

**EXAMINING THE INFLUENCE OF KNOWLEDGE
ELEMENTS ON INDIVIDUAL COMPETENCE**

Ph.D THESIS

by

POOJA KUSHWAHA



**DEPARTMENT OF MANAGEMENT STUDIES
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE, 247667, INDIA
NOVEMBER, 2015**

**EXAMINING THE INFLUENCE OF KNOWLEDGE
ELEMENTS ON INDIVIDUAL COMPETENCE**

A THESIS

*Submitted in partial fulfillment of the
requirements for the award of the degree*

of

DOCTOR OF PHILOSOPHY

in

MANAGEMENT STUDIES

by

POOJA KUSHWAHA



**DEPARTMENT OF MANAGEMENT STUDIES
INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE
ROORKEE- 247667, INDIA
NOVEMBER, 2015**

© INDIAN INSTITUTE OF TECHNOLOGY ROORKEE, ROORKEE- 2015

ALL RIGHTS RESERVED



INDIAN INSTITUTE OF TECHNOLOGY ROORKEE ROORKEE

CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the thesis entitled “**Examining the Influence of Knowledge Elements on Individual Competence**”, in partial fulfillment of the requirements for the award of the Degree of Doctor of Philosophy and submitted in the Department of Management Studies of the Indian Institute of Technology Roorkee is an authentic record of my own work carried out during a period from January, 2013 to November, 2015 under the supervision of Dr. M.K. Rao, Assistant Professor, Department of Management Studies, Indian Institute of Technology, Roorkee, Roorkee.

The matter presented in the thesis has not been submitted by me for the award of any other degree of this or any other Institute.

(Pooja Kushwaha)

This is to certify that the above statement made by the candidate is correct to the best of my knowledge.

Dated: _____

(Dr. M.K. Rao)
Supervisor

ABSTRACT

“Knowledge is a treasure, but practice is the key to it” this quotation by *Lao Tzu* appears to be highly consistent with the present globalized context, where most of the organizational activities are centered on knowledge capabilities and resources. Nowadays, intense competition and precarious changes in business environment have caused the volatility and uncertainty in the market. Under such circumstances, potential opportunities and threats can be identified and managed through knowledge driven capabilities to sustain competitive edge and long-term business survival. The act of practicing knowledge embodies the inclusion of knowledge capabilities such as KM infrastructure, KM process and needs a comprehensive outlook of strategic dimensions to manage knowledge across the organizations. On the other hand, human resource possesses the key role in practicing knowledge due to their intellect, decision-making capability, and personal competence. The emergence of knowledge economy paves the way to organizational success with the several preconditions that indicates toward optimum utilization of resources, managing knowledge and most remarkably on managing people to utilize their competence and enable them to practice knowledge activities effectively within and across organizational boundaries. As a result, managing individual competence has become a significant issue.

This study aimed at examining the influence of knowledge management (KM) elements mainly, KM infrastructure, KM strategy and KM processes on employees’ individual competence in the context of Indian IT sector. The present study explored the linkages of KM infrastructure, KM strategy and Huber’s Learning constructs and attempted to find out the role of Huber’s constructs (acquisition, distribution, interpretation, organizational memory) in enhancing individual level competence. This study provides a holistic framework, which includes sub-dimensions of KM infrastructure i.e. culture, structure, people and technology, KM strategy i.e. personalization, codification, KM processes i.e. acquisition, distribution, interpretation, organizational memory and individual competence i.e. modeling personal development, modeling self mastery in learning and seek learning activities. Further, this study proposed and tested a model linking KM elements and individual competence by examining the mediating role of KM processes between the relationships of (KM infrastructure, individual competence) and (KM strategy, individual competence) subsequently. Additionally, an effort has been made to explore the linkage between KM strategy and KM infrastructure. Several hypotheses were drawn on the basis of previous literature annotations.

Data were collected from 379 employees of Indian Information Technology (IT) sector. The organizations chosen for this study were located in National Capital Region (NCR) comprising Delhi, Gurgaon and Noida region in India. For administering research questionnaire, the organizations and sample has been selected following a convenience sampling technique. The statistical techniques used to test the proposed hypotheses includes descriptive statistics, correlational analysis, multiple regression and conditional process analysis (PROCESS) macro using regression based approach. Data were analyzed with the help of SPSS 20 and AMOS 20 software.

After analyzing collected responses through data screening process, the exploratory factor analysis (EFA) was conducted to test the factor structure of the study constructs. A confirmatory factor analysis (CFA) was conducted to assess the reliability and validity of the research instrument in Indian context. In the next phase, multiple hierarchical regression technique was used to test the hypotheses and mediation effects using an add-in macro PROCESS developed by Andrew Hayes (2013). Following the multiple hierarchical regression, the impact of KM infrastructure and KM strategy on KM process and subsequently its impact on individual competence were tested. The impact of KM strategy on KM infrastructure was determined using the regression technique. Using PROCESS macro, mediation effect of KM process on the relationship of (KM infrastructure, individual competence) and (KM strategy, individual competence) was examined.

The results of the study provide empirical evidence toward the significant influence of predictors KM infrastructure and KM strategy on KM process and its subsequent impact on outcome variable i.e. individual competence. The mediation effect of KM process on the relationship of (KM infrastructure, individual competence) and (KM strategy, individual competence) was also found significant and indicated as an antecedent to enhance individual competence of employees. The results of this study indicated the significant relationship between KM strategy and KM infrastructure variables. From the viewpoint of Huber's Learning constructs, the results were found significant to predict the relationship among KM infrastructure, KM process and individual competence.

The study has many key implications. First, the study offers an insight into the linkages between KM elements and individual competence. The study suggested that competence development is a key to increase overall performance and organizations need to ensure proper facilitation of knowledge infrastructure i.e. collaborative culture, decentralized structure, technological support and skilled people to gain competitiveness.

This study also emphasizes on adopting a balanced strategic orientation in the view of previous research findings. Second, the study provides an insight in to the Huber's Learning constructs i.e. knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory and suggests practitioners to promote knowledge activities for acquiring, sharing and creation of new knowledge that will be helpful in enhancing employees' competence and expertise. Second, drawing on knowledge-based view, the researcher found that KM process as a mediator predicts the enhancement of competence at individual level.

The results are valuable in establishing empirical, valid and strong evidence that KM elements are essential to develop individual level competence. Several important recommendations for future research were also discussed. This study contributes to existing literature on knowledge management and individual competence by examining and reporting the influence of KM infrastructure and KM strategy on KM process using Huber's Learning Constructs as an underlying mechanism and its subsequent impact on individual competence.

Keywords: KM infrastructure, KM strategy, KM process, Individual competence, Huber's Learning constructs

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to almighty God for blessing me strength and sources to complete my research work. I would never been able to complete my research work without the invaluable guidance of my research supervisor Dr. M.K Rao. I would like to express my special thanks to him for his excellent guidance and support during my PhD program. He has always been a supportive and encouraging guide to me during the ups and downs of my research journey in past years. His guidance to me in my research work and career has always been precious and invaluable.

I would also like to express my gratitude to Chairman, Student Research Committee (SRC), Dr. Santosh Rangnekar and Committee members Dr. Usha Lenka (Internal Expert) and Dr. Pooja Garg (External Expert) for being supportive and providing their valuable suggestions to improve the quality of my research work.

I would like to recognize the support provided by Dr. Neeraj Kaushik and his scholar's group for sharing their valuable resources and opinions regularly, which was quite helpful during my research work analysis. I express my deepest gratitude toward my fellow researchers Vandana Tamta, Pratibha Verma, Bindu Singh and Nitin Simha Vihari who were always supportive during my work.

I would also like to mention the support received from Ministry of Human Resources Development (MHRD), Government of India for providing research assistance to carry on my research work smoothly.

I would like to express my very special thanks to my parents Mr. G.P. Kushwaha, Mrs. Kaushilya, my brothers Rituraj, Deepak and sister Arti for their support, inspiration, and love without which this work would not have been accomplished. I would also like to recognize the extraordinary support and encouragement provided by Mr. Manoj Kumar, who helped me to focus and increase the rigor of this research work.

I would like to thanks Mr. Manoj Kapoor, Dr. Pratap Narayan Pathak, Mr. Vipin Misra, Mr. Santosh Kumar, Ms. Shivani Tiwari, Ms. Ila Misra and Ms. Maansi Singh for providing their valuable opinions, support and inspirations during my research work.

I would also like to thank my cohorts Rimpi Dhiman, Saroj Dhaka, Arti Kushwaha, Ranjana Kushwaha and Madhavi Lakshmi for being wonderful friends and providing support as and when required.

My sincere thanks to Mr. Jagmohan Singh Kushwaha and Mr. Hariom Tripathi with due respect for the encouragement offered throughout my research work.

Finally, I would like to extend my heartfelt thanks to all the people who helped me in many ways to accomplish my research work.

POOJA KUSHWAHA

TABLE OF CONTENTS

Title	Pages
Abstract	<i>i-iii</i>
Acknowledgement	<i>iv-v</i>
Table of Contents	<i>vi-ix</i>
List of Figures	<i>x</i>
List of Tables	<i>xi-xii</i>
List of Abbreviations	<i>xiii</i>
<hr/>	
CHAPTER I: INTRODUCTION	1-14
<hr/>	
1.1. Knowledge Management	2
1.1.1. Overview of Knowledge Elements	
1.1.2. KM Infrastructure	3
1.1.3. KM Strategy	4
1.1.4. KM Process	5
1.2. Managing Individual Competence	5
1.3. Statement of the Problem	8
1.4. Research Questions	9
1.5. Objective of the Study	9
1.6. Study Context	10
1.7. Significance of the Study	11
1.8. Organization of the Thesis	12
1.10. Chapter Summary	13
<hr/>	
CHAPTER II: LITERATURE REVIEW	15-50
<hr/>	
2.1. Introduction	15
2.2. Conceptual Foundation	15
2.3. Knowledge Management Infrastructure	19
2.3.1. Culture	20
2.3.2. Structure	23
2.3.3. People	25

2.3.4. Technology	26
2.4. Knowledge Management Strategy	28
2.4.1. Personalization Strategy	28
2.4.2. Codification Strategy	29
2.5. Knowledge Management Process	30
<i>Huber's Learning Constructs</i>	
2.5.1. Knowledge Acquisition	31
2.5.2. Knowledge Distribution	31
2.5.3. Knowledge Interpretation	31
2.5.4. Organizational Memory	32
2.6. Individual Competence	
2.6.1. Modeling personal development	34
2.6.2. Modeling self mastery in learning	35
2.6.3. Seek learning activities	35
2.7. Conceptual Framework	36
2.7.1. Theories and Approaches	37
2.8. Hypotheses Formulation	43
2.8.1. KM Infrastructure and KM Process	43
2.8.2. KM Strategy and KM Process	44
2.8.3. KM Process and Individual Competence	45
2.8.4. KM Strategy and KM Infrastructure	45
2.8.5. Mediating role of KM Process	46
2.9. Chapter Summary	49

CHAPTER III: RESEARCH METHODOLOGY

51-62

3.1. Introduction	51
3.2. Testing the Hypotheses	53
3.3. Research Design	54
3.3.1. Sampling Frame	54
3.3.2. Target Population	54
3.3.3. Sample Description	55
3.3.4. Sampling Method	55

3.4. Research Instrument	56
3.5. Pilot Study	58
3.6. Uni-dimensionality of the Constructs	59
3.6.1. Reliability	59
3.6.2. Validity	60
3.7. Data Collection	60
3.8. Chapter Summary	61
<hr/>	
CHAPTER IV: DATA ANALYSIS AND RESULTS	63-92
<hr/>	
4.1. Introduction	63
4.2. Data screening	64
4.2.1. Respondents' Demographic Profile	64
4.2.2. Normality Statistics	67
4.2.3. Common Method Bias (CMB) Test	68
4.2.4. Scale Validation	68
4.3. Data Analysis	76
4.3.1. Factor Structure	76
4.3.2. Confirmatory Factor Analysis (Basic Model)	84
4.3.3. Confirmatory Factor Analysis (High Order Model)	85
4.4. Hypotheses Testing	86
4.4.1. Conditional Process Analysis (PROCESS) Results	86
4.4.2. Research Hypothesis 1	88
4.4.3. Research Hypothesis 2	89
4.4.4. Research Hypothesis 3	89
4.4.5. Research Hypothesis 4	90
4.4.6. Research Hypothesis 5	90
4.4.7. Research Hypothesis 6	91
4.5. Summary of the Results	92
4.6. Chapter Summary	92
<hr/>	
CHAPTER V: DISCUSSION AND CONCLUSION	93-109
<hr/>	
5.1. Introduction	93

5.2. Discussion	93
5.2.1. Accomplishment of the objective 1	94
5.2.2. Accomplishment of the objective 2	95
5.2.3. Accomplishment of the objective 3	95
5.2.4. Accomplishment of the objective 4	96
5.2.5. Accomplishment of the objective 5	96
5.3. Study Contribution	103
5.3.1. Theoretical Implications	103
5.3.2. Practical Implications	103
5.4. Limitations of the Study	105
5.5. Future Research Directions	107
5.6. Conclusion	109
5.7. Chapter Summary	109

BIBLIOGRAPHY

110-132

ANNEXURES TO CHAPTERS

133-138

Annexure 1: Survey Participation Request

Annexure 2: Survey Questionnaire

Annexure 3: Survey Reminder Mail

Annexure 4: List of Publications

LIST OF FIGURES

Sr. No.	Figure No.	Title	Page No.
1	Figure 2.1	Knowledge Management System Model	33
2.	Figure 2.2	Proposed Research Framework	37
3	Figure 3.1	Research Methodology Flowchart	52
4	Figure 4.1	Conceptual Model	63
5	Figure 4.2	Gender Wise Classifications (%)	65
6	Figure 4.3	Age Wise Classification (%)	66
7	Figure 4.4	Designation Wise Classification (%)	66
8	Figure 4.5	Experience Wise Classification (%)	67
9	Figure 4.6	Education Wise Classification (%)	67
10	Figure 4.7	Confirmatory Factor Analyses (Basic Model)	84
11	Figure 4.8	Confirmatory Factor Analysis (High Order Model)	85
12	Figure 4.9	Linkage between KMS and KMI	90
13	Figure 4.10	Hypothesized Model	91

