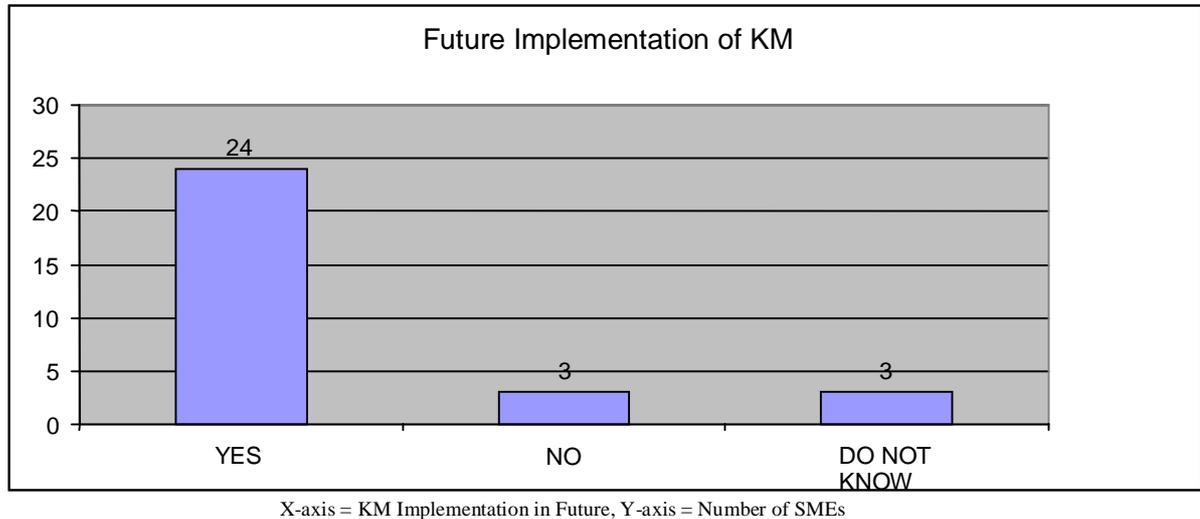


X-axis = Years of KM Implementation, Y-axis = Number of SMEs

A total of 8 SMEs from Pakistan were involved in KM implementation for the last 1-3 years. Eight had implemented KM for the last 3-5 years and 11 SMEs had KM implementation for more than 5 years. Twenty seven SMEs from Pakistan had implemented KM so they are shown in figure 4-6. Remaining 3 were discarded as this graph presents only those SMEs who had implemented KM.

4.4.3 Future of KM (Pakistan Based SMEs)

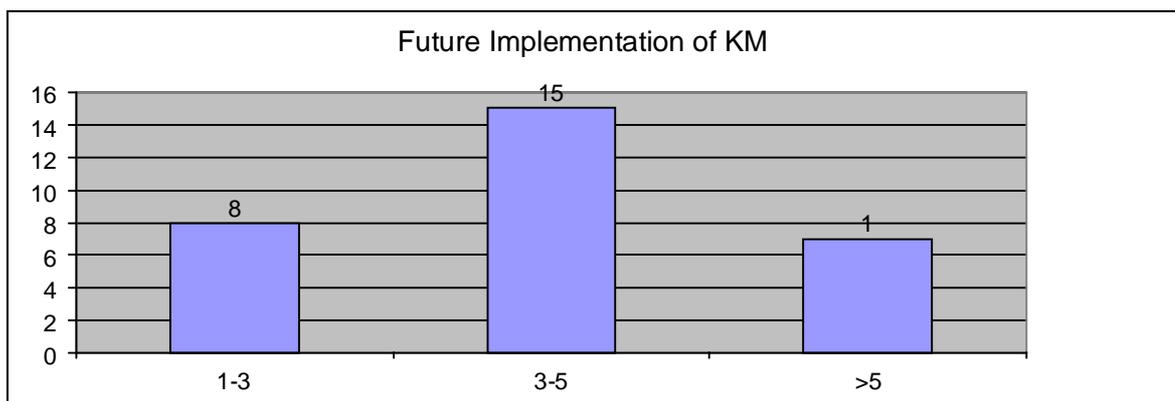
Figure 4-7: Future Implementation of KM (Pakistan SMEs)



Out of 30 SMEs who were approached for participation in the research, 24 companies showed their concern towards KM implementation in future. Three SMEs responded that they will neither implement KM nor will increase their investment in KM implementation. Three SMEs had no idea that whether they will invest in KM implementation in future or not? This analysis was done through question number 13.

4.4.4 Future of KM Implementation in Number of Years (Pakistan Based SMEs)

Figure 4-8: Future of KM Implementation in Years (Pakistan SMEs)

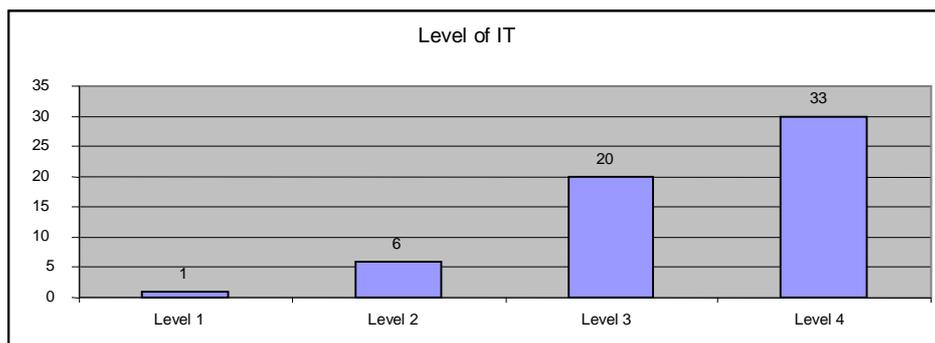


From the 24 SMEs who showed their concern towards KM implementation in future, 8 SMEs said that they will increase their investment in KM implementation in next 1-3 years. Fifteen SMEs will implement or enhance their investment from next 3-5 years and 1 company responded that it will take more than 5 years to implement or increase investment in KM. Responses from question number 14 were used to analyze future implementation of KM.

4.5 History and Future of KM Implementation plus Current Level of IT in SMEs (Pakistan plus Malaysia)

4.5.1 Current Level of IT (Pakistan and Malaysian SMEs)

Figure 4-9: Current Level of IT (Combined Data)

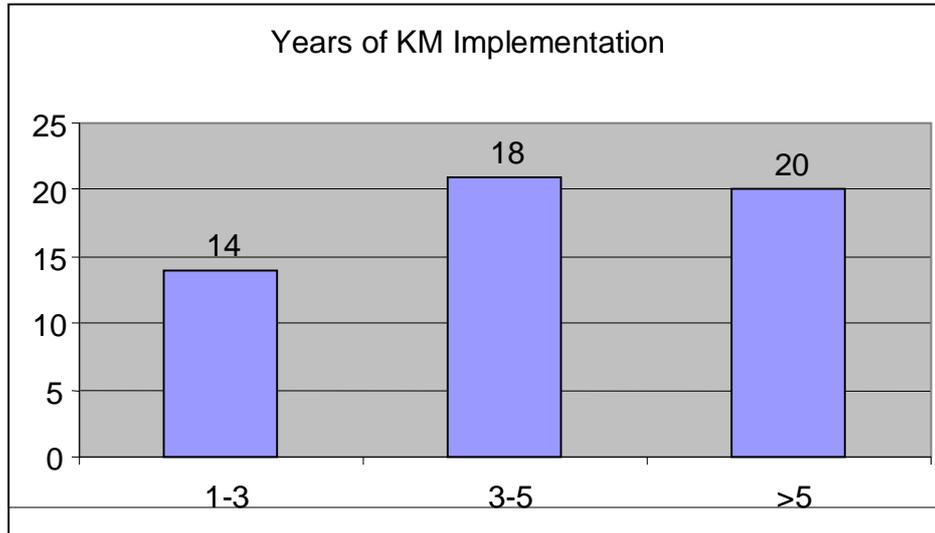


X-axis = Level of IT, Y-axis = Number of SMEs

On analyzing the combined data (Pakistan and Malaysia), it can be seen that only one SME had level 1 implementation of IT. Six SMEs had level 2 of IT implementation, 20 SMEs had level 3 implementation and 33 companies had 4th level of IT implementation.

4.5.2 Years using KM (Pakistan and Malaysian SMEs)

Figure 4-10: Years using KM (Combined Data)

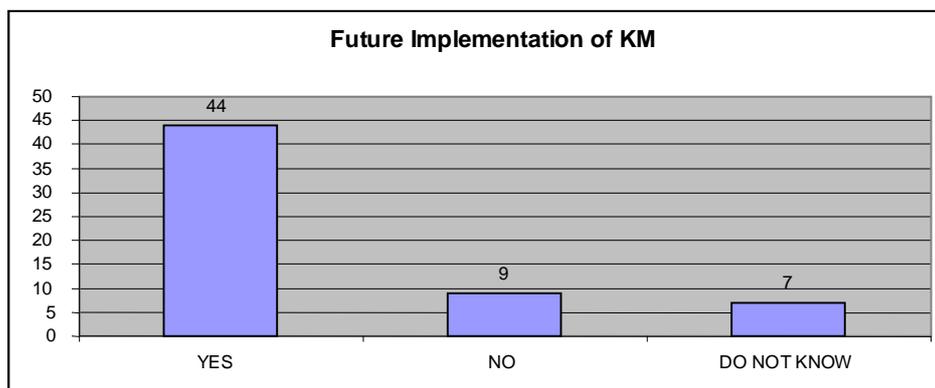


X-axis = Years of KM Implementation, Y-axis = Number of SMEs

Fourteen SMEs had implemented KM from last 1-3 years, 18 implemented it in last 3-5 years and 20 SMEs had implemented KM for more than 5 years.

4.5.3 Future of KM (Pakistan and Malaysian SMEs)

Figure 4-11: Future of KM (Combined Data)

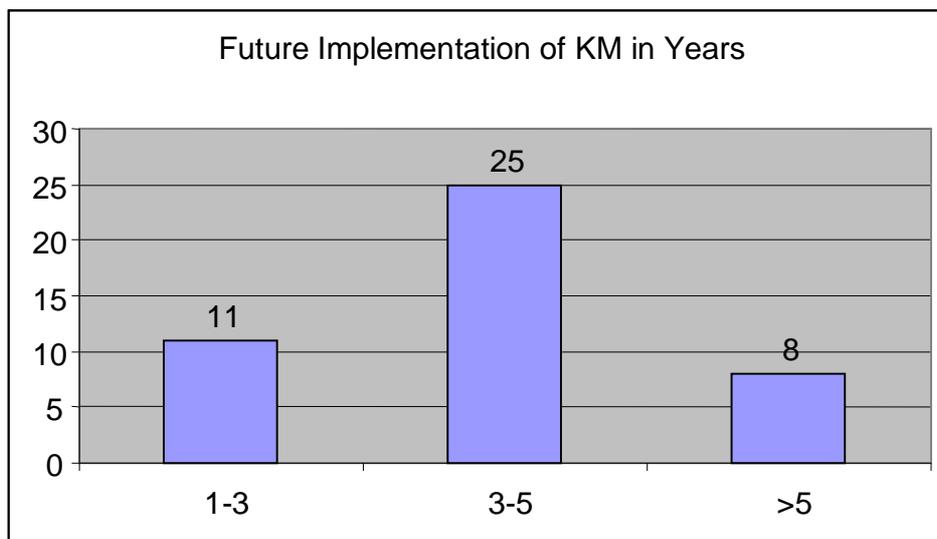


X-axis = KM Implementation in Future, Y-axis = Number of SMEs

Respondents from both (Pakistan and Malaysia) countries provided feedback that 44 SMEs would like to invest in KM in future. Nine SMEs said that they will not invest in KM implementation and 7 companies have not yet decided to invest in KM.

4.5.4 Future of KM Implementation in Number of Years (Pakistan and Malaysian SMEs)

Figure 4-12: Year wise Future of KM (Combined Data)



X-axis = Yearly KM Implementation in Future, Y-axis = Number of SMEs

Eleven respondents from Pakistan and Malaysia said that they will invest in KM implementation in next 1-3 years. Twenty five said that investment will be made in KM in next 3-5 years and 8 companies will take more than 5 years to invest in KM.

PART III – PRIORITIZATION OF CSFs***4.6 Prioritization of CSFs on the Basis of R and R-Square Values (Malaysian Data)***

Following is the significance of each CSFs based on the importance they play while implementing KM in SMEs. Significance is based on the values of ‘R’ and R-square which were calculated with the help of linear regression. R-square tells that how much variance in the dependent variable can be predicted by independent variable and ‘R’ is the correlation. In this case, every CSF was separately treated as an independent variable while implementation of KM was dependent variable.

Critical Success Factors	R-Square Values	R Values
1. Understanding of KM	.902 (90.2 %)	.950
2. Top Management Support	.836 (83.6 %)	.914
3. Knowledge Friendly Culture	.805 (80.5 %)	.897
4. Financial Resources	.778 (77.8 %)	.882
5. Communication Between all Levels of Management	.720 (72.0 %)	.849
6. IT Infrastructure (IT Tools)	.717 (71.7 %)	.847
7. Training and Education of Employees	.701 (70.1 %)	.837
8. Hiring and Retention of Knowledgeable Employees	.693 (69.3 %)	.832
9. Rewards to Encourage KM Practices	.685 (68.5 %)	.828
10. Measuring Effectiveness of KM	.672 (67.2 %)	.820
11. Organizational Infrastructure	.608 (60.8 %)	.780
12. Core Values of Business	.594 (59.4 %)	.771
13. Strategy for KM Implementation	.570 (57.0 %)	.755
14. Systematic KM Processes and Activities	.545 (54.5 %)	.738

Understanding of KM has the R-square value of .902. This means that 90.2% variance in the dependent variable (implementation of KM) can be predicted by independent variable

(understanding of KM). This value of R-square is highest as compare to other CSFs thus understanding of KM has most significance relatively to other CSFs. Therefore implementation of KM is highly dependent on understanding of KM. Understanding has the top most priority.

Top management support is important for pursuing any strategy or executing any plan. Implementation of KM requires certain resources (financial and non-financial) which can not be allocated without the consensus of top management especially in SMEs. R-square value is .836 which shows that 83.6% variance in the dependent variable can be predicted by this factor. Thus implementation of KM is highly dependent on top management support. Based on R-square value, top management support is second most important CSF.

Culture plays a vital role in any organization. Implementation of KM needs a culture where knowledge can be easily shared among colleagues. Such kind of culture or environment is known as knowledge friendly culture. Value of R-square is .805. This means that 80.5% variance in the dependent variable (implementation of KM) can be predicted by independent variable (knowledge friendly culture). Based on the value of R-square, knowledge friendly culture is considered as the third important CSF while implementing KM.

Financial resources are very important for any organization whenever a decision is to be made. Successful implementation of any strategy or plan requires financial resources. Even non-financial resources are dependent on financial resources. For SMEs, financial resources have even more importance because they lack such resources thus they becomes more critical. Value of R-square is .778. This shows that 77.8% variance in the dependent variable can be predicted by financial resources. Financial resources are considered as fourth most important CSF by Malaysian SMEs.

Informing about KM is essentially important for the successful implementation of KM. To inform others about KM, seminars, informal talks, meetings and presentations should

be conducted in organization. This helps to increase the understanding of KM among employees which ultimately promotes knowledge friendly culture in organization. R-square value is .720 which shows that 72.0% variance in the dependent variable (implementation of KM) can be predicted by this factor. Based on R-square value, communication between all levels of management is considered as 5th most important CSF by Malaysian SMEs.

IT infrastructure (IT tools) is considered as one of the key enablers of KM implementation. Without proper IT tools, KM implementation will be almost impossible because there are certain IT applications and tools which are critical while sharing, creating and storing knowledge. Based on this, IT infrastructure is considered as sixth most important CSF by Malaysian SMEs while implementing KM. R-square value is .717 which means that 71.7% variance in the dependent variable (implementation of KM) can be predicted by independent variable (IT infrastructure). This CSF has 6th ranking among all CSFs.

Another important CSF for the implementation of KM is to train and educate employees about KM. Training and education is important for employees to motivate them about pursuing KM related career so that KM should be promoted in the organization. Value of R-square is .701 which shows that 70.1% variance in the dependent variable (implementation of KM) can be predicted by independent variable (training and educating employees). Based on R-square value, training and education is considered as important CSF by Malaysian SMEs while implementing KM. This CSF has 7th ranking among all CSFs.

Employees in an organization are important for the success. Therefore, much attention should be paid while hiring employees. When it comes to implementation of KM, those employees should be hired who have aptitude towards knowledge sharing and KM implementation. Similarly, while laying off employees, careful attention should be paid that those employees should be retained in the organization that actually share knowledge and are involved in KM implementation. Value of R-square is .693 which shows that

69.3% variance in the dependent variable can be predicted by this factor. Based on this R-square value, hiring and retention of knowledgeable employees is important for Malaysian SMEs while implementing KM. This CSF has 8th ranking among all CSFs.