LIST OF TABLES

Sr. No.	Table No.	Title	Page No.
1	Table 2.1	KM Definition (Knowledge as a Thing)	17
2	Table 2.2	KM Definition (Knowledge as a Process)	18
3	Table 2.3	Literature Support to proposed Linkages	39
4	Table 2.4	Relevant Theories and Approaches	41
5	Table 2.5	Personal knowledge management Framework	42
6	Table 3.1	Scales and Items	58
7	Table 3.2	Instrument Reliability	59
8	Table 4.1	Demographic Profile	64
9	Table 4.2	Normality Statistics	65
10	Table 4.3	KM Infrastructure Scale Items	69
11	Table 4.4	Reliability and Item-Total Statistics (Culture)	70
12	Table 4.5	Reliability and Item-Total Statistics (Structure)	70
13	Table 4.6	Reliability and Item-Total Statistics (Technology)	71
14	Table 4.7	Reliability and Item-Total Statistics (People)	71
15	Table 4.8	KM Strategy Scale Items	71
16	Table 4.9	Reliability and Item-Total Statistics (Personalization)	72
17	Table 4.10	Reliability and Item-Total Statistics (Codification)	72
18	Table. 4.11	KM Process Scale Items	73
19	Table 4.12	Reliability and Item-Total Statistics (KM Process)	73
20	Table 4.13	Individual Competence Scale Items	74
21	Table 4.14	Reliability and Item-Total Statistics (IC)	75
22	Table 4.15	Descriptive Statistics	75
23	Table 4.16	KMO and Bartlett's Test	77

24	Table 4.17	Rotated Component Matrix	77
25	Table 4.18	Correlation Table	79
26	Table 4.19	Inter-item Correlation Matrix	83
27	Table 4.20	Regression Results using PROCESS	86
28	Table 4.21	Regression Results using PROCESS	88
29	Table 4.22	Hypotheses Results (Summary)	92

LIST OF ABBREVIATIONS

Sr. No.	Abbreviation	Full Form
1	ASTD	American Society for Training and Development
2	CNX	CRISIL NSE Exchange/Index
3	CRISIL	Credit Rating Information Services of India Limited
4	CS	Codification Strategy
5	EDI	Electronic Data Interchange
6	IC	Individual Competence
7	IT	Information Technology
8	KA	Knowledge Acquisition
9	KBV	Knowledge Based View
10	KD	Knowledge Distribution
11	KI	Knowledge Interpretation
12	KM	Knowledge Management
13	KMI	Knowledge Management Infrastructure
14	KMP	Knowledge Management Process
15	KMS	Knowledge Management Strategy
16	NSE	National Stock Exchange of India Limited
17	NCR	National Capital Region
18	OECD	Organization for Economic Co-operation and Development
19	OM	Organizational Memory
20	PS	Personalization Strategy
21	RBV	Resource Based View
22	R&D	Research and Development
23	URL	Uniform Resource Locator

CHAPTER I

INTRODUCTION

Human and knowledge both are inseparable and regarded as a key constituent in today's global, competitive, dynamic and complex business era (Davenport *et al.*, 1996; Edvinsson & Sullivan, 1996). Nielsen and Montemari (2012) elicit that human resource and competence constitute a larger proportion of corporate value that flows toward innovation and knowledge and provides a foundation for industrial competitiveness. Efficient personnel become a source of attaining competitive advantage in the long term for organizations. Human resource as a valuable asset possesses capability to think, analyze and implement the ideas. Decision-making ability is one of the distinguished characteristic of people apart from other skills. They can differentiate between right or wrong, acceptable from unacceptable and further this characteristic helps them to observe as well as analyze the facts. In order to enhance competitive edge, organizations invest in human resource to utilize their talent and intellect. Talented workforce is recruited to manage day-to-day business issues and tackle the problems among customers, employees, shareholders and other stakeholders. However, organizations facilitate better working conditions and lucrative packages to their employees and offers avenues for their personality grooming through training programs and developmental activities. Afore-said factors help to enkindle human behavior for developing competencies and contribute to fulfill their personal as well as organizational goals.

Presently, the emergence of knowledge economy has caused a protracted impact on various dimensions of organizational growth such as individual determinants (personality, self-efficacy, individual competencies), organizational determinants (organizational strategies, resources, structure) and environmental determinants (Zhou & De Wit, 2009). Continuous changes in regulatory, structural and technological factors have given a significant rise to the level of competition and disintermediation in organizations (Padmavathy et al, 2012).

Nowadays, organizations are facing stiff competition due to continuous technological up-gradation and rival's competitiveness, which gradually results in to the market turmoil. Currently, knowledge era is passing through a rapid developmental phase. It provides a wider scope for managers to explore the way of retaining organizational core competencies and to manage them effectively. Optimum utilization of available knowledge resources emerges as a challenge to deal with. However, this study provides a deep insight in to the influence of knowledge management (KM) elements i.e. KM infrastructure, KM strategy and KM process on employees' individual competence.

1.1. Knowledge Management

Knowledge can be viewed as an intangible asset for developing organizational core competencies, solving problems, and enlightening the way for individuals' and organizational success. It is acquirable, renewable and supports to up-build innovation and creativity. Knowledge has been derived from information, which is originally taken from the data. According to Davenport and Prusak (1998), "Knowledge can be defined as a fluid mix of framed experiences, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information". Knowledge has always been critical to gain competitive success (Prusak, 1997). It is comprised of core competencies, technology, processes, system, procedure, products and services (Pemberton & Stonehouse, 2000). In this context, knowledge based view provides a theoretical foundation on how knowledge based resources play an eminent role in increasing sustainable competitiveness of the firm (Choi & Lee, 2003). However, actively managing knowledge can help organizations to enhance the probability of getting success by facilitating decision making, building learning environment, creating learning routines and enabling cultural change and innovation (Quast, 2012).

KM upholds economic benefit to organizations through knowledge processes that enable capturing, creating, sharing, interpreting, and storing knowledge. Generally, it can be described as the collection of processes that deals with creation, distribution and leveraging knowledge to fulfill organizational objectives (Lee & Yang, 2000). Ramanand (2001) says that previous notion of 'land, labor and capital' is now replaced by knowledge, which has become the marketable object in recent times. Managing and sustaining organizational long-term competitive advantage has always been a topic of immense attention for the researchers and practitioners. The concept of resource-based view explains that sustainable competitive edge can be achieved by utilizing rare, valuable, inimitable, and non-substitutable resources (Barney, 1999). In this context, organizations need to support creative people and provide them with proper environment for developing knowledge and competence (Lee & Yang, 2000), in order to utilize the key resources optimally.

The dynamic capability perspective sheds light into the conceptual notion of retaining long-term competitive advantage rather than just achieving short-term competitiveness and up-builds the organizational ability to integrate and reconfigure internal and external competencies to adapt continuous changes in business environment. Further, dynamic capability framework describes that core competence should be used to convert short-term competitiveness to build

sustainable competitive advantage. KM does not depend merely on technology but needs knowledgeable workforce with commitment, and determination to learn for developing knowledge and resolving the routine work problems (Aujirapongpan et al, 2010).

Generally, learning reflects changes in the behavior of people during implementation of knowledge, skills and practices (Birkenholz, 1999). Human resource being a key element in applying and practicing knowledge resources contributes to organization through continuous learning activities. According to Birkinshaw (2001) knowledge creation depends on organization's concept about how or in which manner it learns. It can be therefore, assumed as an antecedent to manage knowledge (Mishra & Bhaskar, 2011). In addition, ability to learn faster than one's rival proves to be a significant source of competitive advantage (Senge, 1990; Ulrich *et al.*,1993). However, Yang and Chen (2007) argued that anyhow organizations initiate their business operations without considering their KM capabilities but it is remarkable that success cannot be achieved in the absence of these aspects.

1.2. Overview of Knowledge Elements

1.2.1. KM Infrastructure

KM infrastructure can be described as a set of formal rules, which governs the exchange between the actors on the network and provides cognitive resources collectively (metaphors, common language) whereby people make sense of events on the network (Pan & Scarbrough, 1999). Generally, three major categories of infrastructure (technical, structural, cultural) contribute to maximize social capital in organizations (Gold *et al.*, 2001). Later, human resource has been added as a fourth infrastructure element, which supports in organizing, managing and utilizing other resources.

Knowledge activities are developed and nurtured within organizations where various internal and external dimensions affect knowledge creation, knowledge transfer, interpretation, access and storage of knowledge. Successful management of knowledge activities is deep rooted in exploring and developing characteristics of knowledge accessible flexible culture (Ho, 2009). It enables characteristics like trust, effective learning and collaboration that support personnel to improve their efficiency. Second infrastructure element, organizational structure is the combination of all the ways through which work can be distributed into different tasks, co-ordination of which must subsequently be ensured (Mintzberg, 1979). Proper structuring and process implementation in organizations are required to manage knowledge and organize multiple knowledge activities. Further, IT has been considered as one of the most important elements among various factors that have contributed to introduce a long-term paradigm shift

(Kandampully, 2002). Previous literature suggests some IT tools for managing knowledge in the form of hardware technologies, software, database tools, collaboration and intelligent tools. Moreover, some non-technology tools for KM are also available in the form of formal information sharing mechanism, research and development facilities, cross functional project team and mentor program. Some other mechanisms that use both the technological and non-technological aspects are; project management system and customer management system. Both, technical and non-technical mechanism works to ameliorate knowledge activities in an integrative manner.

When some value is added to data, it becomes information (Goel et al., 2010). Proper management of IT tools and equipments is required when information is electronically being stored because lack of appropriate knowledge related to the application of these mechanisms can create information overload and inability to assimilate the information properly (Barb, 1997). In organizations, information collected from various sources is generally stored in the form of databases, documents and IT enabled devices. When organizations require information regarding any particular process, event or unit, authorized people access and make use of stored information for further processing. As an element of KM infrastructure, human resource is most valued and unique among other resources. People possess mental abilities and decisive capability to act upon guidelines, which distinguishes them from other human beings. Besides this, people contribute in organizing and utilizing all the resources through their efforts and provide output in the form of product and services. KM infrastructure act as a catalytic agent to support various KM processes e.g. Assimilation of knowledge can be performed through enhancing comprehensive skills. Additionally, it helps in accumulating experience and intellect from various resources and events.

1.2.2. KM Strategy

KM strategy can be defined as a high-level plan that describes the processes, tools and infrastructure required to managing knowledge deficits and surpluses (Hsieh, 2007). In general, it consists of various dimensions to deal with tacit and explicit knowledge. Additionally, previous researchers suggests that it should be properly managed by the means of codifying and personalizing knowledge to have an effective strategic orientation, which organizations generally require to make knowledge available to the business (Donoghue et al., 1999). KM strategy facilitates to implement novel ideas, launch of updated technological products and applying innovative methods and offers avenues for organizations to stay competitive among a large circle of rivals.

Choi and Lee (2002) describes three perspectives of KM strategy focused view, balanced view and dynamic view. According to focused view, organizations should follow one strategy predominantly over another (Hansen *et al.* 1999, Swan *et al.*1999). Zack (1999) says that KM strategies may exert a significant influence on KM processes. In line to this concept, other researchers (Zack, 1999; Bierly & Chakrabarti, 1996) proposed that organizations should adopt a balanced approach for more profitability whether, the dynamic view of KM strategy emphasizes on strategic alignment between knowledge characteristics and expertise (Bohn, 1994; Singh & Zollo, 1998). According to Sveiby (1997) KM has two distinct approaches, one emphasizing highly on people and other focuses on technology. However, inclusion of both the dimensions is required for achieving better outcomes.

1.2.3. KM Process

KM process comprises organizational processes that seek synergistic combination of data and information, processing capacity of technological devices and the creative as well as innovative capacity of human beings (Malhotra, 2005). Organizations explore way to survive and to grow in such a competitive environment. Hansen *et al.*, (1999) assert that managing knowledge asset relies on intelligent people, their knowledge and ideation process. These processes include creation of new knowledge, capture existing knowledge, sharing among others to make knowledge reusable and store in a proper format to enable for further use. Hence, creating, sharing, interpreting, storing and applying knowledge resources are pre-requisite to manage the knowledge assets. However, congruence between KM processes and strategic dimensions of knowledge may lead to enhance corporate performance (Choi & Lee, 2002). Further, Nonaka (1991) argues that knowledge resources include multifaceted aspects, which generally originates from tacit and explicitly represented components. Both, technical and intellectual skills are required to process knowledge resources. Conclusively, firms should focus on developing absorptive capacity to leverage knowledge systematically (Gold *et al.*, 2001).

1.3. Managing Individual Competence

In organizations, human resource contributes in implementing various knowledge activities. In fact, people who possess knowledge and carries firm determination to learn can actively participate and support the development of knowledge processes from initiation to implementation phase. Further, knowledge is based on human actions and relies more upon the situations in which knowledge processes are being implemented (Popadiuk & Choo, 2006). Knowledge practices begin from individual to team level and subsequently moves toward organizational level. Huang et al (2005) conducted a study to explore that how personality traits

exert impact on employee adjustment in different cultural context particularly, in the case of expatriate adjustment in host country and found a significant positive relationship between personality traits and employee adjustment in different culture.

Human resource possesses skill and competence to employ organizational resources in an appropriate manner. Dubois (1998) defines competence as characteristics-knowledge, skills, mindsets, thought patterns, and when used whether singularly or in various combinations results in successful performance. Individual competence is the unique element among multifunctional system, which supports intangible ideas to convert in to outcomes. In general, individual competence consists of three major characteristics i.e. particular job roles, superior performance, and specific behavior observed on the job (Hirsh & Strebler, 1991).

Hartle (1995) added knowledge, skills and several underlying elements such as traits and motives to define competencies. In managerial context the term '*competency*' was first used by Boyatzis (1982) which is defined as underlying characteristics of an individual related to superior performance. In the absence of adequate competencies, knowledge cannot be shared efficiently (Szabo & Cseprenzi, 2011). According to (Draganidis & Mentzas, 2006; Homer, 2001) concept of competence management ensures the linkages of individual competence with organizational strategies. However, the basic elements of KM are individual learning, individual competence and structuring employees' competency development plans (Sarkar, 2013). Hamel and Prahalad (1994) assert that core competence refers to the collective learning in an organization. In fact, capabilities are termed 'core' when possess ability to strategically differentiate the organizations (Leonard-Barton, 1995) particularly, coordinating the diverse production skills and integrating various streams of technologies (Prahalad & Hamel, 1990). However, proper fit among various knowledge elements may lead to achieve higher performance level.

The next step to sustain organizational competitiveness lies in managing individual competence, which is comprised of attitude, knowledge & skills and considered as key elements to accomplish the assigned task (Stoof, 2005). Hartle (1995) elicit competence as individual's characteristics required to drive superior job performance. It is an intangible asset, which plays a significant role in utilizing the organizational resources. In fact, developing individual's competence is a prominent function to make efficient use of knowledge resources. As a result, how to manage individual competence has become a critical issue for modern establishments. Organizations utilize resources for manufacturing products and offer services in order to fulfill two major objectives respectively, profit maximization and wealth

maximization. In both kinds of offerings whether it is a product or service, level of customer expectations have been tracked to go higher day by day. At a certain extent, this problem can be minimized by practicing more innovative and recent trends. McClelland (1973) pioneered the early research on competence and explored that individual's success in a job could not be predicted solely based on intelligence tests. In organizations, competence management helps in identifying the right set of competencies and competent employees (Sarkar, 2013). It allows organizations to identify knowledge gaps that may help in assessing the requirement of recruiting people and facilitating training needs (Lindvall et al, 2002).

Individuals who are capable of combining objectives to task are required for designing developmental processes in organizations (Engestrom, 1987). It seems very difficult to identify and discover the competencies as even people, who possess them are not able to detect them (Civelli, 1998). Adler (1994) says that managers require competencies for managing themselves, managing other people and ultimately managing the task. In general, individual competence delineates capability of the person to analyze and make decisions using their skills in different circumstances. According to Deist and Winterton (2005) individual competence is comprised of some behavioral indicators and professional values. Furthermore, social and cognitive competence plays a pivotal role in mapping personal competence. It reflects when social competence helps in building and bonding relationship among members and cognitive competence paves way to act rationally and promotes decision-making based on logical thinking and self-judgments. In comparison to tangible assets, competitiveness depends more on intellectual assets (Waychal *et al.*, 2011).

While discussing the generalizability of managerial competencies, some researcher agrees that competences are generalizable within and across the organization (Boyatzis, 1982; Spencer & Spencer, 1993) while some other scholars have a different opinion about this statement. They argued the influence of different cultural context in understanding the competence. Commonly, people possess knowledge unless there is schema to store and retain within organizational system (Dunford, 2000). According to Rechberg and Syed (2014) people look, observe, hears and interpret objects differently from others.

However, Nonaka and Takeuchi (1995) elicit that it is difficult to create knowledge without individuals' participation and contribution. Therefore, competence development is highly required for developing confidence, tracking the progress of continuing processes and creating organizational as well as individual capabilities (Tangaraja et al, 2015). After reviewing major aspects of knowledge and competence management, this study intends to explore the linkages

between knowledge elements (i.e. KM infrastructure, KM strategy, KM process) and individual competence.

1.4. Statement of the Problem

In the prevalent competitive business environment, managing knowledge has always been remarked as a requisite pre-condition for organizations to sustain long-term competitive advantage. KM literature highly emphasizes on the significance of the people side of knowledge and characterizes the role of individuals' in making KM effective (Davenport & Prusak, 1998; Malhotra, 2005; Wilson, 2002). In the present volatile environment, opportunities and challenges for the organizational development are changing with fast pace. Moreover, today's certainties might create obstacles for the future because of its uncertain nature. Hence, opportunities can be easily exploited by making use of current available resources, which might be rare to avail in the near future. According to resource-based view, firm equates its capability with the exploitation of its tangible and intangible value generating assets and resources (Pitt & Clarke, 1999). Various tools, techniques and mechanism are available to track the knowledge activities within and outside the organizations. These mechanisms also help to magnify multiple aspects of knowledge. Niu (2010) recommended to find better ideas and create new knowledge and suggested to exchange ideas both within and across organizations in a suitable sharing culture.

Since past two decades, managing knowledge has been considered as a crucial element to increase organizational and individual performance both at the organizational and personal level thereto (Chatti, 2012). Organizations prefer to maintain secrecy of created and captured knowledge so that the risk of facing rivals' challenge can be reduced and core competence can be enhanced. Prior researchers (Cho, 2011; Gold et al, 2001; Hsieh, 2007) explored the linkages among KM capability, KM strategies and KM dimensions such as infrastructure, process and enablers to enhance organizational outcomes i.e. organizational performance, KM performance and organizational effectiveness.

Most of the researchers (Chang & Chuang, 2011; Mciver, 2011; Mills & Smith, 2011; Shaabani et al, 2012) are limited to study of KM elements such as knowledge capability, enablers and strategy to explore organizational outcomes as firm performance and organizational core competence. Pillania (2005) studied new knowledge creation in Indian context and observed that employee attitude toward new knowledge creation is not so positive because most of them perceive it as a function of R & D department. Singh and Soltani (2010) says that employees

awareness and commitment level was found higher in Indian IT firms but the role of top management in resource allocation toward sustaining KM initiative require immense attention. Still, there is lack of studies identifying and exploring individual dimensions of human resource. Present high-tech and knowledge intensive organizations uphold a significant proportion to the competitive advantage through accumulated intellectual capital in the form of human knowledge, which resides within organizations (Jelavic, 2011). Further, Mills and Smith (2011) suggested identifying knowledge elements such as infrastructure, processes and strategy, which influences individual competence. Hence, it is necessary to develop a holistic framework for managing knowledge and individual competence.

1.5. Research Questions

Literature review provides a deep insight into the problem and creates fundamental grounds to raise some research questions. After reviewing prior literature, this study intends to explore answers to the following research questions.

1. What kind of relationship exists among KM infrastructure, KM strategy, KM process and individual competence?
2. Does KM process relates to individual competence in the context of Indian IT sector
3. Is KM strategy related to KM infrastructure dimensions?
4. Does KM infrastructure and KM strategy influence individual competence and are their relationship mediated by KM process?

1.6. Objective of the Study

The main objective of this study is to examine the integrative influence of knowledge elements (i.e. KM infrastructure, KM strategy, KM process) on individual competence in the context of Indian IT sector. Additionally, this study attempts to incorporate learning constructs elaborated by Huber (1991) to assess knowledge process and individual competence. Further, the mediating role of KM process has been examined in the proposed framework.

The objectives of this study are as follows:

- 1) To study the relationship among KM infrastructure, KM strategy and KM process
 1. a) To explore the relationship between KM infrastructure and KM process
 1. b) To explore the relationship between KM strategy and KM process
- 2) To find out the relationship between KM process and individual competence

- 3) To investigate the relationship between and KM strategy and KM infrastructure
- 4) To examine the mediating role of KM process between KM infrastructure and individual competence
- 5) To examine the mediating role of KM process between KM strategy and individual competence

This study provides a holistic framework that includes KM infrastructure (culture, structure, people and technology), KM strategy (personalization, codification), KM process (knowledge acquisition, distribution, interpretation, and organizational memory) elaborated by Huber (1991) as learning constructs and individual competence. However, this study intends to explore the influence of knowledge elements on employees' individual competence.

1.7. Study Context

In India many organizations are practicing KM; yet facing the employee performance problem where knowledge driven approaches are required to be implemented for solving the issues (Sarkar, 2013). KM literature explains that knowledge can be created and shared across various organizational entities. According to Schlegemilch and Penz (2002) knowledge can be converted into new technological equipments for developing competencies at the individual level. Further, Heisig (2009) referred that systematic handling of knowledge is often referred as a core element at the operational level. In general, knowledge can be created through social interaction linked with social aspect of organizational members. Organizations manage knowledge through capabilities and utilize employee experience through social interaction as well as in the form of documented data.

A sense of collaboration develops in organizations when people come together, communicate, understand and get along with each other. They willingly share information and contribute to the learning process. Moreover, presence of mutual understanding and trust is highly essential for knowledge sharing among people. Mutual benefits of people should also be common at certain extent so that sense of unity can be developed easily. This study explores knowledge activities, which are continually practiced in organizations oriented toward utilizing modern technological applications. India is pioneering in the field of software development and IT enabled services (CII report) which is also referred as a highly knowledge intensive industry.

According to the economic survey (2014-15) IT sector continues to be one of the largest employer in the country (Economic Times, 2015). In addition, envisioning individual as the key

knowledge bearer and revisiting the knowledge approaches may develop a context in which effective KM activities can be devised (Rechberg & Syed, 2014).

Based on the above discussion, IT sector seems to more appropriate context for conducting the present study. Conclusively, this study aims to explore knowledge elements and individual competence in the context of Indian IT sector.

1.8. Significance of the Study

According to Bhatt (2002) knowledge development process starts with adoption and creation at the individual level and then it moves toward organizational level, which leads to convert individual knowledge into organizational knowledge. However, it is important to study individual competence to meet the organizational objectives. Since the major purpose of this study is to examine the influence of knowledge elements on individual competence hopefully, it will help to understand the significance of knowledge elements i.e. KM infrastructure, KM strategy and KM process in enhancing individual competence.

Further, it provides a deep insight into the theoretical underpinnings for future researchers to understand KM and competence management thoroughly.

This study highlights upon the following key areas:

- The study is conducted in Indian IT sector. The study sample includes the software professionals working on software development, testing, programming, technical supervision and analysis platforms.
- The study also explores the role of underlying learning dimensions of KM process on individual competence through Huber's Learning constructs.
- The study measures the influence of KM infrastructure, KM strategy and KM processes on individual competence in a highly knowledge intensive sector i.e. IT industry.
- The study measures the impact of KM strategy on KM infrastructure.
- The study incorporated major dimensions of KM elements i.e. KM infrastructure, KM strategy, KM process and individual competence. KM infrastructure includes culture, structure, technology and people as sub-dimensions. KM strategy consists of personalization and codification dimensions. Further, KM process includes knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory. Individual competence is comprised of sub-dimensions i.e. modeling personal development, modeling self -mastery in learning and seeks learning activities.

- Finally, the study aims to investigate the inter-relationship among KM elements on individual competence.

1.9. Organization of the Thesis

Chapter 1 introduces the concept of knowledge management and retraces how it is re-shaping management paradigms in knowledge economy. This chapter explains the key capabilities of knowledge management i.e. KM infrastructure, KM strategy, KM process and proceeds toward explaining a detailed need of study to explore the linkages between afore-said KM elements and individual competence. This section outlines the problem statement, research question, study objective, study context and significance of the study.

Chapter 2 presents a detailed literature review on the various dimensions of KM infrastructure, KM strategy, KM process and individual competence. The comprehensive review of the literature helps identifying core areas for further research. The chapter also discusses prior established empirical and conceptual work, which has been conducted in the similar area. Grounded over the prior literature support, several hypotheses were formulated and further a research framework has been proposed in this chapter.

Chapter 3 discusses the framework and research methodology adopted in the study to analyze the data and seek the results to validate proposed linkages. It outlines the key dimensions of the study and research objectives and the set of hypotheses to accomplish these objectives. It explains the research methodology applied to seek the results. Further, it explains the pilot study conducted for identification of appropriate measures for the study constructs. The procedures for data collection and sample selection have been described. Various tools and techniques followed for data analysis are also outlined in this section.

Chapter 4 presents the description of data screening, analyses, and findings of the model which have been developed during the research study. The chapter also depicts the study results in graphical and tabular formats.

Chapter 5 outlines the justification of findings of proposed hypotheses. It also summarizes the conclusions of the proposed research framework, which has been formulated in the research study. It also discusses contribution to the extant literature along with the theoretical and managerial implications of the study. Further, suggestions for perusal of future studies in the similar research areas have been provided.

1.10. Chapter Summary

The chapter introduces the concept of knowledge management and individual competence. Statement of the problem has been discussed to raise certain research questions on present issues in the knowledge management. Further, the study objective has been mentioned along with study context and significance. In the later part, chapter presents a brief overview of the content of present study.

CHAPTER II

LITERATURE REVIEW

2.1. Introduction

Knowledge as an intangible asset plays a pivotal role in delivering value and sustaining long-term competitive advantage. In the present complex environment, managers are incorporating various processes and strategies to build and sustain competitiveness. Previous literature explicates that knowledge should be created and shared across various organizational entities. Moreover, knowledge can be transformed into new technological equipments for developing competencies at the individual and organizational level thereto (Schlegemilch & Penz, 2002). Organizations manage routine practices, utilize experience through social interaction, and documented data. Generally, knowledge is viewed as organizational ability to manage, store, create and distribute knowledge (Van der Spek & Spijkervet, 1997). Further, the act of processing and selecting appropriate information depends completely on individuals' intellectual capability. In other words, information processing and extracting meaningful facts from vast knowledge resources relies on individual's capability to utilize and manage knowledge effectively.

This chapter presents a detailed enquiry on the linkages between knowledge elements and individual competence. Grounded over the extensive literature review, a conceptual framework has been proposed and several hypotheses were formulated to examine the proposed linkages.

2.2. Conceptual Foundation

An in-depth analysis of previous literature related to study constructs i.e. KM infrastructure, KM strategy, KM process and individual competence has been presented. An information search was made on e-databases with the purpose of accessing study content relating to study. The key words used for this search were KM infrastructure, KM strategy, KM process, individual competence, enablers of knowledge process, etc.

The criterion for selecting studies was as follows:

- 1) Articles and other study material were collected and sorted on the basis of well specified subject i.e. influence of KM infrastructure and KM strategy on KM process and its subsequent impact on individual competence
- 2) Study materials chosen were ranging from 1990 to 2015.

- 3) Empirical and theoretical studies conducted in knowledge intensive sector particularly in information technology (IT) sector were preferred.
- 4) For better illumination of the concept, studies having “knowledge management” and “individual competence” keywords in the title and/or abstract have been taken.
- 5) A random bibliographic scan was performed on all the articles to find out some relevant content on the topic.
- 6) Articles were classified into four categories, i.e. literature emphasizing linkages between KM infrastructure and KM process, KM strategy and KM process, KM strategy and KM infrastructure and KM process and individual competence.
- 7) Further, theoretical and empirical findings from previous literature have been reviewed to support the linkages and to conceptualize the proposed framework.

In previous studies, managing knowledge has been referred as most important activity because resources collectively cannot take any form in the absence of knowledge applications. According to Drucker (1995), “Knowledge has to be improved, challenged, and increased constantly, or it vanishes”. KM process enables access to stored information in order to facilitate strategic implementation within an organization.

In this way, KM process contributes to save time and money as well. Alavi and Leidner’s (2001) define knowledge as ‘the potential to influence action’ and knowledge management as ‘building core competencies and understanding of strategic knowhow’. Bahra (2001) supports the notion and says that managing knowledge is complex because it saves money. As organizations are geographically dispersed and transferability of skills is complex, knowledge sharing through effective mechanism directs knowledge transfer outside the organizational boundaries.

Further, expertise in multiple areas, capability to assimilate multi-dimensional aspects of knowledge, regular practicing, and developing technological innovations through people may be useful for enhancing knowledge practices and managing KM dimensions. Knowledge based theory delineates ‘organization’ as a repository of knowledge and capabilities (Kogut & Zander, 1996; Spender, 1996a).