Whenever the management wants employees to pursue a strategy, rewards are always the key. Even at the time of bringing change in the behavior of employees, rewards play a vital role. Implementation of KM is also influenced by rewards. Rewarding employees so that they promote knowledge related activities which are helpful for implementing KM is important. R-square value is .685 which shows that 68.5% variance in the dependent variable (implementation of KM) can be predicted by independent variable (rewards to encourage KM practices). Based on this R-square value, this factor is a CSF while implementing KM. This CSF has 9th ranking among all CSFs.

Measuring the achievements of goals and objectives is critical for the success of an organization. Measuring is important to see whether the stated goals and objectives are being met or not. If not then what actions should be carried out to take corrective measure? Same goes for the implementation of KM. When KM is being implemented in an organization, it is implemented while keeping some objectives in mind. Therefore, it is necessary to measure that whether those goals and objectives are being met or not. If they are met then organization is on the right path to success and if those goals and objectives are not being met then corrective actions needs to be taken. R-square value is .672 which means that 67.2% variance in the dependent variable (implementation of KM) can be predicted by independent variable (measuring effectiveness of KM). Based on this R-square value, measuring effectiveness of KM is considered as CSF by Malaysian SMEs during and after implementing KM. Measuring effectiveness of KM is also required because enough resources (financial and non-financial) are being utilized by KM. Therefore to see the efficient and effective utilization of those resources, measuring is an important CSF. This CSF has 10th ranking among all CSFs.

Organizational infrastructure is also another important CSF for the implementation of KM. Organizational infrastructure means organizational positions like CIO, CKO or even KM department. KM is relatively a new phenomenon for SMEs, therefore it becomes important for SMEs to have a person like CIO or CKO because he/she will be the one who will be having an eye on KM related activities. Value of R-square is .608 which shows that 60.8% variance in the dependent variable (implementation of KM) can be predicted by independent variable (organizational infrastructure). Based on this R-square value, organizational infrastructure is considered as a CSF for the implementation of KM. This CSF has 11th ranking among all CSFs.

Another important CSF for the implementation of KM is core values of the business. Core values of business mean vision and mission statements. These two statements are publicly stated so it is almost impossible for an organization to deviate from these publicly stated promises. KM plays an important role when it comes to CRM. Better CRM can not be achieved unless knowledge about customers is managed. Therefore, core values of business also has importance when it comes to the implementation of KM. R-square value is .594 which shows that 59.4% variance in the dependent variable (implementation of KM) can be predicted by independent variable (core values of the business). Based on R-square value, this factor is treated as a CSF by Malaysian SMEs while implementing KM. This CSF has 12th ranking among all CSFs.

To implement KM, one should have a strategy. Without proper strategy, any plan can not be executed perfectly. R-square value is .570 which means that 57.0% variance in the implementation of KM can be predicted by KM implementation strategy. Hence, another CSF while implementing KM. This CSF has 13th ranking among all CSFs.

All the key processes and activities of the business should be related and based on KM. If key processes and activities are not linked to KM implementation then there is no use of implementing KM. Value of R-square is .545 which shows that 54.5% variance in the dependent variable (implementation of KM) can be predicted by independent variable (systematic KM processes and activities). Based on the R-square value, this factor is

considered as CSF while implementing KM by Malaysian SMEs. This CSF has 14th ranking among all CSFs.

4.7 Prioritization of CSFs on the Basis of Mean Value (Malaysian Data)

Prioritization of CSFs was also analyzed with the help of mean value. Mean value for each CSF was calculated by adding up all the values and then dividing by number of observations. Scoring was done from 1 to 13 (as in this method understanding of KM was not included). One being most important and thirteen being least important. Therefore, CSFs having less mean will be more important as compare to those CSFs who have more mean value. This method was used to rank the CSF so that general perception of people about CSFs for KM implementation can be observed. This will help in knowing that how people perceive different CSFs for KM implementation.

Table 4-33: Prioritization on the Basis of Mean Value (Malaysian Data)

CSFs	Priority	Maximum Ranking	Minimum Ranking	Std. Dev	Mean Value
Top Management Support	1	1	6	1.5	2.0
Knowledge Friendly Culture	2	1	13	3.7	3.3
Financial Resources	3	1	13	2.9	3.6
IT Infrastructure (IT Tools)	4	2	11	2.4	5.7
Communication Between all Levels of Management	5	3	13	2.8	6.3
Training and Education of Employees	6	1	13	3.2	6.7
Hiring and Retention of Knowledgeable Employees	7	3	13	3.3	7.6
Strategy for KM Implementation	8	4	13	2.2	8.6
Rewards to Encourage KM Practices	9	4	13	2.8	8.7
Systematic KM Processes and Activities	10	1	13	3.3	8.9
Core Values of Business	11	1	13	2.8	9.0
Measuring Effectiveness of KM	12	3	13	2.4	9.7
Organizational Infrastructure	13	4	13	2.2	10.4

Top management support was ranked as the top most CSF for the implementation of KM. Mean value for top management support is 2.0 and standard deviation is 1.5. Maximum ranking score obtained by this CSF from any respondent is 1 while minimum score is 6. Based on this it can be seen that respondents really consider top management support as very important CSF.

Knowledge friendly culture has the mean value of 3.3, standard deviation is 3.7 and is second most important CSF as compare to other CSFs. Maximum value obtained while ranking is 1 and minimum is 13 but as its mean is very small therefore majority of respondents ranked it as a significant CSF.

Financial resources are always important for any organization. Mean score obtained by financial resources is 3.6 and standard deviation is 2.9. Maximum value obtained while ranking is 1 and minimum 13. Financial resources are considered as third most CSF while implementing KM.

IT infrastructure is considered as a key enabler for KM implementation. Mean value for this CSF is 5.7 and standard deviation is 2.4 with maximum score of 2 and minimum 11 by any respondent. Thus IT infrastructure is considered as the 4th most important CSF for the implementation of KM by Malaysian SMEs. Communication between all levels of management is another important CSF with mean scoring of 6.3 and standard deviation is 2.8. Maximum score obtained is 3 and minimum is 13.

Training and education is considered as critical during and after implementation of KM. Mean score for training and education is 6.7 and standard deviation is 3.2 with maximum score of 1 and minimum 13. Hiring and retention of knowledgeable employees scored 7.6 as mean value, standard deviation is 3.3 and is 7th most important CSF for the implementation of KM. Maximum score by any respondent is 3 and minimum 13.

Strategy for KM implementation was among the important CSFs with mean score of 8.6 and standard deviation 2.2. Maximum ranking by any respondent is 4 and minimum is

13. Mean value for rewards to encourage KM practices is 8.7 and standard deviation 2.8. Maximum score while ranking is 4 and minimum 13.

Systematic KM processes and activities were among top 10 important CSFs for the implementation of KM with mean score of 8.9 and standard deviation is 3.3. Maximum value or ranking by any respondent is 1 and minimum is 13. ‘Core values of business’, was 11th most important CSF with mean value of 9 and standard deviation is 2.8. Maximum ranking done by any respondent is 1 and minimum is 13.

Measuring effectiveness of KM is another significant CSF for the implementation of KM. It has mean value of 9.7 and standard deviation is 2.4 with maximum ranking value of 3 and minimum 13. Organizational infrastructure scored 10.4 as mean value and standard deviation is 2.2. Maximum ranking by any respondent is 4 and minimum is 13.

4.8 Prioritization of CSFs on the Basis of R and R-Square Values (Pakistan Data)

Significance of CSFs for the implementation of KM was also calculated on the basis of ‘R’ and R-square values from the data of Pakistan based SMEs. Higher the value of R-square, higher will be the prediction of variance by that CSF for implementation of KM. Just like the method used to analyze Malaysian based SMEs, each CSF was an independent variable and their impact was seen on implementation of KM (dependent variable) separately.

Critical Success Factors	R-Square Values	R Values
1. Top Management Support	.819 (81.9%)	.905
2. Understanding of KM	.798 (79.8%)	.893
3. Financial Resources	.768 (76.8%)	.876
4. IT Infrastructure (IT Tools)	.756 (75.6%)	.869
5. Hiring and Retention of Knowledgeable Employees	.737 (73.7%)	.858
6. Knowledge Friendly Culture	.701 (70.1%)	.837

7. Communication Between all Levels of Management	.689 (68.9%)	.830
8. Training and Education of Employees	.683 (68.3%)	.826
9. Measuring Effectiveness of KM	.670 (67.0%)	.819
10. Rewards to Encourage KM Practices	.665 (66.5%)	.816
11. Organizational Infrastructure	.654 (65.4%)	.809
12. Core Values of Business	.639 (63.9%)	.800
13. Strategy for KM Implementation	.613 (61.3%)	.783
14. Systematic KM Processes and Activities	.597 (59.7%)	.773

Top management support is an important CSF for the implementation of KM. Value of R-square for this CSF is .819 which means that 81.9% variance in the dependent variable (implementation of KM) can be predicted by independent variable (top management support). Therefore, top management support is considered as the top most CSF for the implementation of KM.

Understanding of KM is the 2nd most important CSF for the implementation of KM according to Pakistan based SMEs. Value of R-square is .798 which means that 79.8% variance in the dependent variable (implementation of KM) can be predicted by this CSF (understanding of KM).

Variance prediction level by financial resources as independent variable for implementation of KM (dependent variable) is 76.8%. Based on such a high value of R-square, financial resources are among the top three important CSFs for the implementation of KM.

As discussed earlier, IT infrastructure is a key enabler for the implementation of KM. Therefore, it has a value of R-square equivalent to .756 which shows that 75.6% variance in the dependent variable (implementation of KM) can be predicted by this factor (IT infrastructure). This CSF has 4th ranking among all CSFs.

Hiring and retention of knowledgeable employees is another important CSF and that is why it is considered among top 5 CSFs significant for the implementation of KM. Value of R-square is .737 which means that 73.7% variance in the dependent variable (implementation of KM) can be predicted by hiring and retention of knowledgeable employees (independent variable).

Knowledge friendly culture is important for the implementation of KM. Data collected from Pakistan showed that .701 (70.1%) variance in the dependent variable (implementation of KM) can be predicted by this CSF (knowledge friendly culture). This CSF has 6th ranking among all CSFs.

Communication between all levels of management is important for the successful implementation of KM. Value of R-square for the relationship between 'communication' (independent variable) and 'implementation of KM' (dependent variable) is .689. This means that 68.9% variance in the dependent variable can be predicted by this item. This CSF has 7th ranking among all CSFs.

Training and education of employees about KM is important for the implementation of KM and even after the implementation of KM. R-square value is .683 which shows that 68.3% variance in the dependent variable (implementation of KM) can be predicted by independent variable (training and education of employees). This CSF has 8th ranking among all CSFs.

Measuring the success of KM implementation is another important CSF. Measuring is important to see whether the stated goals and objectives which were set at the time of implementation of KM are being met or not? Value of R-square is .670 which means that 67.0% variance in the implementation of KM (dependent variable) can be predicted by measuring effectiveness of KM (independent variable). This CSF has 9th ranking among all CSFs.

Rewards are critical for changing the behavior of employees so that they involve themselves more in KM related activities. R-square value is .665 which shows that 66.5% variance in the dependent variable (implementation of KM) can be predicted by independent variable (rewards to encourage KM practices). This CSF has 10th ranking among all CSFs.

Value of R-square for relationship between organizational infrastructure (independent variable) and implementation of KM (dependent variable) is .654. This means that 65.4% variance in the implementation of KM can be predicted by organizational infrastructure. This CSF is important because KM is relatively a new phenomenon for SMEs as compare to large organizations thus organizational infrastructure is important to manage KM related activities. This CSF has 11th ranking among all CSFs.

R-square value for the relationship between core values of business and implementation of KM is .639 which means that 63.9% variance in the dependent variable (implementation of KM) can be predicted by independent variable (core values of business). Thus this is also considered as important CSF by Pakistan based SMEs for the implementation of KM. This CSF has 12th ranking among all CSFs.

Value of R-square is .613 which shows that 61.3% variance in the dependent variable (implementation of KM) can be predicted by independent variable which is strategy for KM implementation. Thus this CSF is also considered as important by Pakistan based SMEs for KM implementation. This CSF has 13th ranking among all CSFs.

CSF ranked as least important by Pakistan based SMEs is 'systematic KM processes and activities'. Value of R-square is .597 which shows that 59.7% variance in the implementation of KM (dependent variable) can be predicted by independent variable (systematic KM processes and activities). Although it has a small R-square value as compare to other CSFs but still this factor is considered as important CSF. This CSF has 14th ranking among all CSFs.

4.9 Prioritization of CSFs on the Basis of Mean Value (Pakistan Data)

Just like Malaysian data, data from Pakistan based SMEs was also analyzed with the help of mean value to cross check the results of R-square. Mean value was calculated by adding up all the responses obtained and then dividing by total number of observations. Table 4-34 summarizes the mean value of each CSF and their maximum and minimum ranking by respondents.

Table 4-34: Prioritization on the Basis of Mean Value (Pakistan Data)

CSFs	Priority	Maximum Ranking	Minimum Ranking	Std. Dev	Mean Value
Top Management Support	1	1	4	0.9	2.33
Financial Resources	2	1	5	1.1	3.57
IT Infrastructure (IT Tools)	3	3	7	0.8	4.50
Hiring and Retention of Knowledgeable Employees	4	1	7	1.7	4.60
Knowledge Friendly Culture	5	1	7	1.9	4.73
Communication Between all Levels of Management	6	1	8	2.6	4.80
Training and Education of Employees	7	1	9	3.0	4.93
Measuring Effectiveness of KM	8	1	9	1.5	8.23
Rewards to Encourage KM Practices	9	1	13	3.1	8.77
Organizational Infrastructure	10	8	13	1.0	10.40
Core Values of Business	11	9	13	1.0	11.47
Systematic KM Process and Activities	12	8	13	1.5	11.57
Strategy for KM Implementation	13	10	13	1.0	11.90

1st Priority: Top management support with mean value of 2.33 and standard deviation is 0.9. Minimum ranking by any respondent was 4 and maximum 1.

2nd Priority: Financial resource with mean value of 3.57 and standard deviation is 1.1. Minimum ranking by any respondent was 5 and maximum 1.

3rd Priority: IT infrastructure (IT tools) with mean value of 4.50 and standard deviation is 0.8. Minimum ranking by any respondent was 7 and maximum 3.

4th Priority: Hiring and retention of knowledgeable employees with mean value of 4.60 and standard deviation is 1.7. Minimum ranking by any respondent was 7 and maximum 1.

5th Priority: Knowledge friendly culture with mean value of 4.73 and standard deviation is 1.9. Minimum ranking by any respondent was 7 and maximum 1.

6th Priority: Communication between all levels of management with mean value of 4.80 and standard deviation is 2.6. Minimum ranking by any respondent was 8 and maximum 1.

7th Priority: Training and education of employees with mean value of 4.93 and standard deviation is 3.0. Minimum ranking by any respondent was 9 and maximum 1.

8th Priority: Measuring effectiveness of KM with mean value of 8.23 and standard deviation is 1.5. Minimum ranking by any respondent was 9 and maximum 1.

9th Priority: Rewards to encourage KM practices with mean value of 8.77 and standard deviation is 3.1. Minimum ranking by any respondent was 13 and maximum 1.

10th Priority: Organizational infrastructure with mean value of 10.40 and standard deviation is 1.0. Minimum ranking by any respondent was 13 and maximum 8.

11th Priority: Core values of business with mean value of 11.47 and standard deviation is 1.0. Minimum ranking by any respondent was 13 and maximum 9.

12th Priority: Systematic KM processes and activities with mean value of 11.57 and standard deviation is 1.5. Minimum ranking by any respondent was 13 and maximum 8.

13th Priority: Strategy for KM implementation with mean value of 11.90 and standard deviation is 1.0. Minimum ranking by any respondent was 13 and maximum 10.

4.10 Prioritization of CSFs on the Basis of R and R-Square Values (Combined Data: Malaysia and Pakistan)

To generalize the significance of CSFs for the implementation of KM, the data from Pakistan and Malaysia was combined and linear regression was again applied. This helped to see that the significance of every CSF in general, irrespective of country constraints.

Critical Success Factors	R-Square Values	R Values
1. Understanding of KM	.839 (83.9%)	.915
2. Top Management Support	.733 (73.3%)	.856
3. IT Infrastructure (IT Tools)	.710 (71.0%)	.843
4. Communication Between all Levels of Management	.686 (68.6%)	.828
5. Financial Resources	.680 (68.0%)	.825
6. Hiring and Retention of Knowledgeable Employees	.676 (67.6%)	.822
7. Knowledge Friendly Culture	.653 (65.3%)	.808
8. Core Values of Business	.622 (62.2%)	.789
9. Measuring Effectiveness of KM	.607 (60.7%)	.779
10. Training and Education of Employees	.594 (59.4%)	.771
11. Rewards to Encourage KM Practices	.591 (59.1%)	.769
12. Organizational Infrastructure	.590 (59.0%)	.768
13. Systematic KM Processes and Activities	.554 (55.4%)	.744
14. Strategy for KM Implementation	.539 (53.9%)	.734

Combined analysis shows that understanding of KM has the top most significance as CSF for the implementation of KM based on the value of R-square, which is .839 (83.9% variance prediction level). Top management support is the 2nd most important CSF for the implementation of KM with R-square value of .733 (73.3% variance due to independent variable). IT tools are important for the implementation of KM thus another important CSF with value of R-square equivalent to .710 (71.0% variance by independent variable in dependent variable). Communication between all levels of management is the 4th most important CSF with R-square value of .686 which means that 68.6% variance in the dependent variable (implementation of KM) can be predicted by independent variable (communication between all levels of management). Another important CSF is financial resources with R-square value of .680 thus predicting 68.0% variance in the dependent variable. Hiring and retention of knowledgeable employees is also one of the important CSF for the implementation of KM and has R-square value of .676. i.e., 67.6% variance

in the dependent variable (implementation of KM) can be predicted by independent variable (hiring and retention of knowledgeable employees).