KM is comprised of several processes such as acquisition, creation, distribution, interpretation and storage of knowledge. However, the intangible nature of knowledge provides it a complex form. Various researchers in the past decades, who explored multi-dimensional aspects of KM

and areas to manage knowledge activities, have defined KM in various ways. Some definitions of KM are given hereunder:

Knowledge Management Definitions

Dalkir (2007), “KM is the deliberate and systematic coordination of an organization’s people, processes, technology and organizational structure”.

Marques and Simon (2006), “KM can be seen as an organizational innovation involving changes in strategy and management practices of firms”.

Choi and Hilton (2005), “Systematic management of organizational knowledge which involves the processes of creating, gathering, organizing, store, diffusing, use and exploitation of knowledge for creating business value and generating competitive advantage”.

American Productivity and Quality Centre (APQC) (1999), “A conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that strive to improve organizational performance”

Drucker (1995), “KM is the collective knowledge residing in the minds of its employees, customers, suppliers etc”.

Despite availability of so many definitions, there is lack of common agreement among researchers regarding nature and universal definition of KM. Chatti (2012) classified KM in to two broad categories i.e. knowledge as a *thing* and as a *process* respectively.

Knowledge as a Thing

Some researchers in the past have depicted static view of knowledge and focused on the technological dimension by describing knowledge as a thing. Further, static conceptualization of knowledge describes it as a thing or object which can be created, transferred and stored while objectification view of knowledge asserts it in physical form as documents, computer programs and technological equipments (Bolisani *et al.* , 2012).

Table 2.1. KM Definitions (Knowledge as a Thing)	
Wiig, K. M. (1997)	“KM is to understand, focus on, and manage systematic, explicit, and deliberate knowledge building, renewal, and application-that is, manage effective knowledge processing (EKP)”.
Bair and O’ Connor, (1998)	“KM technology is the integration of families of software products including information retrieval, groupware and document

	management”.
Davenport and Prusak (1998)	“Knowledge management is getting the right information to the right people at the right time”.
Rosenberg (2006)	“Knowledge management is the creation, archiving, and sharing of valued information, expertise, and insight within and across communities of people and organizations with similar interests and needs, the goal of which is to build competitive advantage”.
Source: Author	

Knowledge as a Process

In another school of thought, knowledge is viewed as a process and it is not considered as any objects, which exists in the physical form. According to Quintas *et al.* (1997) KM is a process of critically managing knowledge to meet existing needs, to exploit existing knowledge and to develop new opportunities. Previous researchers observed knowledge as a process that includes creation, assimilation, transfer and application functions.

Table. 2.2. KM Definitions (Knowledge as a Process)	
Malhotra (1998)	“Essentially, it embodies organizational processes that seek synergetic combination of data and information-processing capacity of information technologies, and the creative and innovative capacity of human beings”.
McElroy, Mark (2000)	“KM is about understanding how knowledge is created and how it is shared and diffused throughout an organization”.
Nonaka and Toyama (2004)	“Our dynamic model of knowledge creation is anchored to a critical assumption that human knowledge is created and expanded through social interaction between tacit knowledge and explicit knowledge”.
Gupta et al. (2000),	“Process that helps organizations to find, select, organize, disseminate, and transfer information and expertise necessary for activities such as problem solving, dynamic learning, strategic planning and decision making”.
Source: Author	

In a knowledge-based economy, ability to exploit knowledge assets through creating, protecting, transferring, and integrating knowledge is recognized as a distinguished feature of firm (Teece, 2000; Baskerville & Dulipovici, 2006). Nowadays managers are emphasizing on resource utilization through knowledge assets rather than any other conventional resources and capabilities. Snehota and Hakansson (1995) quoted that the value of a resource is dependent on the type of resource to which it is being combined. Generally, resources and capabilities which are not effective in isolation, when combined with other resources form a superior and effective program (Coltman, 2007). Knowledge intensive firms are continuously competing to learn and build their strength to cope-up with their competitors and to achieve an intense high growth rate in comparison to their rival firms.

2.3. Knowledge Management Infrastructure

KM infrastructure refers to organizational infrastructure that enhances efficiency of knowledge activities. According to Boliveau et al. (2011) it can be viewed as an enabler to maximize efficiency and improving skills to acquire knowledge. Previous studies provide a deep insight into key capabilities, which can empower knowledge practices across organizations. Gold *et al.* (2001) identified KM capabilities that incorporate knowledge infrastructure and knowledge process capabilities for enabling KM activities. Generally, KM infrastructure is comprised of two major dimensions i.e. technical and social KM infrastructure (Pan & Scarbrough, 1998; Chang & Chuang, 2011). The technical perspective of KM Infrastructure is composed of physical, IT infrastructure, devices and components while social perspective consists of cultural, structural and human resource elements.

In earlier literature of KM, researchers focused highly on technological aspect and stated technical infrastructure as key enabler for information transfer (McCouston & Jamrog, 2005). Instead of the term 'enablers or catalyst', Pinho *et al.* (2012) uses a new note 'facilitators' that might be individual, socio-organizational or technological factors to promote knowledge flow and to facilitate knowledge distribution, creation, sharing, and transfer within and across the organizational boundaries. Major enablers of KM are people, process and system. Organizational structure, culture, strategy, leadership, motivation, commitment and competition are other enablers of KM (Egbu, 2004). In present scenario, organizations invest human efforts and resources to develop technological infrastructure and key knowledge activities but often fail to get success in the lack of proper congruence among KM capabilities, strong enablers and human integration. Lee and Choi (2003) suggested culture, structure, people and information technology as sub-dimensions of KM infrastructure. Quinn *et al.* (1997) added culture and

supportive infrastructure as antecedents of KM infrastructure. Later on, combined management support and proactive leadership were added to these sub-dimensions.

The first element of KM infrastructure, 'culture' incorporates collaboration, trust and learning as its sub-dimensions. Second element 'structure' is composed of centralization and formalization. Third element of KM infrastructure consists of 'people' and elaborates t-shaped skills while fourth element 'technology' refers to information technology support as its sub part. The next section provides the description of major sub-dimensions relating to KM infrastructure.

2.3.1. Culture

Organizational culture incorporate values, belief, behavior, norms and vision within organization system and reflects the connectivity of employees toward organizational ambience and environment that affects human behavior. It also acts as a linkage between people and processes. Nold (2012) cites culture as a prominent enabler for developing an effective KM environment. In addition, skill sharing, resources availability and presence of knowledge oriented culture are essentials of individual learning. Islam et al (2015) identifies culture as a critical element in knowledge creation and sharing. In fact, culture stems in ancient values and contemporary belief that fabricates the heritage in the form of traditions and are reflected in the activities of personnel, organizational vision and policy decisions.

It may also affect employees' behavioral patterns and foster knowledge innovations but there is lack of studies to elucidate that how the organization is actually managing knowledge-in-practice. Moreover, sustaining effective organizational culture is a requisite condition for successful KM implementation. KM efforts do not fully succeed in the absence of emphatic culture. From extant literature review, this study comprises three constructs of culture i.e. collaboration, trust and learning.

i) Collaboration

Collaboration is an important element that might enhance congenial culture for knowledge creation (Lee & Choi, 2003). Fahey and Prusak (1998) assert that collaboration between organizational members can shape a mutual farsightedness about the organization's environment. Further, Bhatt (2002) proposed requirement of developing the sense of collaboration in the complex situations when individual lacks expertise to resolve the problem and intends to accomplish the assigned task, in order to share knowledge and expertise. In addition, collaborative culture positively affects knowledge creation and supports in improving

knowledge exchange practices (Lee *et al.*, 2012). According to Yan *et al.* (2010) a significant indicator of value creation is linked with knowledge, skills and abilities required to attain superior performance. Generally, it is essential for organizations to observe that in a relationship-based society people are motivated to develop relational ties if they perceive supportive organization as well as nurturing leader (Aggarwal & Bhargava, 2010). However, individual skills can be developed through collaboration and enhanced knowledge sharing practices.

In addition, collaboration and communication helps in improving managerial decision-making process (Anantatmula, 2007). Some organizations tend to hoard knowledge that is a remarkable issue because knowledge-sharing efforts become useless due to hoarding practices. Collaboration is an important pre-condition to share knowledge among members and to enables knowledge activities out rightly. In fact, collaboration among experts in the specialized area enables knowledge to be activated (Qureshi *et al.*, 2006). Moreover, knowledge can be distributed easily and in a better way through collaboration within teams and organization members. The process of collaboration seems to be relatively technical but it includes a social construction element through which individual accomplishes tasks within adaptive situations (Clancey, 1993). Several communication technologies that promote collaboration include audiovisual support, e-mail, video conferencing, and multimedia devices (Sproull & Kiesler (1991). Collaboration culture also helps in minimizing gap and developing harmonious relationships among teams. Simonin (1997) emphasized the significance of utilizing experience benefit for collaboration and know-how development that can contribute toward future collaboration efforts. Anantatmula and Kanungo (2008) suggests that attributes like information behavior, perceived value, collaboration and knowledge sharing develops organization's ability to sensing, collecting, organizing, processing information.

Collaboration among different work units or entities facilitate better co-ordination in implementing process, resource availability, allotting time slot, assigning task to personnel and measuring outcomes at organizational and individual level. Conclusively, collaboration reduces processing time, save money and synchronizes organizational processes at the individual level and support integrity co-operation and belongings. Existence of collaborative team proves to be most beneficial condition for organization even in the complex situations; it develops a sense of unity among employees to work as a team member and prepares them to get ready to take the challenges. Bhal (2006) suggested future researchers to explore how dyadic interrelationships in software project team members develop over a period.

ii) Trust

Lee and Choi (2003) describe trust as a most significant element of culture, which may enhance knowledge processes and leads toward firm performance. Trust can be promoted through encouraging knowledge sharing and discouraging knowledge hoarding (Clarke & Rollo, 2001). Generally, employees hesitate to share knowledge because they fear to lose their competitiveness by doing so. Information possessed by individuals' might be unique and specific but after sharing with others it will remain no longer unique as earlier, it was. High level of trust may be useful to lessen the hesitance to share and decreasing the risk of losing competitiveness (Roberts, 2000; Scott, 2000). Padmavathy et al. (2012) found that organizational level relational commitment is affected by functional benefits while individual level relational ties are affected by psychological and social benefits.

Developing mutual trust among employee may likely to help in nurturing their capabilities and skills. Presence of trust among organizational members nurtures an environment that promotes creation and sharing of new knowledge (Lee & Choi, 2003). Successful knowledge exchange practices require a high level of trust among employees but trust development is not a short-term task, it is a process which requires continuous efforts (Ganesh & Gupta, 2015). Mayer *et al.* (1995) described trust as a determinant of shaping collaborative relationship among people. In general, trust plays a significant role in adjoining social relations and a sense of collaboration among organizational members. Hence, trust is entitled as an essential element to implement collaboration process among people (Zand, 1972).

However, all the team members and employees do not possess common characteristics and do not behave in a similar way. Under such circumstances, trust encourages people to share and exchange their experience, ideas, knowledge and problems with others to whom they trust. Most often, mutual agreeableness and common benefits develop trust among team members. Kaplan and Nortan (1992) assert that organization's value directly relates with developing capabilities to innovate, learn and perform. A predominant theme emerged from previous studies supports that knowledge economy entails creating a culture, build on trust, respect and empowerment and encourages professional anatomy, innovation, creativity, self-direction, intrinsic motivation, teamwork, knowledge sharing, learning and dynamic changes (Acsente, 2010). Previous studies on software professionals have focused on the significance of knowledge and information sharing within the group members (Staples & Webster, 2008) that involves utmost level of trust among employee working together (Ganesh & Gupta, 2015). The concept of trust is also effective in relationship between supervisor and subordinate

relationship; If a supervisor feels a congruent fit with the direct subordinate, he or she may be more optimistic and likely to trust, respect and support the sub-ordinates (Zheng et al, 2014).

iii) Learning

Learning encourages people to adopt new processes, methods and provides opportunity to grasp new knowledge (Lee & Choi, 2003). It is remarkable that learning brings permanent change in behavior. New entrants in an organization are not always well-trained and experienced. However, gradually they acquire knowledge during their daily routine through learning process, which is a continuous process that continues until the life of human. People develop themselves, gain knowledge and add experience through learning process. Lee and Choi (2003) assert that learning culture creates new knowledge in organizations. Learning adds value to an organization by bringing positive changes in employees' behavior. Moreover, people possess some inborn or innate qualities while some they learn from external environment that are described as acquired abilities. It enhances competence and upgrades the individuals' knowledge. Learning continues in every phase of daily life; people interact together share their know-how, work experiences, information and learn together in a collaborative environment. It reflects a drastic change in human behavior that takes place slowly and helps to empower skills and abilities.

2.3.2. Structure

Organization structure is one of the dimensions of KM infrastructure, which facilitates formal allocation of work related activities and adhere administrative control mechanism to integrate work activities (Robbins, 1990). The structure dimension refers to “the presence of norms and trust mechanisms” (Gold *et al.*, 2001). If the organizational structure is flattened then people are empowered and make efforts to develop more tacit knowledge when codified knowledge becomes the explicit knowledge and can be kept safe in knowledge repositories of the organization for further use (Mundra et al., 2011). Structure is comprised of two sub-elements i.e. centralization and formalization.

i) Centralization

Caruana *et al.*, (1998) defines centralization as the locus of decision authority and control within an organizational entity. Organizational structure based on traditional command and control offers the benefit of reduced ‘noise’ and it will be quite inflexible in distributing and sharing knowledge laterally and across the teams (Bhatt *et al.*, 2005). Technological applications based on KM databases, internet and groupware technologies are readily available

to support increasing use of KM processes. It is increasingly accepted that knowledge is looked upon as the most important resource within firms (Lopes *et al.* , 2005). Liao *et al.*(2012) state that centralization is the extent to which the right to make decisions and evaluate activities is concentrated. Centralized structure in organization refers to the integration of authority and decision making power at top-level management. Under a centralized structure, subordinates are not authorized to take decisions; they are only expected to follow the rules and execute the plans as per superiors' guidelines. Further, organizational activities depend on top management policies and implementation standards in centralized structure and without their consent; nobody can intervene in organizational issues. However, centralized structure creates hindrances in communication and knowledge sharing among people and work units. Stonehouse and Pemberton (1999) elicit that centralization may distorts the process and cause discontinuity in ideas.

A concentration of decision-making power can reduce creative solutions, experimentation and freedom of expression, which are the lifeblood of knowledge creation (Graham & Pizzo, 1996). Centralize structure focuses on specialized knowledge and expertise within a unit. Presence of flexibility or rigidity in regulations depends on decision-making authority. Further, higher extent of centralization restricts innovative ideas and multiple solutions because the number of people authorized to perform these activities are limited. In the absence of centralize control, decision-making authority is delegated within various units and all units are mutually and equally responsible for the completion of assigned tasks. Decentralized allocation of decision-making power and authorities provides opportunities to utilize talent at all levels of management and it also enable people to prove their potential, make decisions, formulate policies and elaborate procedures to implement them. Wiesner (2007) conducted a study to examine strategic importance of high performance practices in the context of small and medium enterprises and found that it is relatively important for SMEs as it is for larger organizations. According to Chang and Chuang (2011) flattened structure organization are more flexible in sharing and acquiring knowledge.

ii) Formalization

According to Liao *et al.* (2012) formalization is the extent to which an organization uses policies and procedures to depict behavioral aspect. Miller and Salkind (2002) mentioned formalization as rules, instructions, procedures and communication, which have been established to prescribe acceptable or expected actions, with the purpose of controlling employee behavior. Further, lower extent of formalization broadens scope to encourage new

concepts, idea, and knowledge creation (Wikstrom & Norman, 1994). In fact, formalization creates limits for employees to ensure selection between expected and unexpected behavior. In general, formalization facilitates set of guidelines and procedures to define acceptability of task and behavior. An organization having centralized structure faces difficulties in knowledge sharing because of restrictions and central bounded structure while formalization sets criteria for right & wrong and help to conduct rules in a formal way. However, it is beneficial to work in formalized manner but its extent should be balanced.

2.3.3. People

People also termed as “human capital” contribute a lot in achieving organizational value. They do not only possess information but also develop the ability to assimilate knowledge. Human capital in organizations is the most important intangible asset, especially in terms of innovation (Edvinsson, 2000). Human resource plays a vital role in acquiring, disseminating and utilizing knowledge during knowledge process implementation. However, cognitive abilities differentiate human resource from other resources. People are capable of learning and assimilating knowledge and possess quality to describe the facts, make senses, and choose the best among various alternatives.

i) T- Shaped skills

People dimension of KM infrastructure comprised of t-shaped skills. According to Sarkar (2013) people are considered as ‘primary actor’ in executing and practicing KM approaches and the concept of competence management facilitate creation, development, acquisition and storage of knowledge for overall organizational success. T-shaped skills refer to both vertical and horizontal knowledge dimensions of workforce. People who possess knowledge can explore particular knowledge domain (Lee & Lee, 2007). The vertical line in the ‘T’ shape signifies the expertise in the major area and the horizontal line represents the understanding of others specialized areas. Employees are encouraged to develop their t-shaped skills that refer to specialized knowledge in a particular area and the ability to recognize the skills of others in a comprehensive way. Thompson (2005) claims that KM is a combination of technology and people where ‘technology’ constitute about twenty percent and ‘people’ aspect determines eighty percent of the whole KM. In this way, more value has been provided to people in comparison to technological equipments and process where a proportion of 50:25:25 is suggested by Ruggles (1998) to prove contribution among three element of KM infrastructure i.e. people, processes, and technology respectively. Further, Nonaka and Toyama (2003) quoted human resource as most important among all elements and cited its importance for managing

tacit knowledge. Leonard (1995) explicates that people possessing t-shaped skills are extremely valuable for creating knowledge because they initiate knowledge acquisition by integrating knowledge assets.

The key social psychological processes through which people are managed become very important in the complex and dynamic environment (Bhal, 2006). According to Pinho et al.(2012), t-shaped skills as a facilitator enables people to enhance their skills and use expertise in order to support knowledge creation, transfer, application and storage. People differ in qualities and skills they possess, they all carry different attitude, belief, and opinions. Hence, they are capable of making independent decisions and doing things differently. These capabilities represent a unique picture of human resource in the organization. Tziner & Eden, (1985) confirmed that personal cognitive capabilities positively affect individual performance. T-shaped skill denotes the breadth of cognitive capabilities that embodies one's expertise as well as others knowledge (Iansiti, 1993). Madhavan and Grover (1998) proposed that t-shaped skills positively influence team performance in knowledge creation. According to Schilling, (2005) multi-skilled persons are more likely to be able to digest diverse knowledge and skills. Such a capability can be developed to stimulate creative conflicts and promote active communication among team-members (Leonard-Barton, 1995). Skill transfers from one person to another through knowledge sharing; it is not just a socializing skill to get along with others (Madhavan & Grover, 1998).

Ghosh and Mondal (2009) says that: "Human capital is recognized as the largest and the most important intangible asset in an organization. Ultimately it provides the goods or services that customers require or the solutions to their problems. It includes the collective knowledge, competency, experience, skills and talents of people within an organization. It also includes an organization's creative capacity and its ability to be innovative. Although investment in human capital is growing, there is still no standard measure of its effectiveness in companies' balance sheets"(p. 372).

2.3.4. Technology

The word 'technology' is made up of two terms 'technos' means technical expertise and 'logos' refers to *knowledge bases*. KM literature affirms knowledge as people-oriented action that relies on collaboration, trust and mutual interdependence (Mohamed *et al.*, 2006). IT deals with information in whole scenario of managing knowledge. IT applications such as mailing system and electronic data interchange might be used for disseminating knowledge. According to Hustad and Munkvold (2005) technology facilitates knowledge activities for managing

individual competence. Rajan & Baral (2015) says that organizations are primarily focused about how their investment in information technology (IT) will affect organizational and individual performance

i) Information Technology Support

IT support refers to the combination of technological equipments devices and interventions that saves money, time and perform tasks. According to Tsui (2005) IT does not only support people in storing and retrieving data but modern techniques in IT like artificial intelligence and information processing techniques leads to implementation and generalization of stored data to devise new knowledge. Researchers have common viewpoint in the statement that IT infrastructure includes knowledge databases, performance integration system and technological innovation mechanism that support KM initiatives in broader context. Several limitations that cause failure to meet KM challenges are to increase knowledge worker productivity and enhance organizational performance. Most often, reasons for such failures are technological issues (Malhotra, 2005).

Venkatraman and Henderson (1998) quoted that 'IT' enables knowledge and expertise as drivers of value creation and organizational effectiveness. Organizations are employing new technological equipments to leverage intellectual assets (Goel et al., 2010). In general, people who uses electronic equipments and technical aid for communicating facts generate more qualitative and applicable ideas than those others using non-technical and traditional way of sharing knowledge. IT facilitates creation, storage, collection and exchange of knowledge. IT infrastructure eliminates barriers of knowledge sharing and communication. Generally, IT is regarded as essential enabler for knowledge activities like knowledge distribution and knowledge application process (Seleim & Khalil, 2007).

IT does not only govern KM practices but also enables knowledge creation, transfer, exchange and storage in electronic repositories too. To integrate knowledge in organization IT support is required (Teece, 1998). Technological equipments and IT solution facilitates storage, collection and exchange of knowledge that helps in the knowledge creation process (Roberts, 2000). Chuang et al (2013) recommended IT support as crucial element for designing and implementing KM initiatives. Baral and Bhargava (2010) conducted a study on organizational interventions for work life balance and emphasized the significance of technological up-gradations as a predictor in managing work life balance.

2.4. Knowledge Management Strategy

KM strategy can be described as an approach through which organizations intend to align resources and capabilities toward adopting a strategic orientation (Zack, 1999). Maier and Remus (2003) shed light on the significance of adopting a suitable strategy to accelerate knowledge processes and bridge the gap between human and technology-oriented KM. According to Hansen *et al.* (1999) organizations apply two strategies namely, personalization and codification to harness knowledge value from employees. Further, it was observed that using one strategy predominantly over another at a time is more beneficial for organizational growth. However, the decision to select predominant and supportive strategy should be followed by the purpose of strategic applications. Some researchers suggested using strategies in balanced proportion instead of using one as major and another as supportive role (Jasimuddin *et al.*, 2005). Personalization KM strategy adheres to a *person-to-person* approach while codification strategy is based on *people to document* orientation. As proposed in the HNT's model (Hansen *et al.*, 1999) an equal emphasis on both personalization and codification during the initial stages of strategy implementation represents a high-risk approach. In this context, Scheepers *et al.* (2004) found that such a dominant emphasis on either strategy is only of concern at the onset of strategy implementation.

When organizations codify their knowledge, they package it into formats that facilitate knowledge transfer (Schulz & Jobe, 2001). Meso and Smith (2000) explored that organizational knowledge management system (OKMS) consists of two perspectives i.e. technical and socio-technical. First, technical perspective assumes that organizational KM system is an advanced assembly of software, and its associated hardware infrastructure, for supporting knowledge work and/or organizational learning through the free access to and increased sharing of knowledge. Second, socio-technical dimension and organizational KM system are seen as being complex combinations of technology infrastructure, organizational infrastructure, corporate culture, knowledge, and people. Yemeshvary *et al.* (2013) says that irrespective of how effective the strategy is, its success relies on how effectively it is understood by its people, including boardroom to last employee of shop floor, and their competence to execute it.

2.4.1. Personalization Strategy

Knowledge can be classified into two broad dimensions i.e. tacit and explicit. Tacit knowledge embodies abstract ideas, concepts, mental models, belief, know-how and intuition (Baker & Barker, 1997) while explicit dimension contributes to increase effectiveness by codifying and storing knowledge with the help of IT infrastructure. People possess knowledge in tacit form as

abstract ideas, perception and belief. Organizations operate uniquely on their complex pattern of routine based on tacit knowledge (Karthikeyan et al, 2012). Personalization strategy facilitates sharing tacit knowledge through socialization process, which relates to the existence of favorable conditions like collaboration, sense of belief in others and unity among team members to simplify knowledge sharing process. Generally, it is difficult to articulate and share tacit knowledge. Most often, it depends on both the ‘expression capability of knowledge sharer’ and ‘grasping capability of person’ who is gaining knowledge.

Social groups create networks of people who feel an attachment together based on mutual trust through collaboration. People share their experiences, knowledge and skills in the form of general task and practices. Tacit knowledge resides in the human mind and perception (Riggins & Rhee, 1999). In this strategy employee interact among themselves and share their expertise and knowledge. Thus, informal social networks originate through a default practice in which knowledge can be infused through acquisition, sharing and exchange with the help of expert meetings, job-rotation and training programs.

2.4.2. Codification Strategy

Codification strategy is used in organizations to embody knowledge in explicit form. It is a formal and systematic method to codify knowledge. Mirchandani and Pakath, (1999) suggest that codification capability can be increased via advance technological mechanism and complexities can be lessened by using knowledge at a larger extent. According to Kumar and Ganesh (2011) codification strategy embodies explicit knowledge in the form of stored databases and promotes reuse of codified data by the people who require it for further reuse while personalization is concerned to a tacit aspect of knowledge, which emphasizes on knowledge transfer through socialization.

Further, codification strategy is the best fit for organizations where various departments or units are able to generate and provide standardized information. In fact, codification process minimizes data access time, which is the major characteristic required to manage knowledge and increase information reusability. Selection of appropriate KM strategy should be based on compatibility to share and reuse the created knowledge. Tiwana (2000) defines codification strategy as a know-how stored in people’s mind which is personal and can be acquired through education, training and experience. Goh *et al.* (2008) suggested several dimensions such as online collaboration platform, information alerts, user support and resource sharing for knowledge transfer.

2.5. Knowledge management Process

Huber's Learning Constructs

The philosophy of developmental humanism suggests that employees should be enriched with self-regulation, self-control and commitment like qualities that will be helpful to accomplish organizational goals (Garavan & McGuire, 2001). Individuals are perceived as a primary origin for a new knowledge while relational ties among them facilitate information sharing, transfer and new knowledge creation (Kang, Morris & Snell, 2003). Generally, polyvalence is suggested as a criterion to recruit people because the zeal of experimenting new processes, applying innovative methods and flexibility toward adaptation may foster learning at the individual level that will gradually lead to effective KM implementation. Huber (1991) elicits the requirement of aligning learning with acquisition, distribution, interpretation and storage of knowledge. Four learning constructs discerned by Huber (1991) are knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory. In Huber's (1991) review of organization's learning constructs, *knowledge* and *information* are used interchangeably. Considering the term referred to by (Jimenez & Valle, 2013) this study uses 'KM process' in place of learning constructs.

Previous studies emphasize the need of learning at all levels including individual, team and organizational level. West (1994) describes that organizational learning takes place only when learning occurs at the individual level. There is a collective assertion on the fact that individual learning is prominently required for learning at the organizational level. Marquardt (1996) asserts that individual capability, knowledge, behavior and attitude are the fruits of learning. KM facilitates individuals to access, search and utilize knowledge through various means in organizations (Karkoulis *et al.*, 2013). According to the constructivist approach of individual learning, human beings are considered as active, goal-oriented and feedback-seeking. Apart from this individual need, intention, expectations and perceived feedback are the determinants of the individual learning process (Lehesvirta, 2004).

Organizational changes affect the thinking and behavior of employees. Under such circumstances, it becomes obligatory for management to offer training to employees to help them in adopting the change process and manage the stress related with fundamental changes occurring in the organization (Palo & Panigrahi, 2004). Holden (2004) in his study cited that most of the organizations are participating actively in KM activities these days. Among *Fortune 500 companies*, eighty percent have designed their KM processes through developing their own KM strategies (Holden, 2004).

2.5.1. Knowledge Acquisition

Knowledge acquisition is termed as a process of acquiring knowledge from external sources and making it suitable for further use (Holsapple & Jones, 2004). Organizations acquire information and process it into knowledgeable facts, which tend to serve several objectives. People acquire knowledge through learning from past experiences, observing the events, experimenting new method, informal social networks and by conceptualizing new ideas (Huber, 1991). However, knowledge cannot be developed only through internal sources it requires external knowledge to bridge the gap. Acquiring knowledge may likely to benefit both the individual and organization as well. Generally, people intend to acquire more knowledge for expanding their knowledge span due to curiosity and need of achieving expertise. Probst et al (2000) says that knowledge acquisition is always useful and relevant to the organizational need.

2.5.2. Knowledge Distribution

In many industries, knowledge distribution has become a competitive necessity as no company is expected to develop all necessary knowledge inside the firm (Leonard-Barton, 1995). People learn a lot through knowledge distribution process and share ideas, methods, learning experience and information with other members. In this way, knowledge flows within and outside organizational work groups. Knowledge distribution is a process, which helps knowledge recipient to gain knowledge and increase skills comprehensively. IT infrastructure facilitates software and technical solutions to make the knowledge available everywhere; when and what extent it is required. However, knowledge should be distributed through proper channels so that chances of losing data and communication failure can be minimized

Waterman (1986) defines knowledge distribution as the process of extracting, structuring, and organizing knowledge from some sources, usually human experts so that it can be used in organizations as a whole. Distribution processes are “those oriented toward obtaining knowledge” (Gold *et al.*, 2001). Post phase of knowledge distribution is the assimilation that ensures the success of knowledge retrieval process.