Knowledge friendly culture is important for promoting KM related activities especially knowledge sharing. R-square value for this CSF is .653 which means that 65.3% variance in the dependent variable (implementation of KM) can be predicted by independent variable (knowledge friendly culture). Core values of business were also considered as important CSF by both Malaysia and Pakistan based SMEs. Therefore, in combined analysis, it is among top 10 CSFs for the implementation of KM with R-square value of .622 (predicting 62.2% variance in the dependent variable). Among other important CSFs, measuring effectiveness of KM is also significant with R-square value of .607 showing that 60.7% variance in the dependent variable can be predicted by this CSF.

Training and educating employees about KM is important for the successful implementation of KM. This is shown by the R-square value which is .594 meaning that 59.4% variance in the dependent variable (implementation of KM) can be predicted by training and education of employees (independent variable). Rewards are important to change and motivate the behavior of employees towards KM related activities. Therefore it is considered as important CSF for the implementation of KM as shown by the combined analysis. Value of R-square is .591 which means that 59.1% variance in the dependent variable (implementation of KM) can be predicted by rewards to encourage KM practices (independent variable).

Organizational infrastructure is important for the implementation of KM as it might be new for many companies especially SMEs. Value of R-square is .590 which means that 59.0% variance in the dependent variable can be predicted by independent variable. Systematic KM processes and activities is also a CSF for the implementation of KM with R-square value of .554 (55.4% variance prediction level). Last CSF for the implementation of KM is strategy for KM implementation with R-square value of .539 which means that 53.9% variance in the dependent variable (implementation of KM) can be predicted by independent variable (strategy for KM implementation).

4.11 Prioritization of CSFs on the Basis of Mean Value (Combined Data: Malaysia and Pakistan)

Data from Pakistan and Malaysia based SMEs was analyzed with the help of mean value to cross check the results of R-square and to generalize the ranking of CSFs. Mean value was calculated by adding up all the responses obtained and then dividing by total number of observations. Table 4-35 summarizes the mean value of each CSF and their maximum and minimum ranking by any respondent.

Table 4-35: Prioritization on the Basis of Mean Value (Combined Data)

CSFs	Priority	Maximum Ranking	Minimum Ranking	Std. Dev	Mean Value
Top Management Support	1	1	6	1.2	2.20
Financial Resources	2	1	13	2.2	3.60
Knowledge Friendly Culture	3	1	13	3.0	4.03
IT Infrastructure (IT Tools)	4	2	11	1.9	5.12
Communication Between all Levels of Management	5	1	13	2.8	5.57
Training and Education of Employees	6	1	13	3.2	5.83
Hiring and Retention of Knowledgeable Employees	7	1	13	3.0	6.12
Rewards to Encourage KM Practices	8	1	13	2.9	8.75
Measuring Effectiveness of KM	9	1	13	2.1	8.98
Core Values of Business	10	1	13	2.4	10.22
Strategy for KM Implementation	11	4	13	2.4	10.23
Systematic KM Processes and Activities	12	1	13	2.9	10.25
Organizational Infrastructure	13	4	13	1.7	10.38

CSFs were ranked on the basis of mean value after combining the data gathered from Malaysia and Pakistan based SMEs. This was done to see the generalization of CSFs. i.e., what will be the significance of each CSF while implementing KM if results are generalized?

Top management support is the most significant CSF with mean value of 2.20 and standard deviation of 1.2. Financial resource is the second most important CSF for the implementation of KM with mean ranking of 3.60 and standard deviation of 2.2.

Knowledge friendly culture has mean value of 4.03, standard deviation of 3.0 and ranked as third most important CSF. IT infrastructure is the 4th important CSF in ranking with mean value of 5.12 and standard deviation of 1.9. Communication between all levels of management about KM is important and has mean value of 5.57 while standard deviation is 2.8. 5.83 is the mean value of training and education of employees about KM and its standard deviation is 3.2.

Hiring and retention of knowledgeable employees is important for the success of KM and even an organization thus it has mean value of 6.12 and standard deviation is 3.0. Rewards are important to motivate employees, this CSF has mean value of 8.75 and its standard deviation is 2.9. Measuring effectiveness of KM implementation is crucial to see whether goals are met or not and this factor has mean value of 8.98 and its standard deviation is 2.1.

Core values of business which includes vision and mission statements has mean value of 10.22 and its standard deviation is 2.4. Strategy for KM implementation has mean value of 10.23 and its standard deviation is 2.4. 10.25 and 10.38 are the mean values of systematic KM processes and activities and organizational infrastructure respectively whereas their standard deviations are 2.9 and 1.7.

4.12 Spearman Rank Correlation Coefficient

In order to see the relationship between ranking of CSFs from Pakistan and Malaysia, Spearman rank correlation coefficient was used. Spearman rank correlation analyzes that whether any relationship exists between two sets of data. In this case, from two sets of data means ranking of CSFs separately from Pakistan and Malaysia based SMEs.

Table 4-36: Spearman Rank Correlation Coefficient

			PAK	MAL
Spearman's rho	*PAK	Correlation Coefficient	1.000	.930(**)
		Sig.	.	.000
		N	14	14
	*MAL	Correlation Coefficient	.930(**)	1.000
		Sig.	.000	.
		N	14	14

**Correlation is significant at the 0.05 level

*PAK = Pakistan, *MAL = Malaysia

Fourteen CSFs were ranked separately in Pakistan and Malaysia. Results from table 4–36 show that Spearman rank correlation coefficient value is .930. This means that there is very strong relationship between ranking of CSFs from Pakistan and Malaysia. If ranking of CSFs changes in one country then there are very high chances that ranking of CSFs in the other country will also change.

4.13 Benefits for the Implementation of KM (Malaysia and Pakistan Based SMEs)

Respondents from Malaysia and Pakistan based SMEs were asked to provide feedback on the benefits which they are getting due to KM implementation. Table 4-37 summarizes the types of benefits being obtained by SMEs. Frequency (f) means the number of SMEs selected that option.

Table 4-37: Benefits of KM Implementation (Malaysia and Pakistan Based Data)

Malaysia (f)	Pakistan (f)	Total (f)	Benefits
21	18	39	Time saving
18	17	35	Better learning opportunities
17	20	37	More office automation
17	14	31	Improved products or services
15	15	30	Improved responsiveness to customers
15	19	34	Better financial results
14	12	26	Improved innovation
12	21	33	Better management of processes and activities
10	13	23	Improved decision making
7	1	8	Other

4.13.1 Malaysian Perspective

Twenty one SMEs responded that time saving is one of the major benefits which they get due to KM implementation as access to information becomes easy and quick. Eighteen companies responded that KM implementation helps in better learning opportunities. More office automation was considered as a key benefit by 17 SMEs and 17 others were of the view that it helps in improving products and services.

CRM is another benefit which companies get after implementing KM and 15 SMEs selected this option, 15 said that KM implementation helps in better financial results. Fourteen thought innovation is the benefit of KM implementation. Twelve responded that management becomes easier as it helps in automation, 10 supported the option that it helps in improving decision making process while 7 SMEs said that there are some other benefits due to which companies implement KM.

4.13.2 Pakistan Perspective

Twenty one respondents said that KM implementation helps in better management of processes and activities. Office automation was second most important benefit which Pakistan based SMEs consider they will get due to KM implementation. Better financial results are also provided by KM implementation and 19 respondents supported this view. Eighteen SMEs said that time saving is among major benefits received through KM implementation. Learning opportunities was supported by 17 respondents and better CRM by 15 respondents. Improvements in products and services was supported by 14 respondents, 13 said that KM is implemented due to better decision making, 12 said it is implemented due to innovation and 1 SME said that there are other benefits of KM implementation as well.

4.13.3 Generalization of Benefits

Time saving is the major reason or benefit due to which SMEs implement KM as 39 respondents selected this reason. Office automation is another reason due to which KM is implemented, as stated by 37 respondents. KM implementation helps to increase the learning opportunities, stated by 35 respondents. Thirty four respondents said that KM implementation helps in better financial results. Management of processes and activities becomes easy due to KM implementation (said by 33 respondents). KM implementation helps in building better CRM systems which ultimately serves the purpose of good relationship with customers (30 respondents favored this reason). Other benefits include improved products or services (31 respondents), increase in innovation (26 respondents), good decision making (23 respondents) and 8 respondents said that there are other reasons as well due to which KM is implemented in SMEs.

4.14 Reasons for not Implementing KM (Malaysia and Pakistan Based SMEs)

Respondents were provided with number of options for not implementing KM in SMEs. They were asked to provide feedback on those reasons. Table 4-38 summarizes the reasons. Frequency (f) means number of respondents selected that option.

Table 4-38: Reasons for not Implementing KM (Malaysia and Pakistan Based Data)

Malaysia (f)	Pakistan (f)	Total (f)	Reasons
25	14	39	Do not know what knowledge management is
23	15	38	Less financial and non financial resource
23	11	34	Do not know about the benefits of knowledge management
21	22	43	Less commitment from top management
16	13	29	Lack of time and human resource
11	12	23	Lack of knowledge oriented people
9	2	11	Other

4.14.1 Malaysian Perspective

Twenty five SMEs said that KM is not implemented because people do not know about KM. Twenty three SMEs were of the view that as SMEs have less financial and non resources so this is the reason why KM is not implemented by them. People do not know about the benefits of KM therefore it is another important reason due to which SMEs lack implementation of KM and 23 companies selected this option. Lack of commitment from top management is also important and another major factor for less KM implementation (analysis of CSFs at the start of chapter also proved the correlation between top management support and implementation of KM). Therefore, 21 SMEs said that this is the main reason due to which companies lack implementation of KM. Sixteen SMEs said that lack of time and human resource is major factor for less KM implementation as KM implementation requires organizational infrastructure. Eleven SMEs responded that organizations lack knowledge oriented people that is why they have less KM

implementation while 9 SMEs responded that there are other reasons as well due to which KM is not being implemented.

4.14.2 Pakistan Perspective

Twenty two respondents said that less commitment from top management is the main reason due to which SMEs lack KM implementation. Fifteen said that less resources (financial and non-financial) are the major reason due to which there is less implementation of KM. Fourteen SMEs said that people do not know about KM and this is the reason why KM is not implemented at large in SMEs. Lack of time and human resource was supported by 13 respondents who thought that this is the main reason due to which KM is not being implemented in SMEs.

Lack of knowledge oriented people is also another major problem for SMEs due to which they lack KM implementation and this phenomenon was supported by 12 respondents. Benefits of KM are not well communicated among employees due to which KM implementation suffers (11 respondents supported this reason) and 2 respondents said that there are other reasons due to which SMEs lack KM implementation.

4.14.3 Generalization of Reasons for not Implementing KM

Forty three respondents said that less commitment from top management is the major reason for less implementation of KM in SMEs. Thirty nine respondents said that it is mainly due to less understanding of KM in SMEs. Thirty eight said that SMEs have less financial and non-financial resources therefore they lack implementation of KM.

Besides these reasons, other reasons include lack of time and human resource (according to 29 respondents). Lack of knowledge oriented people (23 respondents) because most of the people who have education or training of KM prefer to work in large organizations. Eleven respondents said that there are other reasons as well due to which SMEs lack KM implementation.

4.15 Applications for KM (Malaysia and Pakistan Based SMEs)

Respondents from Malaysia and Pakistan based SMEs were asked to provide response on the types of applications being commonly used by SMEs. Table 4-39 provides a summarized list of applications commonly used by SMEs in two countries. Frequency (f) means number of SMEs selected that option.

Table 4-39: Applications used by SMEs (Malaysia and Pakistan Based Data)

Malaysia (f)	Pakistan (f)	Total (f)	Application Usage
24	15	39	Friendly knowledge sharing culture
21	17	38	Using tools (i.e., database) to share knowledge
20	11	31	Using tools to capture knowledge
17	18	35	Building and maintaining employee's expertise and skills
12	13	25	Using intranet and internet to share information
11	19	30	Identifying internal or external best practices
11	14	25	Providing incentives to knowledge management promoters in organization
10	5	15	Measuring the value of intellectual capital
10	16	26	Appointing knowledge management leaders and teams
8	21	29	Developing strategies for knowledge management

4.15.1 Malaysian Perspective

Application for promoting knowledge friendly culture was selected by 24 SMEs which means that companies mostly use KM applications which are helpful in promoting KM related culture. Twenty one SMEs responded that some sort of database is being used by companies. Twenty SMEs said that tools or applications to capture knowledge are also being used. Building and maintaining employee's skills was another type of application which is being used by SMEs and 17 companies selected this option.

Twelve companies said that intranet or internet is also in use by SMEs to share knowledge. Eleven respondents thought that KM applications which are helpful in identifying best practices are also used by SMEs. Eleven said that applications helping in providing incentives to employees are being used, measuring the intellectual capital applications are in use according to 10 respondents and 8 SMEs said that those applications are also being used which are helpful in making strategies.

4.15.2 Pakistan Perspective

Twenty one respondents responded that developing strategies for KM was the main application used by SMEs. Nineteen were using KM applications for identifying best internal and external practices and 18 were using applications which are helpful in building and maintaining expertise and skills of employees. KM applications to share knowledge are also common among SMEs and such applications include databases, this was selected by 17 respondents. Sixteen respondents said that applications for appointing KM leaders and teams are also being used. Fifteen responded that those applications which are helpful in promoting friendly knowledge sharing culture is important and being used by SMEs.

Applications which are helpful in providing incentives to employees were selected by 14 respondents, 13 said that internet and intranet is another common application used for promoting KM implementation. Eleven respondents said that applications used to capture knowledge are being used and 5 respondents said that those applications which are suitable for measuring the intellectual capital are in use.

4.15.3 Generalization of Applications for KM

Thirty nine respondents said that those applications which are helpful in promoting knowledge sharing culture are mainly used. According to 38 respondents, tools which are helpful in sharing information are widely used by SMEs. Building and maintaining employee's skills and expertise is important and applications or tools should be used to

manage them. Therefore, 35 respondents said that such type of KM applications or tools are being used by Malaysia and Pakistan based SMEs. Thirty one respondents responded that tools to capture knowledge are being used.

Among other applications in use by SMEs include, identifying best practices (30 respondents), appointing KM leaders and teams (26 respondents), using internet and intranet to share information (25 respondents) and measuring the value of intellectual capital (15 respondents).

PART IV – MULTIPLE CORRELATION RESULTS**4.16 Multiple Correlation (Pakistan Data)**

To see the overall fitness of model, multiple correlation was applied. Table 4-40 shows the results of multiple correlation test.

Table 4-40: Multiple Correlation Results from Pakistan Data

		Correlations															
		IKM	MLS	CUL	IT	SP	MEASURE	OI	SPA	MA	FINRES	TE	HR	ORGVAL	COMM	UKM	
Pearson Correlation	IKM	1	0.888	0.797	0.842	0.695	0.703	0.802	0.742	0.784	0.870	0.810	0.830	0.748	0.823	0.872	
	MLS	0.888	1	0.735	0.730	0.704	0.743	0.785	0.701	0.746	0.838	0.708	0.766	0.702	0.729	0.772	
	CUL	0.797	0.735	1	0.714	0.634	0.509	0.588	0.530	0.715	0.658	0.623	0.954	0.646	0.672	0.708	
	IT	0.842	0.730	0.714	1	0.559	0.646	0.728	0.788	0.623	0.718	0.789	0.737	0.676	0.688	0.759	
	SP	0.695	0.704	0.634	0.559	1	0.771	0.715	0.522	0.659	0.656	0.447	0.759	0.805	0.712	0.615	
	MEASURE	0.703	0.743	0.509	0.646	0.771	1	0.759	0.630	0.639	0.715	0.559	0.618	0.719	0.672	0.613	
	OI	0.802	0.785	0.588	0.728	0.715	0.759	1	0.784	0.682	0.741	0.638	0.698	0.652	0.736	0.737	
	SPA	0.742	0.701	0.530	0.788	0.522	0.630	0.784	1	0.636	0.645	0.613	0.596	0.628	0.684	0.756	
	MA	0.784	0.746	0.715	0.623	0.659	0.639	0.682	0.636	1	0.742	0.631	0.782	0.615	0.666	0.737	
	FINRES	0.870	0.838	0.658	0.718	0.656	0.715	0.741	0.645	0.742	1	0.747	0.728	0.678	0.735	0.811	
	TE	0.810	0.708	0.623	0.789	0.447	0.559	0.638	0.613	0.631	0.747	1	0.675	0.620	0.616	0.706	
	HR	0.830	0.766	0.954	0.737	0.759	0.618	0.698	0.596	0.782	0.728	0.675	1	0.726	0.766	0.752	
	ORGVAL	0.748	0.702	0.646	0.676	0.805	0.719	0.652	0.628	0.615	0.678	0.620	0.726	1	0.663	0.720	
	COMM	0.823	0.729	0.672	0.688	0.712	0.672	0.736	0.684	0.666	0.735	0.616	0.766	0.663	1	0.781	
	UKM	0.872	0.772	0.708	0.759	0.615	0.613	0.737	0.756	0.737	0.811	0.706	0.752	0.720	0.781	1	
	Significance	IKM	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		MLS	0	.	0	0	0	0	0	0	0	0	0	0	0	0	0
CUL		0	0	.	0	0	0.002	0	0.001	0	0	0	0	0	0	0	
IT		0	0	0	.	0.001	0	0	0	0	0	0	0	0	0	0	
SP		0	0	0	0.001	.	0	0	0.002	0	0	0.007	0	0	0	0	
MEASURE		0	0	0.002	0	0	.	0	0	0	0	0.001	0	0	0	0	
OI		0	0	0	0	0	0	.	0	0	0	0	0	0	0	0	
SPA		0	0	0.001	0	0.002	0	0	.	0	0	0	0	0	0	0	
MA		0	0	0	0	0	0	0	0	.	0	0	0	0	0	0	
FINRES		0	0	0	0	0	0	0	0	0	.	0	0	0	0	0	
TE		0	0	0	0	0.007	0.001	0	0	0	0	.	0	0	0	0	
HR		0	0	0	0	0	0	0	0	0	0	0	.	0	0	0	
ORGVAL		0	0	0	0	0	0	0	0	0	0	0	0	.	0	0	
COMM		0	0	0	0	0	0	0	0	0	0	0	0	0	.	0	
UKM		0	0	0	0	0	0	0	0	0	0	0	0	0	0	.	

IKM=Implementation of KM, MLS=Top Management Support, CUL= Knowledge Friendly Culture, IT=IT Infrastructure, SP=Strategy and Purpose, MEASURE=Measuring Effectiveness of KM, OI=Organizational Infrastructure, SPA=Systematic Processes and Activities, MA=Rewards to Encourage KM Practices, FINRES=Financial Resources, TE=Training and Education, HR=Hiring and Retention of Knowledgeable Employees, ORGVAL=Organizational Values, COMM=Communication Between all Levels of Management, UKM=Understanding of KM.

Results of multiple correlation analysis between CSFs and implementation of KM in table 4-40 (Pakistan data) show that:

a. Top management support and implementation of KM have statistically significant relationship as the correlation value is .888 which is close to 1. At the same time P-value is .000 which is less than .05 thus suggesting a significant relationship ($R=.888, p<.05$).

b. Knowledge friendly culture and implementation of KM have statistically significant relationship as value of correlation is .797. P-value is .000 which is less than .05 thus showing that correlation is significant ($R=.797, p<.05$).

c. IT is a key enabler for KM implementation and is proved by the correlation value between IT infrastructure and implementation of KM. Correlation value is .842, close to 1 thus a statistically significant relationship exists. P-value is less than .05 therefore significant correlation exists ($R=.842, p<.05$) between IT infrastructure and implementation of KM.

d. Strategy and purpose has strong relationship with implementation of KM as value of Pearson correlation is .695. P-value is also less than .05 thus showing that significant relationship exists ($R= .695, p<.05$) between strategy and purpose and implementation of KM.

e. Measuring effectiveness of KM is also important to see that whether purpose for which KM was implemented is fulfilled or not? Value of Pearson correlation shows that strong relationship exists between measuring effectiveness of KM and implementation of KM with correlation value of .703. P-value is .000 which is less than .05 thus relationship is significant ($R= .703, p<.05$).

f. Organizational infrastructure is important for the implementation of KM. Pearson correlation show that statistically significant relationship exists between organizational infrastructure and implementation of KM. Value of Pearson correlation is .802 which is close

to 1. P-value is .000 showing that significant relationship exists ($R = .802, p < .05$) between organizational infrastructure and implementation of KM.

g. Systematic processes and activities and implementation of KM have significant correlation. Value of Pearson correlation is .742 which means that statistically significant relationship exists between implementation of KM and systematic processes and activities. P-value is less than .05 thus relationship is significant ($R = .742, p < .05$).

h. Rewards are necessary to promote any activity in the organization and same is the case with implementation of KM. Pearson correlation value is .784 which means that statistically significant relationship exists between rewards to encourage KM practices and implementation of KM. P-value is .000 which is less than .05 thus suggesting a significant relationship ($R = .784, p < .05$).

i. Financial resources are extremely important for the successful implementation of KM and it is shown by Pearson correlation as well which is .870. P-value is also less than .05 thus showing that significant relationship exists ($R = .870, p < .05$) between financial resources and implementation of KM.

j. Training and educating employees is important for the successful implementation of KM. Pearson correlation value is .810. P-value is less than .05 which means that significant relationship exists ($R = .810, p < .05$) between training and education of employees and implementation of KM.

k. Hiring and retention of knowledgeable employees is also important for the proper implementation of KM. Pearson correlation value is .830 showing that statistically significant relationship exists between hiring and retention of knowledgeable employees and implementation of KM. P-value is .000 which is less than .05 thus a significant relationship exists ($R = .830, p < .05$).

l. Organizational values are significant for the implementation of KM as shown by the Pearson correlation value which is .748. P-value is .000 thus it is concluded that significant relationship is present ($R = .748, p < .05$) between organizational values and implementation of KM.

m. Telling every one about KM, its benefits and how it will improve the job performance of each employee is critical to create a suitable environment for KM implementation. Pearson correlation value is .823 which means that statistically significant relationship exists between implementation of KM and communication between all levels of management. P-value is .000 which is less than .05 thus relationship is significant ($R = .823, p < .05$).

n. Understanding of KM is extremely important for KM implementation. If people do not understand that what KM is all about then how they will implement and use it? Correlation value is .872 which means that statistically significant relationship exists between understanding of KM and implementation of KM. P-value is less than .05 thus relationship is significant ($R = .872, p < .05$).

Table 4-41: Model Summary from Pakistan Data

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1.000	0.971	0.943	0.890	0.198

Table 4-42: ANOVA Results from Pakistan Data

ANOVA (b)						
Model		Sum of Squares	df	Mean Square	F	Sig.
1.000	Regression	9.721	14.000	0.694	17.678	0.000
	Residual	0.589	15.000	0.039		
	Total	10.310	29.000			

Overall correlation of model is very strong as it is .971, very close to 1. R-square is .943 which means that 94.3% variance in the dependent variable can be predicted by independent variables and 89.0% variance in the model can be predicted by predicting variables thus it is a good model. P-value is .000 which is less than .05 thus overall model is significant ($R = .971, p < .05$).

4.17 Multiple Correlation (Malaysian Data)

Data from Malaysian SMEs was also tested through multiple correlation to see whether the proposed model fits according to Malaysian data or not. Following are the results of that test:

Table 4-43: Multiple Correlation Results from Malaysian Data

		Correlations														
		IKM	MLS	CUL	IT	SP	MEAS	OI	SPA	MA	FINRE	TE	HR	ORGV	COMM	UKM
Pearson	IKM	1.000	0.905	0.872	0.860	0.660	0.674	0.714	0.704	0.740	0.778	0.800	0.815	0.708	0.843	0.943
Correlation	MLS	0.905	1.000	0.901	0.839	0.745	0.806	0.736	0.733	0.680	0.713	0.734	0.779	0.743	0.787	0.839
	CUL	0.872	0.901	1.000	0.792	0.633	0.684	0.721	0.700	0.623	0.764	0.706	0.732	0.692	0.769	0.855
	IT	0.860	0.839	0.792	1.000	0.562	0.652	0.699	0.765	0.681	0.654	0.796	0.779	0.675	0.714	0.838
	SP	0.660	0.745	0.633	0.562	1.000	0.739	0.586	0.490	0.582	0.567	0.473	0.680	0.715	0.669	0.612
	MEAS	0.674	0.806	0.684	0.652	0.739	1.000	0.676	0.510	0.583	0.615	0.574	0.633	0.669	0.616	0.560
	OI	0.714	0.736	0.721	0.699	0.586	0.676	1.000	0.767	0.483	0.585	0.608	0.629	0.578	0.691	0.737
	SPA	0.704	0.733	0.700	0.765	0.490	0.510	0.767	1.000	0.619	0.594	0.556	0.592	0.607	0.627	0.758
	MA	0.740	0.680	0.623	0.681	0.582	0.583	0.483	0.619	1.000	0.705	0.602	0.718	0.549	0.579	0.720
	FINRE	0.778	0.713	0.764	0.654	0.567	0.615	0.585	0.594	0.705	1.000	0.700	0.588	0.603	0.624	0.773
	TE	0.800	0.734	0.706	0.796	0.473	0.574	0.608	0.556	0.602	0.700	1.000	0.702	0.583	0.602	0.762
	HR	0.815	0.779	0.732	0.779	0.680	0.633	0.629	0.592	0.718	0.588	0.702	1.000	0.703	0.713	0.776
	ORGV	0.708	0.743	0.692	0.675	0.715	0.669	0.578	0.607	0.549	0.603	0.583	0.703	1.000	0.642	0.700
	COMM	0.843	0.787	0.769	0.714	0.669	0.616	0.691	0.627	0.579	0.624	0.602	0.713	0.642	1.000	0.818
	UKM	0.943	0.839	0.855	0.838	0.612	0.560	0.737	0.758	0.720	0.773	0.762	0.776	0.700	0.818	1.000
Significance	IKM	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MLS	0	.	0	0	0	0	0	0	0	0	0	0	0	0	0
	CUL	0	0	.	0	0	0	0	0	0	0	0	0	0	0	0
	IT	0	0	0	.	0.001	0	0	0	0	0	0	0	0	0	0
	SP	0	0	0	0.001	.	0	0	0.003	0	0.001	0.004	0	0	0	0
	MEAS	0	0	0	0	0	.	0	0.002	0	0	0	0	0	0	0.001
	OI	0	0	0	0	0	0	.	0	0.003	0	0	0	0	0	0
	SPA	0	0	0	0	0.003	0.002	0	.	0	0	0.001	0	0	0	0
	MA	0	0	0	0	0	0	0.003	0	.	0	0	0	0.001	0	0
	FINRE	0	0	0	0	0.001	0	0	0	0	.	0	0	0	0	0
	TE	0	0	0	0	0.004	0	0	0.001	0	0	.	0	0	0	0
	HR	0	0	0	0	0	0	0	0	0	0	0	.	0	0	0
	ORGV	0	0	0	0	0	0	0	0	0.001	0	0	0	.	0	0
	COMM	0	0	0	0	0	0	0	0	0	0	0	0	0	.	0
	UKM	0	0	0	0	0	0.001	0	0	0	0	0	0	0	0	.

IKM=Implementation of KM, MLS=Top Management Support, CUL= Knowledge Friendly Culture, IT=IT Infrastructure, SP=Strategy and Purpose, MEAS=Measuring Effectiveness of KM, OI=Organizational Infrastructure, SPA=Systematic Processes and Activities, MA=Rewards to Encourage KM Practices, FINRE=Financial Resources, TE=Training and Education, HR=Hiring and Retention of Knowledgeable Employees, ORGV=Organizational Values, COMM=Communication Between all Levels of Management, UKM=Understanding of KM.

Results of multiple correlation analysis between CSFs and implementation of KM in table 4-43 (Malaysian data) show that:

a. Top management support and implementation of KM has correlation value of .905 which is very close to 1 and thus suggests that a statistically significant relationship exists between these two variables. P-value is less than .05 thus relationship is significant ($R=.905, p<.05$).

b. Correlation value between knowledge friendly culture and implementation of KM is .872 which means that statistically significant relationship exists between dependent (implementation of KM) and independent variable (knowledge friendly culture). P-value is .000 which is less than .05 thus relationship is significant ($R=.872, p<.05$).

c. IT infrastructure and implementation of KM has a significant relationship as the value of Pearson correlation is .860. P-value is less than .05 thus relationship is significant ($R=.860, p<.05$).

d. Strategy and purpose has significant relationship with implementation of KM as value of correlation is .660. P-value is .000 which is less than .05 thus relationship is significant ($R=.660, p<.05$).

e. Measuring effectiveness of KM is important as without measurement how one can know that whether the purpose for which KM was implemented have been fulfilled or not? Value of correlation is .674 which shows that significant relationship exists between measuring effectiveness of KM and implementation of KM. P-value is less than .05 thus relationship is significant ($R=.674, p<.05$).

f. Organizational infrastructure is important for the implementation of KM. This is the reason due to which Pearson correlation value is .714 which means that significant relationship exists between organizational infrastructure and implementation of KM. P-value is .000 which is less than .05 thus making the relationship significant ($R=.714, p<.05$).

g. Systematic KM processes and activities and implementation of KM have a significant relationship as the correlation value is .704. P-value is also less than .05 which shows that relationship is significant ($R=.704, p<.05$).

h. Rewards are important for motivating employees towards KM implementation. Value of correlation is .740 which means that significant relationship exists between implementation of KM and rewards to encourage KM practices. P-value is .000 which is less than .05 thus showing that relationship is significant ($R=.740, p<.05$).

i. Training and education is important for the implementation of KM and is proved by the value of Pearson correlation which is .800. Therefore statistically significant relationship exists between implementation of KM and training and education of employees. P-value is less than .05 thus showing that relationship is significant ($R=.800, p<.05$).

j. Hiring and retention of knowledgeable employees and implementation of KM has a very significant relationship as the value of correlation is .815. P-value is less than .05 thus relationship is significant ($R=.815, p<.05$).

k. Organizational values are important for the success of an organization and at the same time for the implementation of KM. Correlation value for this relationship is .708 which means that significant relationship exists between these two variables. P-value is .000 which is less than .05 thus relationship is significant ($R=.708, p<.05$).

l. Communication between all levels of management and implementation of KM has significant relationship as the value of correlation is .843. P-value is less than .05 thus relationship is significant ($R=.843, p<.05$).

m. Understanding of KM is really important for the implementation of KM. Correlation value for the relationship between understanding of KM and implementation of KM is .943. This shows that significant relationship exists between these two variables. P-value is .000 which is less than .05 thus relationship is significant ($R=.943, p<.05$).

n. Financial resources have statistically significant relationship with implementation of KM as correlation value is .778. $P < .05$ thus relationship is significant ($R = .778$, $p < .05$).

Table 4-44: Model Summary from Malaysian Data

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1.000	0.977	0.954	0.911	0.236

Table 4-45: ANOVA Results from Malaysian Data

ANOVA (b)						
Model		Sum of Squares	df	Mean Square	F	Sig.
1.000	Regression	17.309	4	1.236	22.230	0.000
	Residual	0.834	5	0.056		
	Total	18.144	9			

Value of 'R' is .977 in table 4-44 which means that overall correlation of the model is statistically significant. R-square is .954 thus showing that 95.4% variance in the dependent variables can be predicted by independent variables. Adjusted R-square is .911 which shows that 91.1% variance in the model can be predicted by predicting variables which is very good. P-value is also less than .05 thus suggesting that overall model is significant ($R = .977$, $p < .05$).

4.18 Summary

Chapter discussed results of data collected from Pakistan and Malaysia separately. Results of hypothesis testing, prioritization of CSFs, benefits of KM implementation, reasons for not implementing KM, level of IT implementation and results of multiple regression to see the overall fitness of model were discussed.

Next chapter is about discussion which will explain that whether the results obtained in this chapter (chapter 4) by using the methodology discussed in the previous chapter (chapter 3) are in compliance with studies done over the years or not.

CHAPTER 5 – DISCUSSION

5.0 Overview

This chapter discusses all the results which include data reliability analysis, hypotheses testing, items deleted which were insignificant, list of significant items, comparison of CSFs and level of IT implementation between Pakistan and Malaysia.

5.1 Data Reliability

As discussed in chapter 3 (research methodology) that data was collected through personally administered questionnaire. Before further analysis, it becomes really important that data should be reliable so that results obtained from that data present a true picture. If the data is not reliable then there is no use of such research. Therefore, data collected from the SMEs of Pakistan and Malaysia was first tested so that there should be no question on the authenticity of the data and results.

Cronbach was the main test used to see the reliability. This test was applied on data collected from Pakistan and Malaysia. To cross check the results of reliability analysis through Cronbach alpha, Split-Half test was also conducted.

5.1.1 Data Reliability (Malaysian Data)

Cronbach alpha value for the data collected from Malaysian SMEs was .9776. This means that 97.76% data was reliable. This showed that data collected from Malaysia was suitable for further analysis. Malaysian data was also analyzed through Split-Half test which confirmed that result from Cronbach alpha was accurate.