2.5.3. Knowledge Interpretation

In technical terms, knowledge interpretation refers to decoding the encoded information which sender disseminate to a knowledge recipient. According to Daft and Weick (1984) knowledge interpretation can be defined as the process of translating events, developing shared understanding and conceptual schemes. In knowledge sharing process, facts and information

are shared from one person to another within a group. Further, making sense and utilizing acquired information is fully dependent on human intelligence. Organizations use both technical and human resources to interpret knowledge. In addition, technological equipments can decode electronic data and provide it a comprehensible format. Apart from this, statistical tool and techniques are used to translate the data for converting it into useful information.

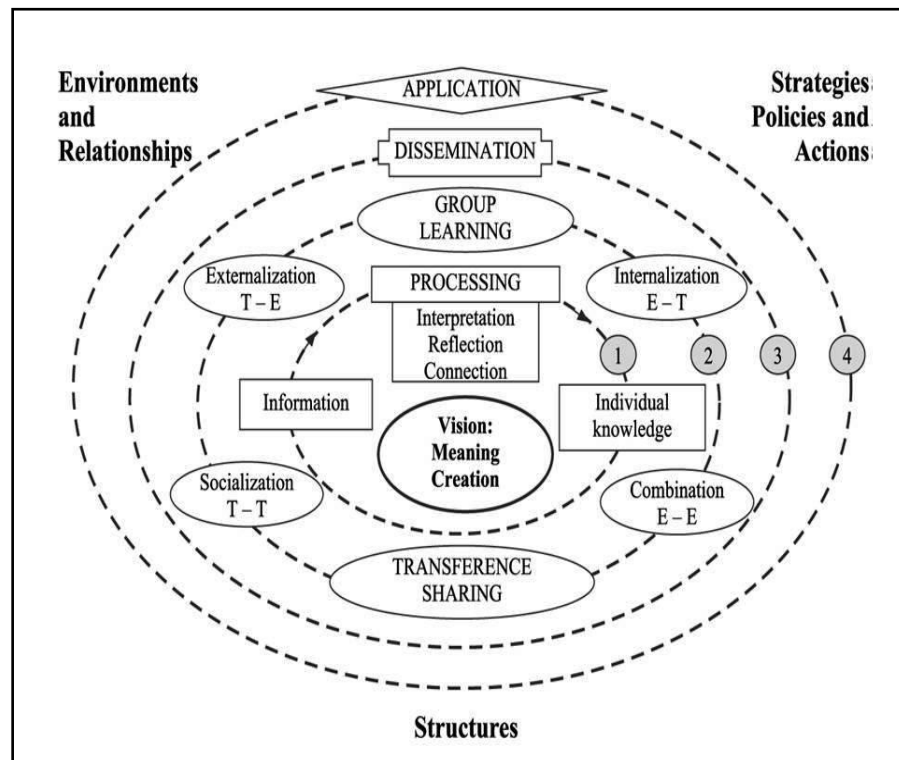
2.5.4. Organizational Memory

Organizational memory refers to storage of knowledge, belief, values, facts and intellect possessed by employees. Employees can access information from stored data through information retrieval method with a pre-condition that purpose of access should be better known to recipient so that outcomes of information access proves better. Through accessing knowledge store, it is possible to utilize available resources on the basis of past events, experiences, common errors and success stories as well. Through the process of de-codification individuals may be able to gain access and utilize stored specific information.

Gammelgaard and Ritter (2005) suggested instruments for retrieving knowledge depicted as knowledge retrieval means matrix. Four dimensions of this matrix are database, individual memory, virtual communities of practice and social capital. It is quite important for organizations to implement firm archives, databases and computerized systems with the purpose of knowledge storage, which is requisite condition for effective knowledge dissemination and exchange within organizational boundaries (Omerzel, 2011). People can access knowledge using organizational databases, socialization processes, community interactions and memorizing.

In individualistic approach, characteristics of acquiring, retention and accessing knowledge relates to understanding, recalling and retrieving data from knowledge repositories to affect individual behavior. However, a general disagreement takes place in use of term 'organizational memory' in previous studies. Argyris and Schon (1978) stated organizational memory as a metaphor because organization do not retain and recall the things this is individual who possesses, shares, retains and memorizes data and represents the organization memory collectively. Researchers have contradictory favors on this issue, considering both the aspects (Walsh & Ungson, 1991) suggested organizational memory as both an individual and organizational level construct.

Figure 2.1: Knowledge Management System Model



Source: Lustri et al, (2007)

Lustri et al (2007) proposed a model depicting KM system implementation, which consists of the interrelationships among various components of KM such as environment, structure, strategies, policies and managerial actions. Researchers in the past, suggested that relationship among environmental elements, policies, structure, actions and strategies should be aligned to effectively enhance KM practices. The central point of the figure represents shared visions, meaning and creation, which highlights toward the need of creating awareness in people regarding development of the knowledge. The first circle presents an internal process reflecting knowledge creation among individuals. It involves the process of facilitating communication and collaboration among individuals to access the relationship networks, databases and online information. It also involves activities that enable reflection, interpretation and information connection for creation and developing a concept.

The second circle highlights the actions to enable four modes of knowledge by (Nonaka & Takeuchi, 1995) i.e externalization, internalization, combination and socialization. The aim of enabling these knowledge modes as depicted by Lustri et al. (2007) is to sharing exiting knowledge and creating new knowledge to promote learning process. The third circle presents the process of knowledge dissemination. However, it is important to develop a sharing mechanism to disseminate knowledge of individual and groups to other organizational level.

The fourth circle represents the actions aiming at collective utilization of organizational knowledge and promoting knowledge application in problem solving, product development and innovation.

2.6. Individual Competence

Individual competence is comprised of personal skills, attributes and behavior to perform assigned job in a designated but superior way (Murray, 2003). Godbout (2000) elicit that aptitude, skills and motivation of employees are significant factors in achieving organizational objective. Prasad (2006) asserts on the need of incorporating personal characteristics such as openness, empathy, co-operation, positivism and equality in to behavior while communicating to others. Bergenhenegouwen *et al.*(1996) stated that managers must possess specific personal competencies along with task specific competencies to perform effectively. Further, Barnes and Liao (2012) identified organizational awareness and collaborative awareness as specific competencies to improve employee performance. Shen and Darby (2006) say that the manager's emphasis should be on developing requisite skills and competencies for completing an assignment.

2.6.1. Modeling Personal Development

The overall purpose of personal development is to maximize effectiveness of employees' knowledge and leverage them constantly (Wiig, 1997; Bontis & Fitz-enz, 2002). A specific objective of managing knowledge is to support activities that promote knowledge renewal. Further, it confirms updating knowledge in accordance to present business trends that helps to sustain competitive advantage in long term. Major qualities that enhance orientation toward personal effectiveness and performance are use of sound judgment, convey information, share meaningful information, adopt and development, know the organization and the business, establish plans, manage execution, influence others and drive for results. Orientation toward specific knowledge refers to a bit of knowledge that help to learn any specific task, gain expertise in a particular area or any specific method of doing work that differentiate a skilled person from others.

Expertise is always required in organization to cope up with the challenges. Further, specific skills and experience acquired during continuous learning process enlightens and guide human resource to work for the organization and their own well-being. Individual competence has been considered as a key element in a mix of organizational operating system, technologies and infrastructure that reframes the competence. Hence, managing personal competencies is the utmost requirement to manage and up-build strategic competitive advantage. However,

previous researchers have usually not been emphasized on the measurement of individual competencies. Extant literature of KM has introduced new aspect and dimensions of competence management. The emergent dimensions of competence are driven by IT applications and aimed at enhancing, accessing, sharing, using and creating new knowledge in organizations. Waychal et al. (2011) pronounces that just facilitating employees, a better access to existing knowledge and communication networks has not always resulted in to value adding outcomes.

2.6.2. Modeling Self Mastery in Learning

The major characteristics that bend managerial competence toward people orientations is to foster enthusiasm and teamwork, reward and celebrate achievement, attract and develop talent and build relationships. Continuous learning capacity is a precondition for survival of the organization (Senge, 1990). Lustrì et al. (2007) says that: “The organization lends people its competency assets, thus providing them with the conditions to face different situations. People return the organization with their learning, thus giving it survival and development conditions” (p.188). When individual share their mental models with other group members, then it is termed as ‘shared mental model’.

According to Michellone and Zollo (2000) the very paradox of knowledge is that organizations possess knowledge only if they are able to convert and exploit it and the major ability to convert knowledge resides in people and their competencies. Wright et al (2001) says that a core competence involves observing the people involved, particularly the skill set and behavior they must demonstrate to develop the core competence. In other words, it can be said that individual level competencies are required to create organizational level core competences. However, organizational member can take advantage from such common sharing and unique ideas. Five underlying dimensions of learning capability are experimentations, risk taking, dialogue, participative decision-making, interaction with external environment and these dimensions were depicted as highly significant factors in the extant literature (Chiva et al, 2007).

2.6.3. Seek Learning Activities

Human capital is comprised of the knowledge that is acquired through various means as education, training and experience and results as skill and individual competence. Anna (1997) says that knowledge sharing is possible when people believes each other and have faith in their integrity. If peoples’ expectation do not get fulfilled even after working long durations and devoting their skill; they will get de-motivated. On the other hand, organizations require their

employees to seek new learning opportunities and develop the ability to cope-up with the new dimensions of change. The characteristics of people orientatedness provide a chance to develop cordial relation and collaboration among team members.

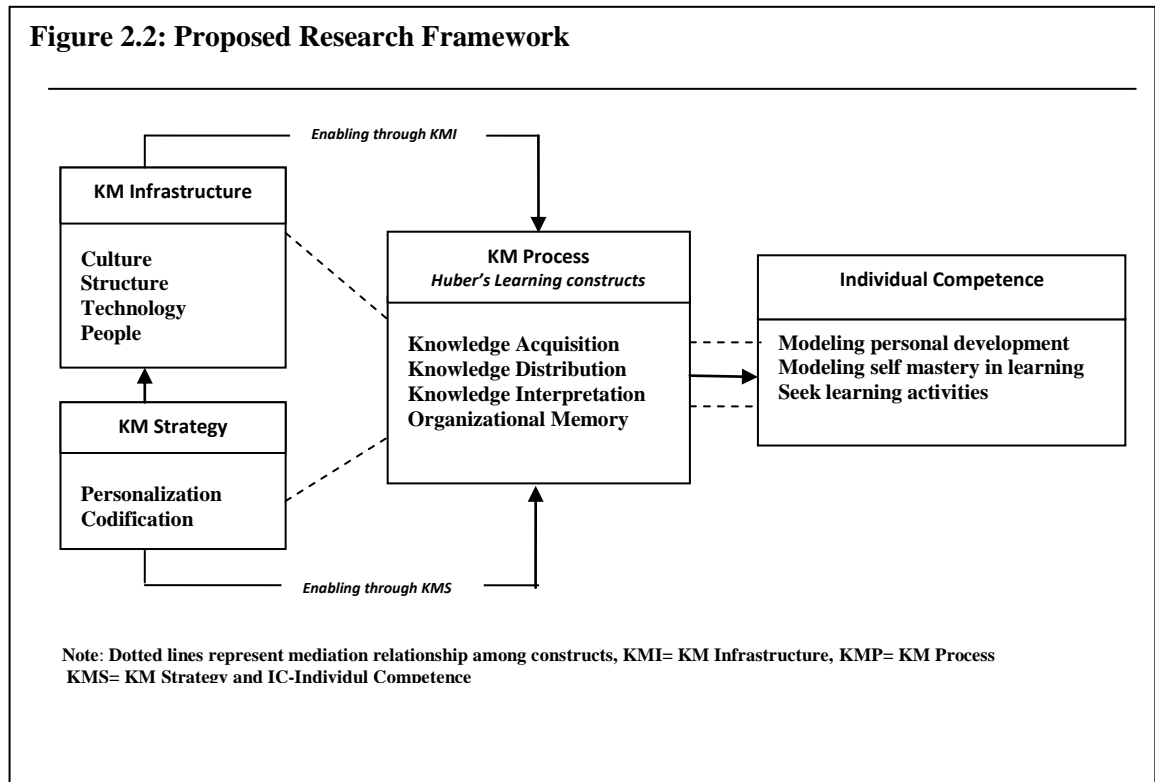
Organizations should adopt dynamic work environment and methodological procedures in order to take persistent move toward progress. According to Collis and Montgomery (1995) organizational assets and capabilities will determine how effectively the functional activities are conducted in organizations when the resource enables to perform activities better and cost effective than their rivals, it gains a competitive advantage. Behavioral and knowledge integration emerges as outcomes of revealing and using intellectual assets of the organization (Mason, 2003).

The characteristics of improving and attaining specialized knowledge, improve systems and processes, commitment toward quality and focus on customer needs are several factors that help organizations to focus on gaining specialized knowledge so that challenges can be overcome. However, KM and learning must be significantly considered as part of the same continuum; if organizations want to compete effectively (Chawla & Joshi, 2011). Individual competencies include some common characteristics required to confront day to day problems in the organizations. These special characteristics are known as management job orientation, personal effectiveness and performance, people centered behavior, urge to gain specialized knowledge and orientation toward integrity at work (Ekaterini, 2011).

2.7. Conceptual Framework

To elucidate and summarize the previous linkages among underlying dimensions of KM infrastructure, KM strategy and KM process as independent variables and individual competence as a dependent variable, most of the previous studies have established linkages among various knowledge dimensions and organizational outcomes. However, limited studies are oriented toward exploration of individual level outcomes.

Therefore, literature suggests studying KM elements in the context of individual level outcomes. Based on previous literature annotations, a research framework has been proposed (See Figure 2.2).



The linkages between KM infrastructure and KM process has been depicted through linking the dimensions of culture, structure, technology and people. The second variable undertaken in the study is KM strategy, which measure the sub-dimensions of personalization and codification. The third variable under study is KM process, which represents the linkages of KM process and individual competence linking four dimensions of KM process based on Hubers’ Learning Constructs and three dimensions of individual competence i.e. modeling personal competence, modeling self- mastery in learning and seek learning activities.