5.1.2 Data Reliability (Pakistan Based Data)

Just like Malaysia, data collected from Pakistan based SMEs was also tested for reliability through Cronbach alpha and Split-Half tests. Result from Cronbach alpha showed that alpha value for Pakistan based data was .9778 which means that 97.78% data was reliable. Thus data from Pakistan was also suitable and reliable for further analysis. Split-Half test also validated the result obtained from Cronbach alpha.

5.2 Hypotheses Testing and Framework Validity (Malaysia and Pakistan Based Results)

Linear Regression method was used to test each hypothesis. Fourteen CSFs were used in this research. Each of those CSFs was considered as independent variable which will have an impact on the implementation of KM. Values of 'R', R-square and 'p' was used to see the impact of independent variable on dependent variable. Higher value of 'R' and R-square means that more correlation and variance in the dependent variable is caused by independent variable. Value of 'R' ranges from -1 to +1. -1 means that correlation is in negative or reverse direction. 0 means there is no correlation between dependent and independent variables and +1 means correlation is in positive direction.

H₁: 'Understanding of KM' has a statistically significant relationship with 'Implementation of KM'.

Malaysia: Value of 'R' is .950 which is very close to one thus showing that statistically significant relationship exists between understanding of KM and implementation of KM. Value of R-square is .902 which means that 90.2% variance in the dependent variable can be caused or predicted by independent variable. Therefore on the basis of 'R' and R-square values, this hypothesis that understanding of KM and implementation of KM has statistically significant relationship does hold true. This also shows that understanding of KM can be considered as a CSF for the implementation of KM.

Pakistan: Value of 'R' is .893 which is very close to +1 and shows that there is statistically significant relationship between understanding of KM and implementation of KM. R-square is .798 which shows that 79.8% variance in the dependent variable (implementation of KM) can be predicted by independent variable (understanding of KM). Therefore, above mentioned hypothesis is proved and it can be said that a statistically significant relationship exists between understanding of KM and implementation of KM.

Discussion: Above mentioned results showed that there exists a statistically significant relationship between 'understanding of KM' and 'implementation of KM'. Understanding of anything before going into the specific details is extremely important. From understanding this research means basic know how of KM. If top management and employees do not have basic know how of KM and its implementation then it is obvious that they can not implement it. In other words, before knowing the actual details of KM, it is critical to know about KM, how it can be implemented, what will be the benefits for KM implementation and what type of IT tools will be required? All these queries should be answered to have general understanding of KM. This will help to increase the chances of successful implementation of KM.

Understanding of KM was not considered as a CSF for KM implementation in the previous literature. Therefore no literature is available in which this factor was discussed as a CSF but results of this research proved that understanding of KM is a CSF for KM implementation.

H₂: 'Top Management Support' has a statistically significant relationship with Implementation of KM'.

Malaysia: Value of 'R' is .914 which is close to 1. This shows that statistically significant relationship exists between top management support and implementation of KM. Value of R-square is .836 which means that 83.6% variance in the dependent variable (implementation of KM) can be predicted by independent variable (top

management support). Based on 'R' and R-square values above mentioned hypothesis is true and thus top management support is a CSF for the implementation of KM.

Pakistan: Hypothesis H₂ is about statistically significant relationship between top management support and implementation of KM. Value of 'R' is .905 which means that statistically significant relationship exists between top management support and implementation of KM thus proving the above mentioned hypothesis. R-square is .819 showing that 81.9% variance in the implementation of KM can be predicted by top management support.

Discussion: Top management is the key to successful KM implementation because they can influence it, (Horak, 2001; Pan and Scarbrough, 1998) not through verbal communication but by practically pursuing KM implementation. This can be done through sharing their knowledge. They can also set examples by learning new knowledge as actions speak louder than words (Wong, 2005). Therefore support and commitment from top management is critical for KM implementation (Martensson, 2000; Sharp, 2003) as top management can motivate other employees by indulging themselves in KM implementation.

This CSF was previously suggested by Abell & Oxbrow, 1999; APQC (b), 1999; Civi, 2000; Choi, 2000; Chong and Choi, 2005; Davenport et al., 1998; Dess and Pickens, 2000; Greco, 1999; Hasanali, 2002; Holsapple and Joshi, 2000; Kalling, 2003; Liebowitz, 1999; Moffett et al., 2003; Pemberton et al., 2002; Ryan and Prybutok, 2001; Salleh and Goh, 2002; Skyrme and Amidon, 1997; Ribiere and Sitar, 2003.

H₃: 'Knowledge Friendly Culture' has a statistically significant relationship with 'Implementation of KM'.

Malaysia: Value of 'R' for hypothesis H₃ is .897 which is close to 1 whereas value of R-square is .805 thus showing that 80.5% variance in the implementation of KM can be predicted by knowledge friendly culture. Based on the values of 'R' and R-square it can

be concluded that a statistically significant relationship exists between knowledge friendly culture and implementation of KM. Therefore, knowledge friendly culture can be considered as a CSF for the implementation of KM as it has a significant impact on the implementation of KM.

Pakistan: Hypothesis H₃ states that knowledge friendly culture is important and has significant relationship with implementation of KM. This is proved by the value of 'R' which is .837 suggesting that there is statistically significant relationship between knowledge friendly culture and implementation of KM. Value of R-square is .701 which means that 70.1% variance in the dependent variable (implementation of KM) can be predicted by independent variable (knowledge friendly culture). Based on the values of 'R' and R-square, it is concluded that above stated hypothesis is proved.

Discussion: Culture defines the beliefs, norms and values of an organization (Wong, 2005) and thus important for successful KM implementation. KM implementation is possible by promoting environment of creating, learning and sharing of knowledge in the organization. Culture is so important that a study done by (Davenport et al., 1998) emphasized that organizations pursuing KM initiative should try to align it with organizational culture otherwise they should change the culture of the organization. Meaning that if organizational culture and KM implementation initiative are not supporting each other then KM implementation will be unsuccessful. This shows the importance of culture for successful KM implementation.

Culture itself consist of many organizational aspects like collaboration among employees (Goh, 2002), trust (Lee and Choi, 2003) and empowerment (Stonehouse and Pemberton, 1999). Hence care should be taken while modifying the organizational culture according to KM implementation requirements.

This CSF was previously suggested by Skyrme and Amidon, 1997; APQC (b), 1999; Choi, 2000; Chong and Choi, 2005; Davenport et al., 1998; Greco, 1999; Greengard,

1998; Gupta et al., 2000; Jager, 1999; Liebowitz, 1999; McDermott and O'Dell, 2001; Moffett et al., 2003; Ribiere, 2001; Ryan and Prybutok, 2001; Wild et al., 2002.

H₄: 'Financial Resources' has a statistically significant relationship with 'Implementation of KM'.

Malaysia: Value of R-square is .778 which means that 77.8% variance in the dependent variable (implementation of KM) can be predicted by independent variable (financial resources). Value of 'R' is .882 which is close to 1 thus suggesting that a statistically significant relationship exists between financial resources and implementation of KM. Therefore on the basis of R-square and 'R', it is concluded that financial resources are important for the implementation of KM and can be considered as a CSF for the implementation of KM.

Pakistan: Value of 'R' is .876 and is close to +1, suggesting that statistically significant relationship exists between financial resources and implementation of KM. R-square value is .768 which means that 76.8% variance in the implementation of KM can be predicted by financial resources. Therefore, based on the values of 'R' and R-square, H₄ is proved.

Discussion: Financial resources are the key to KM implementation as IT tools will be required (Wong, 2005). SMEs lack financial and non-financial resources therefore careful attention should be paid while implementing KM. "Nice to have" (Wong, 2005) strategy should not be adopted. Decisions should be taken while keeping in mind the actual resources company has. This means that proper budgeting should be done for implementing KM.

This CSF was previously suggested by Davenport and Volpel, 2001; Holsapple and Joshi, 2000; Wong and Aspinwall, 2004 under resources. Resources consist of both financial and non-financial resources. At the same time financial resources are more important as compare to non-financial resources because all other resources are dependent on financial

resources thus this research proved that financial resources should be treated as a separate CSF besides non-financial resources.

H₅: 'IT Infrastructure' has a statistically significant relationship with 'Implementation of KM'.

Malaysia: Value of 'R' for H₅ is .847 which means that statistically significant relationship exists between IT infrastructure and implementation of KM. This is also supported by R-square value which is .763 showing that 76.3% variance in the dependent variable (implementation of KM) can be predicted by independent variable (IT infrastructure). Hence it is proved that IT infrastructure is a CSF for the implementation of KM.

Pakistan: Value of 'R' for hypothesis H₅ is .869 which means that statistically significant relationship exists between IT infrastructure and implementation of KM. This is also supported by R-square whose value is .756, thus showing that 75.6% variance in the dependent variable (implementation of KM) can be predicted by independent variable (IT infrastructure). Based on the values of 'R' and R-square, hypothesis H₅ is proved.

Discussion: IT is one of the key enablers for KM implementation as it can increase the search, sharing, retrieval of knowledge and at the same time helps employees to communicate with each other (Wong, 2005). On the other hand it is not right to assume that IT implementation means KM implementation, IT is only a facilitator but not KM implementation as a whole (Wong and Aspinwall, 2004). IT technologies which are helpful in successful KM implementation include data mining, CRM, e-learning and portals (Luan and Serban, 2002).

This CSF was previously suggested by Alavi and Leidner, 2001; APQC (b), 1999; Bhatt, 2001; Bontis et al., 2000; Choi, 2000; Chong and Choi, 2005; Davenport et al., 1998; Hasanali, 2002; Kotorov and Hsu, 2001; Liebowitz, 1999; McCampbell et al., 1999; Moffett et al., 2003; Ryan and Prybutok, 2001; Skyrme and Amidon, 1997.

H₆: 'Communication Between all Levels of Management' and 'Implementation of KM' has a statistically significant relationship.

Malaysia: 'R' value is .849 for this relationship which suggests that statistically significant relationship exists between communication and implementation of KM. Value of R-square is .720 which means that 72.0% variance in the dependent variable (implementation of KM) can be predicted by independent variable (communication between all levels of management). Thus on the basis of 'R' and R-square values, it can be concluded that above mentioned hypothesis is correct.

Pakistan: Hypothesis H₆ states about statistically significant relationship between communication about KM and implementation of KM. Value of 'R' is .830 which means that significant relationship exists between communication at all levels of management and implementation of KM. Value of R-square is .689 which shows that 68.9% variance in the dependent variable (implementation of KM) can be predicted by independent variable (communication between all levels of management). Based on the values of 'R' and R-square, it is concluded that hypothesis 6 is proved.

Discussion: Communication between all levels of management means that top, middle and lower levels of management should communicate with each other about KM initiatives and its successful implementation. Employees should discuss more and more about KM implementation so that it should become a norm in the organization. This will help to promote KM culture in the organization. Seminars, informal talks and dinners should be held at regular interval inside and outside the organization to increase the understanding of employees about KM. This will increase the level of trust among employees which is important for knowledge sharing culture (Lee and Chio, 2003).

This CSF was previously suggested by Wong, 2005 as sub component of another CSF but here results showed that this factor can be treated as a separate CSF.

H₇: 'Training and Education of Employees' has a statistically significant relationship with 'Implementation of KM'.

Malaysia: Value of 'R' is .837 which shows that statistically significant relationship exists between implementation of KM and training and education of employees. R-square value also suggests that 70.1% variance in the implementation of KM can be predicted by training and education.

Pakistan: Hypothesis H₇ states that there is significant relationship between training and education of employees and implementation of KM whereas value of 'R' is .826. Based on this value of 'R', one can conclude that a statistically significant relationship exists between training and education of employees and implementation of KM. R-square value is .683 which means that 68.3% variance in the dependent variable can be predicted by independent variable. Thus hypothesis H₇ is accepted and suggests that strong correlation exists between training and education of employees and implementation of KM.

Discussion: Employees play an important role in developing knowledge oriented culture in the organization. Therefore they should be trained about KM so that understanding of KM concepts increases among employees (Wong, 2005). Besides providing training about KM, emphasis should also be on tools and technologies (IT) because less awareness about IT will be an obstacle for KM implementation. Training and education should be provided about creation, sharing, retrieval and communication of knowledge. This CSF was previously suggested by Wong, 2005.

H₈: 'Hiring and Retention of Knowledgeable Employees' has a statistically significant relationship with 'Implementation of KM'.

Malaysia: Hiring and retention of knowledgeable employees is important for the implementation of KM and it has been proved by this research. Value of 'R' is .832 which means that statistically significant relationship exists between hiring and retention of knowledgeable employees and implementation of KM. R-square value also suggests

that 69.3% variance in the implementation of KM can be predicted by hiring and retention of knowledgeable employees. Thus above stated hypothesis is proved.

Pakistan: Hypothesis H₈ states that hiring and retention of knowledgeable employees has significant relationship with implementation of KM. Value of 'R' is .858 which is close to 1 thus a statistically significant relationship exists between hiring and retention of knowledgeable employees and implementation of KM. Value of R-square is .737 which shows that 73.7% variance in the dependent variable can be predicted by independent variable. Therefore based on the values of 'R' and R-square, hypothesis H₈ is proved.

Discussion: Organizations are run by employees and even success or failure of organizations depends on decisions made by people. Therefore careful attention should be paid while hiring employees. Only those people should be hired who have appropriate knowledge and who has aptitude for knowledge sharing. This will not only increase the overall level of knowledge in the organization as everybody will be sharing his/her knowledge but will also promote knowledge sharing culture. Importance of hiring of employees can be analyzed from the study done by (Davenport and Volpel, 2001) in which they stated that "managing knowledge is managing people; managing people is managing knowledge". Hence it is obvious that successful KM implementation is not possible without managing people as they are the producers of knowledge.

Retention of employees is also very important for organizations because when an employee leaves an organization then the knowledge that person possesses also leaves that organization. Hence, such policies should be formulated which will help to retain key employees (Brelade and Harman, 2000).

This CSF was introduced by Wong, 2005 but as a subcomponent of HRM. HRM itself is a vast field and consist of more than five functions. Whereas when it comes to the implementation of KM, concern should be more focused towards hiring and retention of those employees who are knowledgeable. Thus, results from this research showed that hiring and retention of knowledgeable employees should be treated as a separate CSF.

H₉: 'Rewards to Encourage KM Practices' has a statistically significant relationship with 'Implementation of KM'.

Malaysia: Hypothesis 9 is about rewards having a statistically significant relationship with implementation of KM. Value of 'R' is .828 which shows that there exists a significant relationship between successful implementation of KM and rewards to encourage KM practices. Value of R-square is .685 which means that 68.5% variance in the implementation of KM which is dependent variable can be predicted by independent variable (rewards to encourage KM practices).

Pakistan: Hypothesis H₉ is about statistically significant relationship between rewards and implementation of KM. Value of 'R' is .816 therefore significant relationship exists between rewards to encourage KM practices and implementation of KM. R-square value is .665 which shows that 66.5% variance in the dependent variable (implementation of KM) can be predicted by independent variable (rewards to encourage KM practices). Thus on these values, above mentioned hypothesis is proved.

Discussion: Employee's involvement in KM is extremely important because KM systems can not operate on their own. If employees are not interested then it is only wastage of resources (Wong, 2005). Therefore, to motivate employees about KM initiative and its successful implementation, they should be provided with rewards (intrinsic and extrinsic). Every person has some way of satisfaction so rewards can play an important role for successful KM implementation. It will be a good idea to link employee's performance with KM practices. Higher the KM practices performed by an individual, higher his/her performance appraisal should be.

This CSF was previously suggested by Davenport et al., 1998; Hauschild et al., 2001; Liebowitz, 1999; Salleh and Goh, 2002.

H₁₀: 'Measuring Effectiveness of KM' has a statistically significant relationship with 'Implementation of KM'.

Malaysia: Measuring effectiveness of KM is important. Value of 'R' is .820 which shows that statistically significant relationship exists between measuring the effectiveness of KM and implementation of KM. R-square value is .672 which means that 67.2% variance in the dependent variable can be predicted by independent variable. Therefore, hypothesis that measuring effectiveness of KM has a significant relationship with implementation of KM is correct.

Pakistan: Hypothesis 10 states that measuring the effectiveness of KM has a statistically significant relationship with implementation of KM. Value of 'R' is .819 which shows that significant relationship exists between measuring the effectiveness of KM and implementation of KM. R-square value is .670 which means that 67.0% variance in the dependent variable (implementation of KM) can be predicted by independent variable (measuring effectiveness of KM). Thus hypothesis H₁₀ is proved.

Discussion: The goals and objectives which are set by the management of an organization should be measurable. Reason for their measurement is that if they are not measured or measurable then how one can say that objectives and goals are being met. Same is the case with KM implementation. KM is implemented in any organization to meet some goals (financial and non-financial). Thus those goals should also be measured to see that whether KM implementation is helping organization to meet those specified goals and objectives or not (Arora, 2002). Otherwise organizations without measuring the success of KM are wasting their resources (Wong, 2005). Measurement helps an organization to control and improve the performance of KM (Ahmed et al., 1999). Measurement also helps lower and middle level management to convince top management that KM is helping organization to achieve its goals in a better and efficient way (Wong, 2005).

This CSF was previously suggested by Ahmed et al., 1999; APQC (b), 1999; Bassi and Van Buren, 1999; Beijerse, 2000; Carneiro, 2001; Choi, 2000; Chong and Choi, 2005; Davenport et al., 1998; Gooijer, 2000; Hasanali, 2002; Holsapple and Joshi, 2000; Martinez, 1998; Moffett et al., 2003; Pearson, 1999.

H₁₁: 'Organizational Infrastructure' has a statistically significant relationship with 'Implementation of KM'.

Malaysia: Hypothesis 11 states that there exists a statistically significant relationship between organizational infrastructure and implementation of KM. Value of 'R' is .780 which shows that there is a significant relationship between these two variables. R-square value also supports this phenomenon. R-square is .608 which shows that 60.8% variance in the dependent variable (implementation of KM) can be predicted by organizational infrastructure. Thus the above mentioned hypothesis is true.

Pakistan: Value of 'R' is .809 showing that statistically significant relationship exists between organizational infrastructure and implementation of KM. R-square value is .654 which means that 65.4% variance in the dependent variable (implementation of KM) can be predicted by independent variable (organizational infrastructure). Thus hypothesis H₁₁ is accepted on the basis of values of 'R' and R-square.

Discussion: Organizational infrastructure means that roles and responsibilities related to KM should be assigned to people who have the capacity to do that. Such people include CKO, CIO or KM department and their responsibilities should be to coordinate, manage and set directions for KM (Earl and Scott, 1999; Abell and Oxbrow, 1999; Herschel and Nemati, 2000). Organizational infrastructure is one of the reasons due to which SMEs can not initiate KM because they do not have enough resources for setting up this infrastructure.

This CSF was previously suggested by Davenport et al., 1998; Hasanali, 2002; Herschel and Nemati, 2000; Liebowitz, 1999.

H₁₂: 'Strategy for KM Implementation' has a statistically significant relationship with 'Implementation of KM'.

Malaysia: Value of 'R' is .755 which is close to +1 thus a statistically significant relationship exists between strategy for KM implementation and implementation of KM. R-square value is .570 which means that 57.0% variance in the dependent variable can be predicted by independent variable. Therefore on the basis of 'R' and R-square values, it can be concluded that the above mentioned hypothesis which is about significant relationship between strategy for KM implementation and KM implementation is justified.

Pakistan: Correlation value ('R' value) between strategy for KM implementation and implementation of KM is .783. This value is close to 1 and therefore a significant relationship exists between independent variable (strategy for KM implementation) and dependent variable (implementation of KM). Value of R-square is .613 which means that 61.3% variance in the dependent variable can be predicted by independent variable. Therefore, hypothesis H₁₂ is proved.

Discussion: Strategies are important for achieving any goals, without a proper strategy any plan will have more chances of failure. Same is the case with KM implementation. Strategy for KM implementation is extremely important (Liebowitz, 1999). Various strategies for KM implementation exist but it should be noted that a proper KM implementation strategy will be the one which is aligned with core business processes (Wong, 2005). If core business process strategy and KM implementation strategy are not aligned or they do not support each other then there are chances that KM implementation might not produce required results.

This CSF was previously suggested by APQC (b), 1999; Davenport et al., 1998; Liebowitz, 1999; Skyrme and Amidon, 1997; Zack, 1999.

H₁₃: 'Core Values of Business' has a statistically significant relationship with 'Implementation of KM'.

Malaysia: Statistically significant relationship exists between core values of business and implementation of KM as suggested by value of 'R' which is .771. R-square value is .594 which means that 59.4% variance in the implementation of KM (dependent variable) can be predicted by core values of business (independent variable). Thus hypothesis H₁₃ is correct.

Pakistan: Hypothesis H₁₃ states that there is a significant relationship between core values of business (vision and mission statements) and implementation of KM. Value of 'R' is .800 showing that statistically significant relationship exists between core values of a business and implementation of KM. R-square value is .639 which means that 63.9% variance in the dependent variable can be predicted by independent variable. Thus above mentioned hypothesis is accepted.

Discussion: In this research, core values means vision and mission statements of business. Management attracts their customers through these two statements. Inclusion of customer related knowledge in these two statements will compel management to pursue KM, as these two statements are considered publicly made promises. For the profitable existence of an organization, top management will never move away from public promises as this will hurt their market reputation. Therefore, KM's addition as part of core values of business through CRM can help in successful implementation of KM. At the same time employees should pursue this common vision and make sure that it is working (Wong, 2005).

This CSF was previously suggested by Wong, 2005, a subcomponent of another CSF as 'common vision'. Results from this research showed that core values of a business which includes vision and mission statements should be treated as a separate CSF for KM implementation.

H₁₄: 'Systematic KM Processes and Activities' has a statistically significant relationship with 'Implementation of KM'.

Malaysia: Hypothesis 14 is about the significant relationship between systematic KM processes and activities and KM implementation. Value of 'R' is .738 which means that statistically significant relationship is present between systematic KM processes and activities and implementation of KM. R-square value is .545 which shows that 54.5% variance in the dependent variable (implementation of KM) can be predicted by independent variable (systematic KM processes and activities). Therefore, hypothesis H₁₄ is proved.

Pakistan: Hypothesis H₁₄ is about statistically significant relationship between systematic KM processes and activities and implementation of KM. 'R' value is .773 which means that significant relationship exists between implementation of KM and systematic KM processes and activities. Value of R-square is .597, showing that 59.7% variance in the dependent variable (implementation of KM) can be predicted by independent variable (systematic KM processes and activities). Based on the values of 'R' and R-square, hypothesis H₁₄ is proved.

Discussion: According to (Johannsen, 2000), some operations can be performed on knowledge to use it in organization. There are many processes and activities associated with KM (Wong, 2005). For example, KM processes consist of creation, storage, transfer and application (Alavi and Leidner, 2001). Organizations should develop a "process-based" view for KM (Wong, 2005). Systematic KM processes and activities should support core and daily processes and activities of the organization. This will help in increasing the usefulness of KM implementation.

This CSF was previously suggested by Bhatt, 2000; Davenport et al., 1998; Holsapple and Joshi, 2000; Skyrme and Amidon, 1997.

H₁₅: 'Implementation of KM' has a statistically significant relationship with 'Non financial (daily) Performance of Company'.

Malaysia: Hypothesis 15 is about significant relationship between non-financial performance (daily performance) of the company and implementation of KM. This is proved with the value of 'R' which is .779 thus showing that a statistically significant relationship exists between dependent and independent variables. At the same time value of R-square is .606 which means that 60.6% variance in the dependent variable (non-financial performance of the company) can be predicted by independent variable (implementation of KM). Therefore, hypothesis H₁₅ is proved.

Pakistan: Non financial (daily) performance of the company can impact implementation of KM. Value of 'R' is .807 which shows that statistically significant relationship exists between implementation of KM and non-financial performance of the company. R-square value is .651 meaning that 65.1% variance in the dependent variable (non-financial performance of the company) can be predicted by implementation of KM (independent variable). Thus hypothesis H₁₅ is proved.

Discussion: KM implementation helps an organization to store its knowledge in codified form. This will reduce knowledge loss. When there will be less knowledge loss then employees will have more access to knowledge which will increase their understanding. This will ultimately help in efficient and quick decision making (Cortada and Woods 1999, p. 299-300). Organizational innovation and capability of utilizing resources increases after implementing KM (Darroch, 2005) and this research also proved that non-financial performance of the company improves after KM is implemented.

H₁₆: 'Implementation of KM' has a statistically significant relationship with 'Financial Performance of Company'.

Malaysia: Hypothesis 16 states that there is a significant relationship between financial performance of the company and implementation of KM. Value of 'R' (.887) suggests

that there is a statistically significant relationship thus proving the hypothesis. R-square value is .788 which shows that 78.8% variance in the financial performance of the company can be predicted by implementation of KM.

Pakistan: Hypothesis H₁₆ is about significant relationship between implementation of KM and financial performance of the company. 'R' value is .840 showing that statistically significant relationship exists between implementation of KM and financial performance of the company. Value of R-square is .705 which means that 70.5% variance in the dependent variable (financial performance of the company) can be predicted by independent variable (implementation of KM).

Discussion: Not enough work has been done on the relationship between KM implementation and financial performance. Still there are evidences that KM implementation helps to increase financial performance of the organization as it does for non-financial performance. For example, a study done by (Cortada and Woods 1999, p. 298) concluded that financial performance improved when KM was implemented in the projects. Similarly, (Chan and Chao, 2008) suggested that company's financial performance can be improved by implementing KM and this relationship is proved by this research as well.

5.3 Summary of all Hypotheses

Table 5-1 summarizes the results of all hypotheses which were tested through the data collected from Pakistan and Malaysia. Table 5-1 lists the dependent and independent variables and the results of hypothesis separately for both countries.

Table 5-1: Summary of all Hypotheses

Summary of all Hypotheses					
	Hypothesis	Independent Variable	Dependent variable	Pakistan	Malaysia
1	H ₁	Understanding of KM	Implementation of KM	Supported	Supported
2	H ₂	Top Management Support	Implementation of KM	Supported	Supported
3	H ₃	Knowledge Friendly Culture	Implementation of KM	Supported	Supported
4	H ₄	Financial Resources	Implementation of KM	Supported	Supported
5	H ₅	IT Infrastructure	Implementation of KM	Supported	Supported
6	H ₆	Communication Between all Levels of Management	Implementation of KM	Supported	Supported
7	H ₇	Training and Education of Employees	Implementation of KM	Supported	Supported
8	H ₈	Hiring and Retention of Knowledgeable Employees	Implementation of KM	Supported	Supported
9	H ₉	Rewards to Encourage KM Practices	Implementation of KM	Supported	Supported
10	H ₁₀	Measuring Effectiveness of KM	Implementation of KM	Supported	Supported
11	H ₁₁	Organizational Infrastructure	Implementation of KM	Supported	Supported
12	H ₁₂	Strategy for KM Implementation	Implementation of KM	Supported	Supported
13	H ₁₃	Core Values of Business	Implementation of KM	Supported	Supported
14	H ₁₄	Systematic KM Processes and Activities	Implementation of KM	Supported	Supported
15	H ₁₅	Implementation of KM	Non-financial Performance	Supported	Supported
16	H ₁₆	Implementation of KM	Financial Performance	Supported	Supported

5.4 Items Deleted (Malaysian Data)

Table 5-2 provides a list of items that were deleted from the total items used to measure the relationship between independent and dependent variables. These items were deleted based on their p-values which were compared against .05 level. The p-values of these items were above .05 level, thus they were insignificant items. Their beta values were also showing that they were not significant contributors.

Table 5-2: Items Deleted (Malaysian Data)

<i>Item</i>	<i>Beta Value</i>	<i>P-value</i>
Importance of KM for SMEs	0.121	0.159
Trust for sharing knowledge	0.128	0.129
Allocation of financial resources	0.064	0.323
Financial resources for manpower	0.170	0.136
Appropriate tools	0.219	0.080
KM systems Vs user needs	0.062	0.357
Knowledge fairs	0.200	0.165
Informal presentations and meetings	0.128	0.176
Writing or telling stories	0.264	0.096
Training and educating about KM	0.064	0.658
Training for creative thinking, team building	0.001	0.995
Hiring people who like knowledge sharing	0.127	0.207
Growth opportunities for knowledgeable employees	0.131	0.224
Incentives to promote KM	0.127	0.163
Encouraging employees to look for new knowledge	-0.043	0.354
Monitoring the progress	0.010	0.467
Impact of KM on performance	-0.009	0.472
Knowledge officers	0.280	0.077
Groups or teams of knowledgeable people	-0.143	0.394
KM strategy Vs business strategy	-0.075	0.333
Organizational values and employee behavior	0.226	0.222
Organizational culture	-0.028	0.869
Practice by top management	0.215	0.253
Methods for categorizing knowledge	0.123	0.194
Communication among employees	0.238	0.050
Time saving	-0.031	0.429
Efficiency in daily performance	0.004	0.488
Less administrative errors	0.148	0.204
Procurement cost	0.193	0.135

5.5 Items Selected (Malaysian Data)

Items shown in table 5-3 were selected as their contribution towards measuring the relationship between independent and dependent variable was significant. Beta and p-values for each item were significant as p-value was less than .05 level whereas beta value was also high.

Table 5-3: Items Selected (Malaysian Data)

<i>Item</i>	<i>Beta Value</i>	<i>P-value</i>
Importance of IT literacy	0.349	0.001
Spending on KM tools	0.316	0.003
Faster access to information	0.346	0.001
KM initiation	0.341	0.001
Providing suitable environment	0.353	0.001
Encouraging for creating and sharing knowledge	0.175	0.029
Commitment to implement KM	0.372	0.000
Tolerance for mistakes	0.302	0.005
Cooperation among employees	0.184	0.038
Encourage to explore new possibilities	0.554	0.000
Availability of financial resources	0.341	0.009
Investment for IT tools	0.424	0.007
Internet or intranet	0.372	0.006
User friendly systems	0.386	0.011
Keep talking about KM	0.372	0.020
Training about KM tools	0.544	0.002
Training on choosing KM as career	0.334	0.043
Hiring people who have KM aptitude	0.484	0.003
Rewards to those who share knowledge	0.369	0.002
Link b/w knowledge sharing and motivational methods	0.566	0.000
Measuring the benefits	0.558	0.000
KM measurement techniques	0.554	0.000
Roles and responsibilities for KM tasks	0.446	0.009
Number of PCs or laptops per employees	0.490	0.001
Common vision	0.260	0.040
Objectives and goals	0.395	0.012
Dependence of core business on KM	0.518	0.000
KM in organizational values	0.490	0.004
Ideas and knowledge	0.266	0.038
Quality of shared knowledge	0.476	0.001
Finding best practices	0.699	0.000
Income per employee	0.360	0.010
Cost per employee	0.323	0.012
Operating cost	0.254	0.020

5.6 Items Deleted (Pakistan Data)

Following items in table 5-4 were considered as insignificant while measuring the relationship between independent and dependent variables from Pakistan based SMEs. Criterion for deleting items was same as for Malaysian SMEs i.e., based on beta and p-values. If p-value was greater than .05 then that item was considered as insignificant and was discarded.

Table 5-4: Items Deleted (Pakistan Data)

<i>Item</i>	<i>Beta Value</i>	<i>P-value</i>
Importance of KM for SMEs	-0.039	0.765
Spending on KM tools	0.254	0.060
Commitment to implement KM	0.183	0.063
Allocation of financial resources	0.226	0.073
Investment for IT tools	0.155	0.150
Appropriate tools	0.105	0.191
Internet or intranet	0.161	0.092
KM systems Vs user needs	0.243	0.076
Keep talking about KM	0.147	0.212
Knowledge fairs	0.337	0.062
Informal presentations and meetings	0.118	0.206
Writing or telling stories	0.332	0.062
Training on choosing KM as career	0.150	0.299
Training for creative thinking, team building	0.184	0.137
Hiring people who like knowledge sharing	0.092	0.263
Growth opportunities for knowledgeable employees	0.119	0.238
Rewards to those who share knowledge	0.165	0.116
Incentives to promote KM	0.207	0.062
Monitoring the progress	-0.067	0.306
Impact of KM on performance	0.186	0.079
Knowledge officers	0.174	0.235
Groups or teams of knowledgeable people	0.277	0.073
Roles and responsibilities for KM tasks	0.257	0.091
Common vision	0.124	0.174
Objectives and goals	0.094	0.282
KM strategy Vs business strategy	0.204	0.105
Organizational values and employee behavior	0.077	0.664
Organizational culture	0.046	0.806
Practice by top management	0.289	0.160
Methods for categorizing knowledge	0.157	0.121
Communication among employees	0.196	0.074
Getting right information when needed	0.054	0.360
Increase in knowledge sharing via internet/intranet	-0.019	0.448
Increase of financial resources on IT tools	-0.010	0.471
Income per employee	0.162	0.249
Cost per employee	0.218	0.110
Procurement cost	0.280	0.050

5.7 Items Selected (Pakistan Data)

Following items in table 5-5 were selected to measure the relationship between independent and dependent variables. Beta and p-values were used to select these items. Higher the value of beta, more is the significance of that item. P-value was also used to see the significance of the item. If p-value of a particular item was less than .05, it was significant.

Table 5-5: Items Selected (Pakistan Data)

<i>Item</i>	Beta Value	P-value
Importance of IT literacy	0.454	0.003
Faster access to information	0.344	0.017
KM initiation	0.217	0.019
Providing suitable environment	0.510	0.000
Encouraging for creating and sharing knowledge	0.430	0.000
Toleration for mistakes	0.492	0.000
Cooperation among employees	0.282	0.018
Encourage to explore new possibilities	0.352	0.012
Availability of financial resources	0.205	0.048
Financial resources for manpower	0.454	0.001
User friendly systems	0.528	0.001
Training and educating about KM	0.421	0.006
Training about KM tools	0.369	0.008
Hiring people who have KM aptitude	0.523	0.001
Retaining knowledgeable employees	0.253	0.040
Encouraging employees to look for new knowledge	0.268	0.020
Link between knowledge sharing and motivational methods	0.542	0.000
Measuring the benefits	0.479	0.001
KM measurement techniques	0.602	0.000
Number of PCs or laptops per employee	0.360	0.013
Dependence of core business on KM	0.635	0.000
KM in organizational values	0.522	0.002
Ideas and knowledge	0.347	0.011
Quality of shared knowledge	0.419	0.004
Knowledge loss due to employee turnover	0.797	0.000
Operating cost	0.426	0.003

5.8 Comparison of Significance of CSFs (Malaysia and Pakistan Based Results)

Significance of CSFs varied from Malaysia to Pakistan based SMEs. There are various reasons for this. Most important of them are understanding of KM, educated people in the organization and level of financial and non-financial resources. Other reasons include level of IT, years using KM, government interference and top management commitment towards KM implementation.