2.7.1. Theories and Approaches

The resource-based view (RBV) as a basis for the competitive advantage of a firm lies primarily in the application of a bundle of valuable tangible or intangible resources at the firm's disposal. According to resource-based view, firm equates the capability with the firm exploitation of its tangible and intangible value generating asset and resources (Pitt & Clarke, 1999). Zack (1999) pronounces that: “knowledge can be considered as the most significant strategic source and the capability to acquire, collect, integrate, share and implement the knowledge resource is most significant capability to for up building and sustaining long term competitive advantage” (p.128). Smith (2006) says that: “KM literature is always supportive of knowledge being a key source of achieving competitive edge. However, KM implementation

might fail, as competitive advantages are often not realized. The major problem seems is to explore models, framework and methodologies that will help organizations in successfully implementing KM programs” (p.5). Hence, knowledge is not always a competitive asset of an organization itself there are several preconditions to apply and avail the advantages of knowledge applications. If the organizations are willing to be more valuable asset and utilize it to gain competitive advantage over other rivals in the industry, knowledge should possess the characteristics of uniqueness, inimitability and non-substitutability (Desouza & Vanapalli, 2005). Drawing on RBV of the organization, extant researches on human resource tend to focus on managing knowledge stock as a source of value creation (Kang et al, 2007).

The underlying assumption of present study has been propounded on the basis of knowledge based view (KBV), which figures out ‘knowledge’ as a most strategically significant resource (Grant, 1996). KBV is based on the ideology that knowledge is embedded and carried through entities including culture, policies, routine, system and employees. Basically, KBV is originated from resource based theory that emphasizes on the significance of value, rareness, inimitability and non-substitutability of the organizational resources (Wernerfelt, 1984). Collis and Montgomery (1995) posit that the resource based view considers organizational resources and capabilities as a core element or a heart of organizational competitiveness within the specific context of market forces. The theory proposes that a firm’s strategies should be based on the internal resources and external environment factors. Successful strategies should exploit the firm’ strengths and opportunities and avoid its weakness and threats (Collis & Montgomery, 1995). The competence-based perspective sees the existence, structure and boundaries of the firm as explained in some way by the associated existence of individual or team competences and maintained by that organization (Hodgson, 1998).

Table 2.3.: Literature Support to Proposed Linkages			
Linkages	Major Contributors	Theme	Recommendations
KM Infrastructure and KM Process	McAllister (1995), Lee and Yang (2000), Gold <i>et al.</i> (2001), Grover and Davenport (2001), Lee and Choi (2003), Sharifuddin <i>et al.</i> (2004), Jasimuddin <i>et al.</i> (2006), Kerr and Clegg (2007), Hsieh (2007), Aujirapongpan (2010), Islam <i>et al.</i> (2011), Lee <i>et al.</i> (2011), Pandey and Dutta (2013), Islam <i>et al.</i> (2015)	Prior studies emphasized on the linkages of KMI capabilities, process capabilities, knowledge value chain, knowledge enabler process and organizational characteristics with KM performance and other organizational outcomes.	The study of specific strategies for sustaining organization structure, and facilitating KM that leads to enhanced organizational effectiveness is suggested. Further, study of IS resources to enhance knowledge performance is also recommended in the previous studies.
Culture and KM Process	Eisenberger <i>et al.</i> (1990), Parker and Price (1994), Hurley and Hult (1998), Jones <i>et al.</i> (2003), Lopez <i>et al.</i> (2004), Sanchez (2004), Yang (2007), Ho (2008), Jones (2009), Rivera-Vazquez <i>et al.</i> (2009), Chang and Chuang (2010), Handzic (2011), Liao <i>et al.</i> (2012), Nold III (2012), Shaabani <i>et al.</i> (2012)	Culture, Infrastructure capability, business strategy and various contextual factors were studied with organizational element, i.e. knowledge transfer and other processes.	Some other aspects of organizational culture that enable KM processes and influence organizational structure is required to emphasize.
Structure and KM Process	O'Dell and Grayson, (1998), Ruggles (1998), Chang and Chuang (2010), Abouzeedan and Hedner (2012), Shaabani <i>et al.</i> (2012), Mahmoudsalehi <i>et al.</i> (2012)	The role of the structure has been explored in determining KM and the way by which structure affects KM performance have also been investigated in studies.	Need to evaluate effects of the structure dimensions as centralization, formalization, integration on KM processes like creating, sharing and knowledge utilization.
Technology and KM Process	Hedlund (1994), Leonard (1995), Alavi and Leidner (2001), Carneiro(2001), Sridharan and Kinshuk (2002), Lindvall <i>et al.</i> (2003), Tanriverdi (2005), Yang and Chen (2007), Ho (2008), Chang and Chuang (2010), Lopez and Alegre (2011), Shaabani <i>et al.</i> (2012), Chuang <i>et al.</i> (2013)	Applications of Intelligent resources in managing knowledge and role of technology to strengthen key factors of KM have been explored.	Significance of factors that affect intelligent agent and their relationships between KM and core competencies by investigating the internal and external environment is recommended.

People and KM Process	Choi and Lee (2002), Peachey (2006), Chang and Chuang (2010), Shaabani <i>et al</i> (2012)	The contribution of human resource to determine KM elements and interaction among knowledge variables to acquire core competencies is a key theme of these studies.	Varied aspects of HR in achieving core competence and other organizational outcomes are required to be investigated.
KM strategy and KM Process	Choi and Lee (2002), Ju <i>et al</i> (2006), Hsieh (2007), Erwee <i>et al</i> (2011), Shaabani <i>et al</i> (2012)	Linkages of KM strategy and its relevance with knowledge creation models for KM capability and innovation have been explored.	Study of KM enablers that triggers KM creation, particularly is recommended for future research.
Personalization and KM Process	Hansen, Nohria and Tierney (1999), Keskin (2005), Yu <i>et al.</i> (2006), Bosua and Venkitachalam (2013)	The role of personalization strategy to manage knowledge has been investigated.	Approaches to align KM strategies and work group knowledge process are required to study.
Codification and KM Process	Majchrzak <i>et al.</i> (2004), Keskin (2005), Greiner <i>et al.</i> (2007), Hansen, Nohria and Tierney (1999), Kumar and Ganesh (2011), Bosua and Venkitachalam (2013)	The role of codification strategy to manage knowledge has been examined in prior studies.	Factors affecting codifiability and knowledge process in organizations are suggested to be explored.
Competence (<i>Individual level</i>)	Nonaka and Takeuchi (1995), Thomas <i>et al.</i> (2001), Delamare Le Deist and Winterton (2005), Wickramasinghe and Zoyza (2007), Qiao and Wang (2009), Nonaka and Von Krogh (2009), Stevens and Helm (2010), Szabo and Csepregi (2011)	Key aspects of individual competence have been explored by researchers to address the issues in managing knowledge.	Assessment of specific skills required for different functional level and identification of individual competencies that would help to perform efficiently is required to be explored.

Source: Kushwaha and Rao (2015)

Table 2.4. Relevant Theories and Approaches			
Constructs	Authors	Linkages	Models and Theories
KM Infrastructure	Carneiro(2001), Lopez et al (2004), Tanriverdi (2005), Ho (2008), Jones(2009), Chang and Chuang (2010), Handzic (2011), Lopez and Alegre(2011), Islam <i>et al.</i> (2011), Lee <i>et al</i> (2011), Shaabani et al. (2012), Liao et al. (2012), Nold III(2012), Mahmoudsalehi et al (2012), Pandey and Dutta (2013), Islam <i>et al</i> (2015)	Prior studies emphasized on the linkages of KMI capabilities, process capabilities, knowledge value chain, knowledge enabler process and organizational characteristics with KM performance and other organizational outcomes. Culture, infrastructure capability, business strategy and various contextual factors were studied with knowledge dimension, i.e. knowledge transfer and KM processes.	Knowledge Based View (KBV)
KM Strategy	Hansen, Nohria and Tierney (1999), Choi and Lee (2002), Majchrzak <i>et al.</i> (2004), Keskin (2005), Ju et al(2006), Hsieh(2007),Greiner <i>et al.</i> (2007), Stevens and Helm (2010), Erwee et al(2011), Kumar and Ganesh (2011), Shaabani et al (2012).	Relationship of KM strategy and its relevance with knowledge creation models for KM capability and innovation have been explored. The role of personalization and codification strategies to manage knowledge has been investigated.	HNT's Knowledge Strategy Model, Nonaka and Takeuchi SECI Model
KM Process	Huber (1991), Baines (1997),Hansen Nohria and Tierney (1999), Aujirapongpan (2010), Erwee et al (2011), Bosua and Venkitachalam (2013)Jimenez-Jimenez and Sanz-Valle(2013)	Applications of intelligent resources in managing knowledge and role of technology to strengthen key factors of KM have been explored	Resource Based Theory, Knowledge based theory, Huber learning Model, Senge (1990) OL five disciplines
Individual Competence	Delamare Deist & Winterton (2005), Wickramasinghe and Zoyza (2007), Abel (2008), Qiao and Wang (2008), Stevens and Helm (2010), Szabo and Csepregi(2011)	The contribution of human resource to determine KM elements and interaction among knowledge variables to acquire core competencies has been a central theme of these studies. Key aspects of individual competence have been explored by researchers to address the KM issues.	Rational Competence Theory, Self Determination Theory, Wright's PKM Model
Source : Author			

Table 2.5 Emergent Personal Knowledge Management Framework

<i>Problem type</i>	<i>Routine</i>	<i>Novel</i>	<i>Discovery</i>	<i>Outside of expertise</i>
Cognitive problem-solving competencies	Apply rapid problem solving process including: -problem scoping -pattern recognition -sense making -problem analysis -heuristics -risk assessment -identification of solution option	In addition : Careful, systematic, definition, diagnosis and analysis of problems Reflection and double loop learning improvisation skills	In addition: Create prototype of complex ideas to make tacit knowledge explicit Structured discussion and collaboration process to explore ideas	Cautious problem solving pace of problem definition and pattern recognition
Information Competencies	Access personal notes and relevant information Ability to access, search, store and organize key information resources	In addition: Access and assess quality of external information (sensing and sourcing) consultations with community of practice and external networks	Knowledge (information, assumption, values) embedded in prototypes and models	Seek additional insights by seeking discussion with new networks (dynamic information source)
Social Competencies	Primarily a solitary activity	Collaborative activity requiring communication and collaboration skills Extensive internal and external discussions, Team work processes	In addition Use of shared space for collaborative discussion of prototypes Supported by use of 'shared space' technologies	Engage in wider search for ideas an insight Develop more extensive external networks Internal community used to vet external information
Learning Competencies	Stronger problem definition capacity	Increased pattern recognition and sense making. Stronger analytical skills	Creation of new knowledge through experiments and prototyping	Capacity for reflection.
Individual, social and organizational context	Individual motivation to excel, learn, risk taking and innovation, collaboration and strong interpersonal skills Strong social capital, high trust, strong bonding networks, strong bridging networks, support of community of practice and strong collaborative abilities Organizational enablers including flexibility, high trust, tolerance to risk and innovation, autonomy, supportive leadership and challenging work			

Source: Wright (2005)

2.8. Hypotheses Formulation

2.8.1. KM Infrastructure and KM Process

KM infrastructure element comprised of culture, structure, people or technology plays a significant role in creating, disseminating, interpreting and storing knowledge. Information system literature signifies that infrastructure capability can enhance the KM process (Gold *et al.*, 2001; Lee & Choi, 2003). Earl (2001) says that KM process must be enabled to store, transform and disseminate knowledge to leverage KM infrastructure and these activities are related to knowledge development (Earl, 2001). Pinho *et al.* (2012) introduced the term 'facilitator' in the context of individual, technological and/or socio/ organizational factors that promotes knowledge flow to facilitate KM processes. Several industries such as manufacturing, financial services, IT, outsourcing are considered information intensive and requires capabilities to store, share, process and apply knowledge in organizational functions (Chawla & Joshi, 2010).

Tsai (2014) mentioned the significance of an automated KM system in overcoming organizational issues such kind of employees' willingness to share knowledge, collecting documented data and insufficient operational procedures. Further, Tseng and Lee (2014) elicit that KM infrastructure can be leveraged by transferring, storing and accumulating knowledge through KM processes. According to resource based view theory, valuable, rare, inimitable and non-substitutable resources lead to achieve long-term competitive advantage (Wernerfelt, 1984; Barney, 1991). However, Gold et al (2001) mentioned that structural, technical and cultural infrastructure contributes in enhancing organizational social capital. Hence, a moderate IT infrastructure investment is recommended to facilitate conversations and the exchange of tacit knowledge (Kumar & Ganesh, 2011; Venkitachalam & Busch, 2012). According to Grant (1996) Organizations focuses on organizational culture to build collaborative knowledge sharing.

According to Carneiro (2001), the new possibilities of IT infrastructure may lead to individual knowledge that can enhance the task performance. When people obtain data, information and more experience from any source, they also acquire possibility of developing new knowledge (Sena & Shani, 1999). The KM infrastructure may include Information Technology, support from top management, Information Technology resources and a basis of trust, mentoring, employee training and development along with the distribution of adequate resources and adequate budgeting to endow in KM initiatives (Srikantaiah & Koenig, 2000). Grounded over previous literature annotations, it can be concluded that KM infrastructure is likely to have a

positive influence on KM process. Hence, the following research hypothesis has been proposed.

Hypothesis 1: KM infrastructure has a positive influence on knowledge process

2.8.2. KM Strategy and KM Process

KM strategy is formulated to deal with knowledge process implementation and to acquire, create, disseminate and store knowledge. Bosua and Venkitachalam (2013) says that KM strategic orientation guides organization in managing their knowledge processes, exploring capabilities and devising solutions to the problem. In fact, effective and efficient execution of knowledge processes ensures KM success. Dawson (2000) elicits that individual and organizational both dimensions should be explored for developing KM capabilities. In addition, Hansen (1999) explored that codification strategy reduces the time of internal knowledge transfer and allows accessing codified knowledge without having direct interaction with the people who originally creates or possessing it (Hansen *et al.*, 1999). De Pablos (2002) point out that purpose of KM strategy is to generate or acquire knowledge, identify knowledge structure and provide value to transfer knowledge for establishing mechanism of effective knowledge re-use.

Several researchers in the past (Choi & Lee, 2002; Denford & Chan, 2011; Earl, 2001; Kumar & Ganesh, 2011; Bettiol *et al.*, 2012; Jasimuddin *et al.*, 2005) confirms the significance of KM strategy in improving and enhancing KM processes across organizations. The codification strategy deals with knowledge codification and storage to allow its easy access, reuse and application (Malhotra, 2005; Kumar & Ganesh, 2011). Hence, it can be concluded that KM strategies are positively related to KM processes in enabling and aligning them with organizational context. Knowledge development process starts with creation and adoption at the individual level and then it moves into distribution, review and reuse at organizational level, which actually converts individual knowledge into organizational knowledge (Bhatt, 2000). At all stages KM infrastructure capabilities concatenate with KM strategy and KM process to receive expected outcomes in the form of enhanced individual competence that will contribute to enhance organizational core competence in the long term. Tacit knowledge reflects in face to face conversations (both formal & informal), telephone conversations and the knowledge that an individual possesses (Srikantaiah & Koenig, 2000). Explicit knowledge reflects in commercial publications, business records, e-mails, web technologies, groupware, databases, intranet and self study (Srikantaiah & Koenig, 2000). Based on previous literature

annotations, it can be concluded that KM strategy is likely to have a positive influence on KM process. Hence, the following research hypothesis has been formulated.