Pakistan based SMEs were having more understanding of KM and top management was more committed towards KM implementation. This can be found through the significance of CSFs produced by Pakistan based SMEs. Although there is not much difference among the ranking of top 5 CSF because they are more general and very important for KM implementation.

Ranking of CSFs done by Pakistan based SMEs seems to be more reliable for KM implementation. For example top management support is important, if top management is committed then people should have understanding of KM. When top management and employees are ready and they understand KM then financial and non-financial resources are required to implement KM.

People who have knowledge sharing aptitude should be hired and retained. After this knowledge friendly culture should be promoted because culture is made by employees so when you hire and retain knowledge sharing people then obviously knowledge sharing culture will prevail in the organization.

Once knowledge sharing culture is being promoted, it is important to communicate about KM at every level of management. Besides this, people should also be educated and trained about KM. When KM is implemented, then measuring its effectiveness is important to see whether stated goals and objectives are met or not. It is also important to give rewards to employees when KM is implemented.

So this ranking of CSFs is more logical as compare to Malaysia based ranking which ranks knowledge friendly culture before financial resources and IT infrastructure. Knowledge friendly culture can be promoted when KM is about to be implemented or has been implemented and for its implementation, SMEs need financial and non-financial resources.

5.9 Comparison of IT Situation in SMEs (Malaysia and Pakistan Based Results)

IT is a key enabler for KM implementation. Therefore those organizations which have more sophisticated tools of IT, they will have more chances of easily implementing KM as compare to non-IT or less IT oriented companies. While comparing the situation of Pakistan and Malaysian SMEs from IT perspective, Pakistan based SMEs seems to have advantage over Malaysian SMEs.

IT implementation was categorized into four levels. Level 1 means there is no implementation of IT at all, except some basic communication tools like land line and mobile phones. Level 2 means use of Microsoft Office and computers for day to day transactions. Level 3 means internet or intranet and some sort of database usage besides email and video conferencing. Level 4 means usage of tools which are more advanced in nature like inventory management systems, ERP tools and decision support systems.

Malaysia had one SME which was using level 1 whereas Pakistan had none. Three companies had level 2 of IT implementation from Pakistan and Malaysia each. As far as level 3 is concerned, 11 Malaysian SMEs were at this level whereas 9 Pakistan based SMEs were using level 3. Fifteen Malaysia based SMEs were at level 4 of IT implementation whereas 18 Pakistan based SMEs were at this level. Therefore Pakistan based SMEs are using more sophisticated tools as compare to Malaysian SMEs.

***5.10 Companies and Years wise Comparison of Current KM Situation in SMEs
(Malaysia and Pakistan Based Results)***

More companies had implemented KM in Pakistan as compare to Malaysia. Total 27 SMEs were using KM in Pakistan in comparison to Malaysia in which 25 companies were using KM techniques. Eight SMEs of Pakistan were using KM from last 1-3 years while 6 SMEs from Malaysia were involved in KM in the same duration. Ten Malaysian SMEs were using KM from 3-5 years and 8 Pakistan based SMEs. Similarly, 11 Pakistan based SMEs and 9 Malaysia based SMEs were using KM from more than 5 years.

Therefore, based on this feedback and analysis, it is clear that KM is being followed more in Pakistan as compare to Malaysia. This is one of the reasons of having more KM awareness in Pakistan.

***5.11 Companies and Years wise Comparison of Future KM Situation in SMEs
(Malaysia and Pakistan Based Results)***

Future KM situation seems to be better in Pakistan as compare to Malaysia. Twenty SMEs from Malaysia said that they will invest in KM whereas 24 SMEs from Pakistan will invest in KM in coming years.

Three SMEs from Malaysia responded that they will invest in KM in next 1-3 years whereas 8 Pakistan based SMEs will invest in KM in the same time period. Fifteen SMEs from Pakistan will invest in KM in next 3-5 years whereas 10 SMEs from Malaysia. Seven SMEs from Malaysia will take more than 5 years to implement KM whereas 1 SME from Pakistan will take this much time.

Based on this feedback, one can see that from last 1-5 years, KM implementation situation in Pakistan based SMEs is better in comparison to Malaysia based SMEs. At the same time in next 1-5 years, more SMEs from Pakistan will invest in KM while less SMEs from Malaysia will invest in KM.

5.12 Comparison of Reasons for not Implementing KM in SMEs (Malaysia and Pakistan Based Results)

Pakistan and Malaysia based SMEs were asked to provide feedback on the reasons due to which they or other SMEs have not implemented KM. Set of reasons were provided to them and respondents were to choose from those reasons.

Respondents from both the countries agreed that top management commitment, less financial and non-financial resources and less information about KM benefits are the three main reasons for not implementing KM. Other reasons include lack of time and human resource besides lack of knowledge oriented people.

5.13 Summary

This chapter summarized and discussed all the results which included reliability analysis, hypotheses testing, items deleted which were insignificant, significant items, comparison of CSFs and comparison of IT level between Pakistan and Malaysia.

Next chapter will summarize the contributions made by this research, recommendations and future work.

CHAPTER 6 – CONCLUSION

6.0 Overview

This chapter discusses about the contributions of the research work, recommendations and future work.

Following section of the research provides details about how stated objectives (chapter 1) were met.

6.1 Contributions of Research Work

1. Fourteen CSFs for the implementation of KM in SMEs were focused. These CSFs were identified with the help of hypotheses testing. Fourteen hypotheses were formed to see whether the factors suggested in the research can be considered as CSFs for KM implementation or not. This contribution fulfills the 1st objective of the research work which is about identifying CSFs for KM implementation.
2. CSFs were ranked on the basis of significance each CSF has while implementing KM. This ranking was done on the basis of values of 'R' and R-square. These values were obtained with the help of linear regression which was used to test hypotheses. Although this contribution is not one of the major objectives of the research, but still it was done to analyze which CSFs has more significance over others.
3. Based on those CSFs, a framework for KM implementation in SMEs was proposed. This contribution of the research is also a secondary objective and is about proposing a framework for KM implementation based on CSFs obtained from objective one.

4. Impact of KM implementation on financial and non-financial (daily) performance of the organization was analyzed. This was the 2nd objective of research. This was done through linear regression.
5. Level of IT implementation in SMEs of Pakistan and Malaysia was analyzed which showed that SMEs from Pakistan have more IT and KM awareness as compare to Malaysian SMEs. IT is a key enabler for KM implementation therefore to see the overall situation of KM in an organization or country; one has to see the IT situation. Therefore, this research contribution was basically to support third objective of the research work. This contribution does not directly measure the level of KM implementation; in fact it gives an indirect overview of KM implementation.
6. Current and future situation of KM implementation in Malaysia and Pakistan based SMEs was measured. The results showed that SMEs from last 1-5 years are moving towards KM implementation. At the same time those SMEs which have not implemented KM so far are interested to invest in KM in next 1-5 years. This contribution of the research meets the 3rd objective which is about analyzing current and future situation of KM implementation in Malaysia and Pakistan.
7. Reasons for not implementing KM in SMEs were also discussed. List of reasons was provided to respondents and they were asked to select those reasons which according to them were more important for not implementing KM. This was not one of the major objectives of the research, but it was included in the research just to see that what can be those reasons which can delay KM implementation in SMEs.
8. Benefits of KM implementation in SMEs were also discussed. List of benefits of KM implementation was provided to respondents and they were asked to state those benefits which according to them are guaranteed to achieve after KM

implementation. This is also a side contribution of the research apart from mainstream objectives.

9. General types of KM applications used by SMEs were also analyzed. This contribution helps to analyze that what are those applications which are mostly used by SMEs and what are their uses? Either they are being used for knowledge capturing, knowledge sharing or knowledge storing?

All the objectives and research questions which were stated in the first chapter were answered. This research was primarily based on (Wong, 2005) and is an enhancement plus validity of previous studies.

6.2 Recommendations and Future Work

1. Number of SMEs should be increased from these countries (Pakistan and Malaysia) to get more accurate and reliable results.
2. Research should be expanded to different countries so that framework and CSFs can be generalized.
3. Instead of only top management, other levels of management should be included in the research to get involvement of all levels of management.

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*Appendix A**Conference Papers*

1. **Rehman, M.** Mahmood, K.B and Sugathan, S.K. (2009), “Preliminary Study on Critical Success Factors for the Implementation of Knowledge Management in Malaysian Small and Medium Enterprises”, National Postgraduate Conference (NPC), Universiti Teknologi PETRONAS, Malaysia, 25th – 26th March, 2009.
2. **Rehman, M.** Mahmood, K.B and Sugathan, S.K. (2009), “Preliminary Study on Proposed Framework for the Implementation of Knowledge Management in Small and Medium Enterprises”, 12th IBIMA Conference, Kuala Lumpur, Malaysia, 29th – 30th June, 2009.
3. **Rehman, M.** Mahmood, K.B and Sugathan, S.K. (2009), “Implementation of Knowledge Management in Small and Medium Enterprises – Malaysian Perspective”, 12th IBIMA Conference, Kuala Lumpur, Malaysia, 29th – 30th June, 2009.

Appendix B**Questionnaire**

**RESEARCH TITLE: CRITICAL SUCCESS FACTORS FOR THE IMPLEMENTATION OF
KNOWLEDGE MANAGEMENT IN SMALL AND MEDIUM ENTERPRISES**

DISCLAIMER: Information gathered from this questionnaire will strictly be confidential. Entire information will be used for research purpose only and will not be shared with third party under any circumstances.

Definition(s)

Knowledge Management (KM): Managing the 'expertise and skills' of employees working in an organization.

Critical Success Factors: Factors which play an important role in implementing KM (managing the expertise and skills of employees) in an organization.

Abbreviation(s)

KM = Knowledge Management (managing the expertise and skills of employees)

Critical Success Factors and Items to Measure Them

From question 1 – 3, please use the following scale:

1 = Not important at all, 2 = Slightly important, 3 = Moderately important, 4 = Important, 5 = Very important, 6 = Extremely important

Q1: How important the following statements are for implementing knowledge management (managing the expertise and skills of employees) in an organization?

Management Leadership and Support

Leaders initiate KM related activities	1	2	3	4	5	6
Management provides the suitable environment for KM	1	2	3	4	5	6
Leaders encourage creation, sharing and use of knowledge	1	2	3	4	5	6
Management shows commitment to implement KM	1	2	3	4	5	6

Culture

<u>Mistakes are tolerated in the organization</u>	1	2	3	4	5	6
<u>Employees trust each other while sharing knowledge</u>	1	2	3	4	5	6
<u>Level of cooperation among employees</u>	1	2	3	4	5	6
<u>Employees are encouraged to explore new possibilities</u>	1	2	3	4	5	6

Information Technology

<u>Use of appropriate KM tools</u>	1	2	3	4	5	6
<u>Utilization of intranet or internet</u>	1	2	3	4	5	6
<u>User friendly systems</u>	1	2	3	4	5	6
<u>KM systems should match user needs</u>	1	2	3	4	5	6

Strategy and Purpose

<u>A common vision that people support</u>	1	2	3	4	5	6
<u>Development of a KM strategy with clear objectives and goals</u>	1	2	3	4	5	6
<u>KM strategy and business strategy should support each other</u>	1	2	3	4	5	6
<u>How much a core business issue is dependent on KM strategy</u>	1	2	3	4	5	6

Measurement

<u>Measuring the benefits of KM implementation</u>	1	2	3	4	5	6
<u>Monitoring the progress of KM implementation</u>	1	2	3	4	5	6
<u>Impact of KM on financial performance</u>	1	2	3	4	5	6
<u>Developing KM measurement techniques</u>	1	2	3	4	5	6

Organizational Infrastructure

<u>Presence of knowledge officer(s) in the company</u>	1	2	3	4	5	6
<u>Making group(s) or team(s) of knowledgeable people</u>	1	2	3	4	5	6
<u>Assigning roles and responsibilities for performing KM tasks</u>	1	2	3	4	5	6
<u>Number of PCs or laptops per employee</u>	1	2	3	4	5	6

Processes and Activities

<u>Creating new ideas and knowledge</u>	1	2	3	4	5	6
<u>Better methods for categorizing, storing and finding required knowledge</u>	1	2	3	4	5	6
<u>Effective communication among employees</u>	1	2	3	4	5	6
<u>Quality of the shared knowledge</u>	1	2	3	4	5	6

Motivational Aids

<u>Providing incentives to promote KM</u>	1	2	3	4	5	6
<u>Encouraging employees to always look for new knowledge</u>	1	2	3	4	5	6
<u>Give rewards to those employees who share knowledge</u>	1	2	3	4	5	6
<u>Motivational methods and job performance should be linked together</u>	1	2	3	4	5	6

Resources

<u>Availability of resources while implementing KM</u>	1	2	3	4	5	6
<u>Allocation of resources for KM implementation and maintenance</u>	1	2	3	4	5	6
<u>Enough financial resources for KM tools</u>	1	2	3	4	5	6
<u>Enough manpower to implement and maintain KM</u>	1	2	3	4	5	6

Human Resource Development

<u>Providing training and education about the concepts of KM</u>	1	2	3	4	5	6
<u>Training employees to use KM tools</u>	1	2	3	4	5	6
<u>Training and educating individuals on choosing KM as career</u>	1	2	3	4	5	6
<u>Training for creative thinking, problem solving, communication, soft networking and team building</u>	1	2	3	4	5	6

Human Resource Management

<u>Hiring people who know about knowledge, KM and its benefits</u>	1	2	3	4	5	6
<u>Hiring those people who like knowledge sharing activities</u>	1	2	3	4	5	6
<u>Giving importance to retain knowledgeable employees</u>	1	2	3	4	5	6
<u>Growth opportunities for employees</u>	1	2	3	4	5	6

Organizational Values

<u>Importance of KM in organizational values</u>	1	2	3	4	5	6
<u>Influence of organizational values on employee behavior</u>	1	2	3	4	5	6
<u>Support by organizational culture to organizational values</u>	1	2	3	4	5	6
<u>Extent organizational values are practiced by top management</u>	1	2	3	4	5	6

Communication

<u>Keep talking about the concepts of KM</u>	1	2	3	4	5	6
<u>Holding knowledge fairs regularly in the organization</u>	1	2	3	4	5	6
<u>Informal presentations and lunches</u>	1	2	3	4	5	6
<u>Writing, telling stories or providing links on internet or intranet about KM activities</u>	1	2	3	4	5	6

Q2. IT literacy is important for all employees at all levels of management? 1 2 3 4 5 6

Q3. How important KM (managing expertise and skills) is for small and medium organizations?

1 2 3 4 5 6

Q4. Rank the following variables according to the role they play in implementing KM (managing the expertise and skills of employees). (Rank from 1 to 13) 1 = Most important and 13 = Least important.

Variables	Rank
1. Senior management support and leadership	_____
2. Knowledge friendly culture	_____
3. Technological infrastructure (IT Tools)	_____
4. Strategy for KM	_____
5. Measuring the effectiveness of KM	_____
6. Roles and responsibilities for managing knowledge	_____
7. Systematic KM processes and activities	_____
8. Core values of business	_____
9. Rewards to encourage KM practices	_____
10. Resources	_____
11. Hiring and retention of knowledgeable people	_____
12. Training and education of employees	_____
13. Communication between top, middle and lower levels of management	_____

Q5. Besides 13 variables ranked above, are there any other factors which you think are important for managing the expertise and skills of employees?

- Yes
- No

If yes than what are those?

Understanding of Knowledge Management (KM)

For questions 6 - 10, please use the following scale:

1 = Completely Disagree, 2 = Slightly Disagree, 3 = Moderately Disagree, 4 = Slightly Agree, 5 = Moderately Agree, 6 = Completely Agree

Q6. Do you agree that efficiency in daily processes and activities increases by implementing KM?

1 2 3 4 5 6

Q7. Do you agree that employees in your organization are getting right information whenever they need that?

1 2 3 4 5 6

Q8. Do you agree that your organization never suffers loss of knowledge due to employee turnover?

1 2 3 4 5 6

Q9. Do you agree that knowledge sharing by internet or intranet has increased in your organization?

1 2 3 4 5 6

Q10. Do you agree that spending of financial resources on IT related tools is increasing or has increased in your organization?

1 2 3 4 5 6

Implementation of Knowledge Management

Q11. Have you implemented KM in your organization?

- Yes (If yes then go to question 12)
- No (If no then go to question 13)
- Do not know

Q12. For how long you have implemented KM in your organization?

- 1-3 years
- 3-5 years
- More than 5 years

Q13. Are you planning to invest in KM in future?

- Yes (If yes then answer question 14)
- No (If no then answer question 15)
- Do not know

Q14. If yes then when and why?

- 1-3 years
- 3-5 years
- More than 5 years

Why (you can choose multiple options)?

- Improves decision making
- Improves responsiveness to customers
- Improves innovation
- Improves products or services
- Due to better management of processes and activities
- Due to better financial results
- Due to time saving
- Due to more office automation
- Better learning opportunities
- Others

Q15. What are the reasons for not practicing KM (managing the expertise and skills of employees) in SMEs? (You can choose more than one options)

- Do not know about the benefits of KM
- Do not know what KM is
- Lack of knowledge oriented people
- Lack of time and human resource
- Less financial and non financial resources
- Less commitment from top management
- Others

Q16. What type of Information Technology (IT) hardware and software you are using in your company?

<ul style="list-style-type: none"> Level 1: Fixed line/mobile phone, fax (basic communication)
<ul style="list-style-type: none"> Level 2: Computers with basic applications like Microsoft Office (basic Information Technology)
<ul style="list-style-type: none"> Level 3: Email, internet browsing, video conferencing, intranet, file sharing, creating websites, E-commerce, Voice over Internet Protocol (advanced communication)
<ul style="list-style-type: none"> Level 4: Computers with applications like databases, Enterprise Resource Planning (ERP), inventory management, Customer Relationship Management (CRM) (advanced Information Technology)

Q17. Which of the following types of KM (managing the expertise and skills of employees) initiative(s) have been implemented in your organization? (You can choose more than one options)

<ul style="list-style-type: none"> No implementation of KM Using IT tools to capture knowledge Using IT tools (i.e. database) to share knowledge Using intranet or internet to publish and access information Building and maintaining employee's expertise and skills Identifying internal or external best practices Friendly knowledge sharing culture Developing strategies for KM Appointing KM leaders and teams Providing incentives to KM promoters in organization Measuring the value of intellectual capital
--

Financial Performance of Organization and KM Implementation

For questions 18 - 20, please use the following scale:

1 = Not important at all, 2 = Slightly important, 3 = Moderately important, 4 = Important, 5 = Very important, 6 = Extremely important

Q18. How important implementation of KM is for better financial performance?	1 2 3 4 5 6
Q19. How important spending on IT tools is for the implementation of KM?	1 2 3 4 5 6

Q20. How important faster access to information is for KM implementation?
<u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> <u>6</u>

From question 21 – 27, please use the following scale:

1 = Completely Disagree, 2 = Slightly Disagree, 3 = Moderately Disagree, 4 = Slightly Agree, 5 = Moderately Agree, 6 = Completely Agree

Q21. Do you agree that implementation of KM helps in increasing 'income per employee'?
<u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> <u>6</u>

Q22. Do you agree that implementation of KM helps in decreasing 'cost per employee'?
<u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> <u>6</u>

Q23. Do you agree that implementation of KM helps in the 'reduction of procurement cost'?
<u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> <u>6</u>

Q24. Do you agree that implementation of KM helps in 'reducing operating cost'?
<u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> <u>6</u>

Q25. Do you agree that errors in administration will decline after implementing KM?
<u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> <u>6</u>

Q26. Do you agree that implementation of KM helps in finding best practices in daily operations?
<u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> <u>6</u>

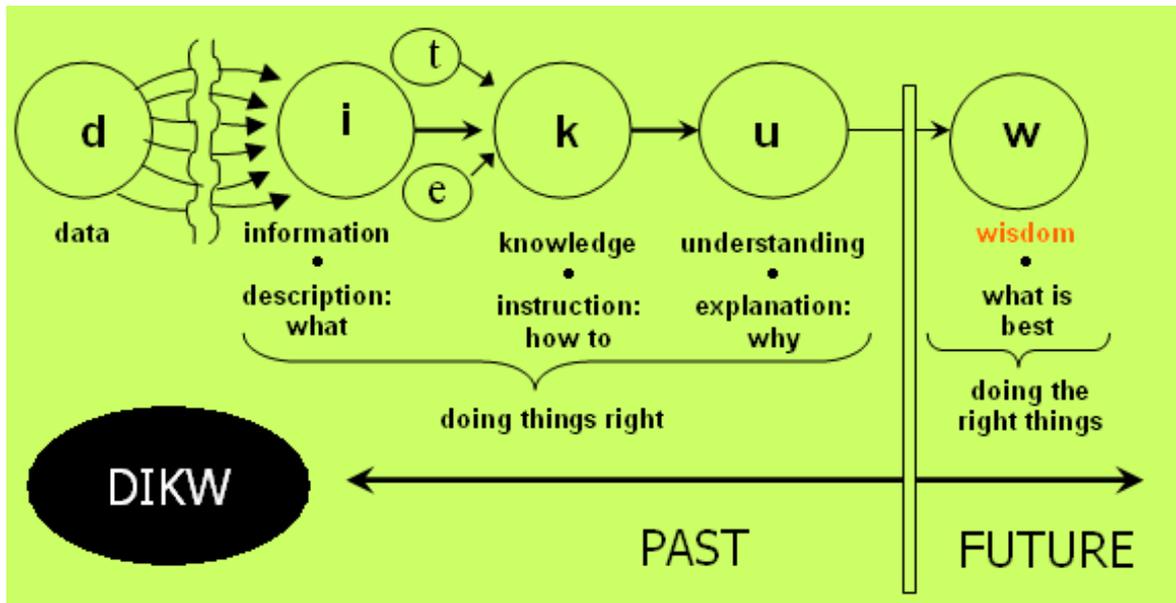
Q27. Do you agree that implementation of KM helps to save the time during the processes?
<u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> <u>6</u>

Any other comment(s) you wish to add:

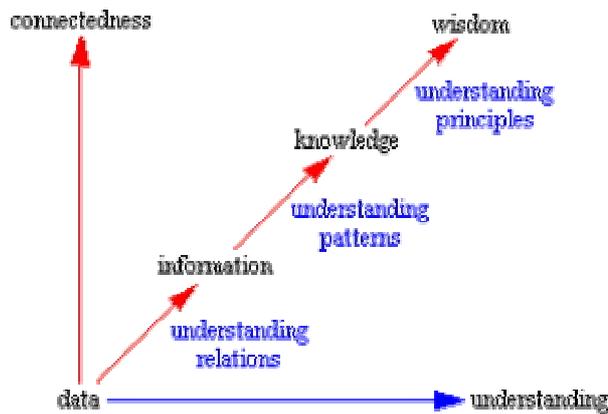
THANK YOU FOR YOUR COOPERATION

Appendix C

Data-to-Information-to-Knowledge-to-Wisdom



Source: <http://en.wikipedia.org/wiki/DIKW>



Source: <http://www.systems-thinking.org>

Appendix D**Defining SMEs and their Importance**

Table 1: EU Criteria for Defining SMEs

	Number of Employees	Turnover (£ Million)	OR	Total Assets (£ Million) as per Balance Sheet
Micro	Less than 10	Less than or equal to 2		Less than or equal to 2
Small	Less than 50	Less than or equal to 10		Less than or equal to 10
Medium	Less than 250	Less than or equal to 50		Less than or equal to 43

Source: http://ec.europa.eu/enterprise/enterprise_policy/sme_definition/index_en.htm

Table 2: SME Defining Criteria from some Other Countries

Country	Criteria for SMEs
China	Number of Employees
Hong Kong	Number of Employees
Indonesia	Number of Employees
Japan	Number of Employees and Assets
Philippines	Number of Employees and Assets
Korea	Number of Employees, Assets and Annual Sales
Singapore	Number of Employees and Assets
Taiwan	Annual Sales and Number of Employees
Thailand	Number of Employees and Assets
Australia	Number of Employees
Canada	Number of Employees
USA	Number of Employees

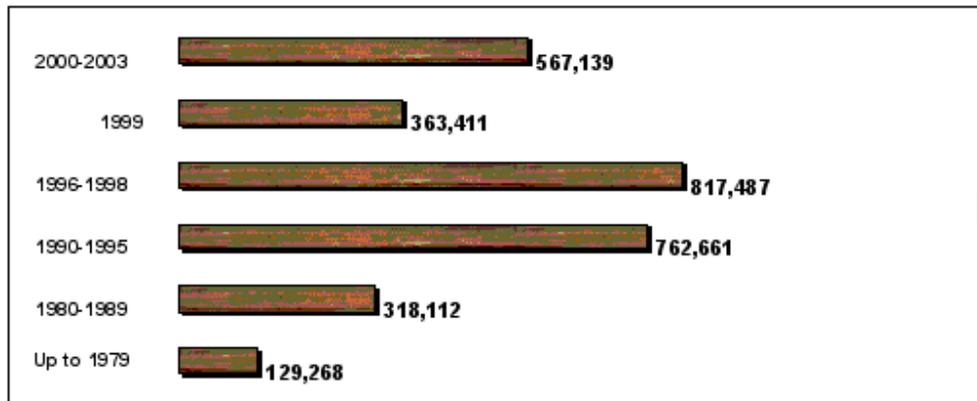
Source: <http://www.moeasmea.gov.tw/eng/2006whitepaper/2006white.asp>

Importance of SMEs to the World (an Overview)

Importance of SME's for the economy of world can be judged from the following facts:

- European Union (EU) - SMEs present the 99% (19.3 million enterprises) of total businesses, providing jobs to almost 75 million people (Lukacs, 2005).
- Japan – 81% of the people out of total employment are employed by SMEs (Lukacs, 2005).
- United Kingdom (UK) – 99% of the businesses are SME based (Lukacs, 2005).
- Latin America – 80-90% of the business establishments are small and medium based enterprises (Lukacs, 2005).

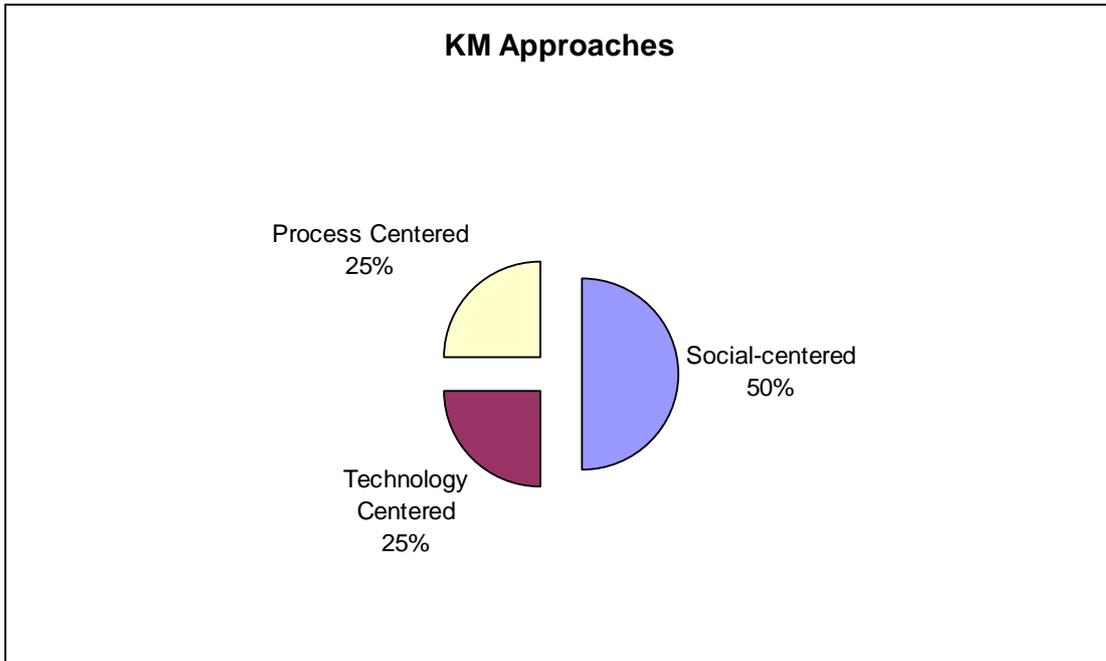
Figure 1: Number of SMEs by start-up Year (Pakistan)



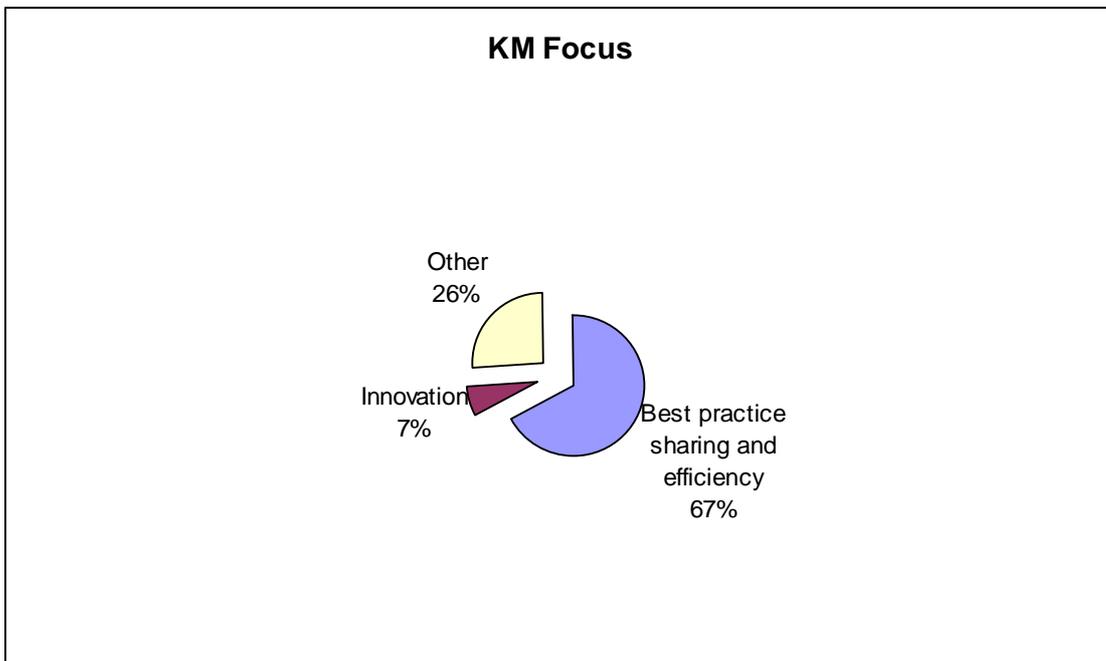
Source: <http://www.smeda.org/>

Appendix E

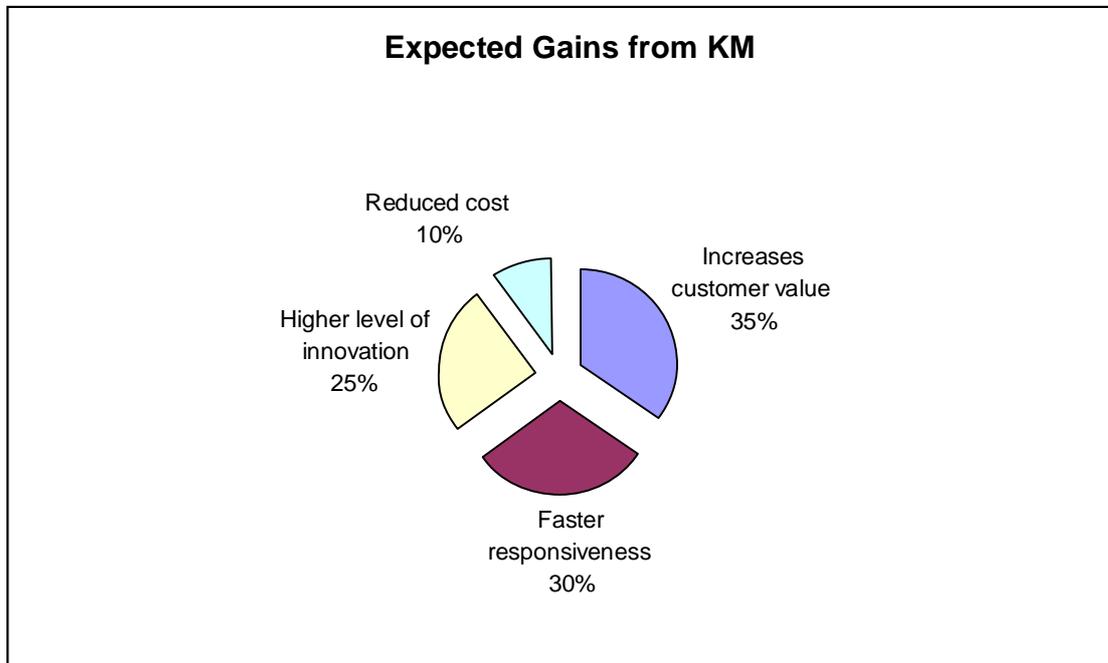
KM Applications and Gains



Source: <http://www.kbos.net/uploadfiles/KnowledgeManagementimplementationtrends.pdf>



Source: <http://www.kbos.net/uploadfiles/KnowledgeManagementimplementationtrends.pdf>



Source: <http://www.kbos.net/uploadfiles/KnowledgeManagementimplementationtrends.pdf>