Hypothesis 2. KM strategy has a positive influence on KM process

2.8.3. KM Process and Individual Competence:

Skills are not only person specific but it also relates to contextual dimensions (Deist and Winterton, 2005). IT sector is a dynamic and people oriented sector with high demand for knowledge workers and talented professionals who often enjoy a high bargaining power (Singh, Kodwani & Agarwal (2013). According to Aujirapongpan et al (2010) knowledge is used to achieve the objectives, requires process or procedures in executing systematic KM. Further, Theriou and Chatzoglou (2014) describe that knowledge base cannot effectively progress in absence of knowledge acquisition, sharing and utilization. People are likely to collaborate with others for sharing and transferring their knowledge to devise the solutions for organizational issues (Bhatt, 2002). KM integrates people, process and technology to enhance effectiveness of organization's operational processes and competences through learning (Armistead, 1999). Rouse and Morris (1985) referred individual's mental model as an information processing mechanism that helps in describing, explaining and forecasting events. Barney (1986) elicit that the organizations should emphasize on its unique skills rather than external environment.

The significance of KM depends not only on the application of IT but also on the individuals' skills toward implementing plans and applying their knowledge (Mason, 2003). In addition, strategic thinking is required to manage effectively and helps to formulate strategies in a way that drives individual competencies toward skills and knowledge development (Ekaterini, 2011). Vera and Crossan (2002) suggested viewing KM as the process of 'managed learning'. On the basis of aforesaid discussion, it can be predicted that KM process may likely to have a positive impact on individual competence of an employee. Thus, the following hypothesis has been framed.

Hypothesis 3. KM process has a positive influence on individual competence

2.8.4. KM Strategy and KM Infrastructure

According to Davenport and Prusak (1998) KM strategy facilitates knowledge enablers to leverage desired benefit in the long-term. Generally, KM strategy is comprised of people, technology infrastructure and culture of sharing knowledge (Montano et al, (2001a). Knowledge management strategies are rooted in the organizational infrastructure and aims to

deliver KM activities and processes (Xie, 2009). According to Freeze and Kulkarni (2007), knowledge capabilities can be leveraged effectively through using knowledge strategies, process and technology. Organizations preferably intend to recruit people with different competencies and skill sets (Nordhaug & Gronhaug, 1994). The individual's ability to adapt changes, develop with the changing contexts and their potential to contribute at the organizational level is the basic factors of human capital (Mayo, 2000). Limited studies have been conducted to visualize the impact of KM elements, in order to achieve individual level outcomes.

Further, Kao (1996) affirms the need of learning, work environment, IT infrastructure and other organizational arrangements to develop a sense of collaboration and individual performance. It is remarked by previous researchers that organizational capabilities would be helpful to develop IC and ultimately in structuring knowledge capabilities (Mills & Smith, 2011). Infrastructure capabilities affect IC as it is noted that competences both at the organizational and personal level are excessively connected to each other because competence at the individual level are generally derived from organizational values and core competencies (Reagan, 1994). Dierickx and Cool (1989) argued that people do not consider the opportunity costs of assets and therefore fail to take appropriate strategic action to render the full value of the organizational asset. Based on the extant literature discussion, it can be concluded that KM strategy may likely to have a positive impact on KM infrastructure. Hence, the following hypothesis has been formulated.

Hypothesis 4. KM strategy has a positive influence on KM infrastructure.

2.8.5. Mediating Role of Knowledge Process

i) KM Infrastructure, KM process and Individual competence

In the extant literature, a prevailing question arises that learning whether organization can learn, or if the organizational learning is merely a combination of individual learning. Huber (1991) elicit organizational learning take place only at individual level. According to Kim (1998) the significance of individual and organizational learning is at once obvious because all organizations recruits people, in order to enhance learning capabilities because organizations can learn in absence of any specific individual but not in absence of all individuals. Nonaka and Takeuchi (1995) assert knowledge creation as the basis of learning at all levels of individual and group learning. However, learning processes at organizational level are quite different from

learning at individual level due to improvements in organizational processes and capabilities even after separation of employee from the organization.

Hamel (1991) describes core competences as ‘a messy accumulation of learning’ comprising tacit and explicit knowledge, skills and technologies, which help organizations to gain long-term competitive advantage (Pilbeam & Corbridge, 2006). Further, enhancing intellectual asset is required to revitalize knowledge efforts. Individuals perceive discrepancy between current situation and the goal and if they perceive that discrepancy can be minimized and desirable outcomes can be achieved, they continually make efforts to attain the desirable outcomes. According to Eskerod (1998) organizations confronts the challenges of prompt technological shifts, competition and composition of workforce to ensure requisite learning and to develop the ability of accommodating with many possibilities as well as resource allocation during program implementation (Eskerod, 1998). On the other side, if they perceive that outcomes are not easily attainable, they instead cease to take a further step (Zheng et al., 2014).

Chakraborty and Mandal (2011) says that knowledge intensive firms continually make efforts to stabilize and synchronize their organizational structure and share responsibilities, in order to confront challenges during knowledge retentions and utilization. Additionally, the role of IT in capturing tacit knowledge and converting it into explicit form is more important task in IT organizations due to their knowledge intensive attribute primarily (Chawla & Joshi, 2010). Much debate surrounds the role of IT infrastructure in supporting organizational knowledge processes (Davenport & Prusak, 1998; Alavi & Leidner, 2001; Damsgaard & Scheepers, 2001). Establishing a supportive culture that facilitates innovation and knowledge sharing could be the evidence for an organization engaging in a knowledge creation and human capital development process (Birasnav & Rangnekar, 2010). A robust and reliable infrastructure is necessary for capturing, storing and sharing of knowledge across the enterprise (Chawla & Joshi, 2010a).

Grounded over previous literature discussion, it can be concluded that KM process may likely to have a mediating affect between the relationship of KM infrastructure and individual competence. Hence, the following hypothesis has been formulated to empirically validate this assumption.

Hypothesis 5: The effect of KM infrastructure on individual competence is indirectly mediated by KM process

ii) KM Strategy, KM process and Individual competence

Draganidis and Mentaz (2006) elicit that competence management significantly contributes at individual and organizational level because it identifies the elemental knowledge, which a personnel or organization should possess to achieve competitiveness. Hansen et al., (1999) have proposed a model to inform the choice of knowledge strategy and IT support for knowledge-intensive organizations. Competence management can have an important contribution at an organizational and personal level, as it identifies the key knowledge that an employee or an organization should possess in order to achieve his/its targets (Draganidis & Mentaz, 2006). The dynamics between individual and organizational learning is an important consideration and an approach, which links the individual and the organization with learning process, systems, and technology that will benefit both in a reciprocal partnership will be the right requirement (Chaudhuri, 2011).

Knowledge, its management and learning processes all become crucial in understanding competence. According to Iansiti (1993) people possess knowledge of not only being competent with a particular discipline but also of knowing how that discipline interacts with other disciplines. According to Spender (1996b) organizational learning, knowledge and memory are not the same as, and works differently than, individual knowledge, learning and memory. Learning promotes the avenues to enhance knowledge that exists both at the individual and organizational level. Further, individual's observations and insights related to organizational processes may lead to enhance the learning at organizational level. However, people are capable to re-adapt and reconstruct knowledge (Allen, 1977); they can store both the tacit and explicit knowledge at a same point of time and possess ability to apply that knowledge in to a new and unpredictable situation (Berry & Broadbent, 1984; Berry & Broadbent, 1987). Hence, the individual knowledge within the organization must be disseminated among other employees who require it to complete their task efficiently for transferring knowledge at the right time, in the right place and to the right person.

Based on previous literature discussion, it can be concluded that KM process may likely to have a mediating affect between the relationship of KM strategy and individual competence. Hence, the following hypothesis has been formulated.

Hypothesis 6: The effect of KM strategy on individual competence is indirectly mediated by KM process.

2.9. Chapter Summary

The chapter provided the details of the extant literature on KM infrastructure, KM strategy, KM process and individual competence. The first section of the chapter describes the existing literature on culture, structure, technology, people, personalization, codification, knowledge acquisition, knowledge distribution, knowledge interpretation, organizational memory, modeling personal development, modeling self mastery in learning and seeks learning activities. In the second section, a conceptual framework has been presented based on existing theories and approaches of knowledge and competence management. Further, the final section of the chapter presents the theoretical foundations to formulate research hypotheses to validate the linkages among the variables undertaken in the study.

CHAPTER III

RESEARCH METHODOLOGY

3.1. Introduction

This chapter provides an overview of the research methodology used to test the proposed hypotheses and to provide answers to the research questions. It also provides information about the measures used in this study. A theoretical discussion is provided to validate the research design. The main purpose of the study is to examine the influence of knowledge elements i.e. KM infrastructure, KM strategy and KM process on individual competence. Following section presents an insight to the sample population, sample plan, data collection, data analysis techniques and summary at the end of the chapter.

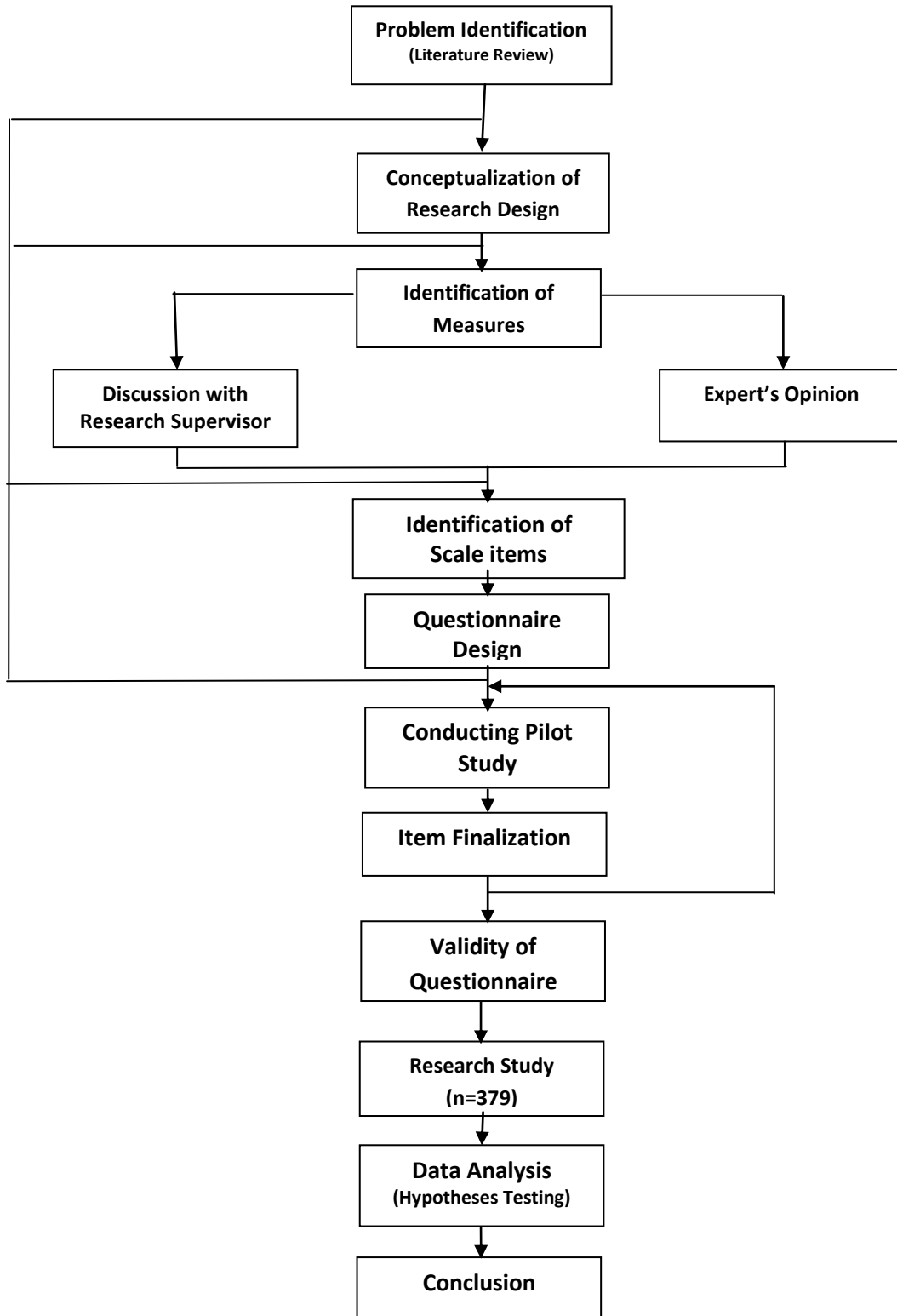
To attain the purpose of the study following objectives have been developed:

1. To study the relationship among KM infrastructure, KM strategy and KM process
 - a. To explore the relationship between KM infrastructure and KM process
 - b. To explore the relationship between KM strategy and KM process
2. To find out the relationship between KM process and individual competence
3. To investigate the relationship between and KM strategy and KM infrastructure
4. To examine the mediating role of KM process between KM infrastructure and individual competence
5. To examine the mediating role of KM process between KM strategy and individual competence

In this study, the following research questions have been derived for accomplishing afore-said objectives.

1. What kind of relationship exists among KM infrastructure, KM strategy, KM process and individual competence?
2. Does KM process relates to individual competence in the context of Indian IT sector
3. Is KM strategy related to KM infrastructure dimensions?
4. Does KM infrastructure and KM strategy influence individual competence and are their relationship mediated by KM process?

Figure 3.1: Research Methodology Flowchart



3.2. Testing the Hypotheses

Objective 1: The first objective was to study the relationship among KM infrastructure, KM strategy and KM process, which is further subdivided in to two parts:

a) To explore the relationship between KM infrastructure and KM process

The hypothesis to test this research question was framed as:

Hypothesis 1: KM infrastructure has a positive influence on KM process

b) To explore the relationship between KM strategy and KM process

The hypothesis for examining this research question was

Hypothesis 2: KM strategy has a positive influence on KM process

Objective 2: The second objective was to find out the relationship between KM process and individual competence.

The hypothesis for exploring this research question was:

Hypothesis 3. KM process has a positive influence on individual competence

Objective 3: The third objective was to investigate the relationship between KM strategy and KM infrastructure.

The hypothesis framed to examine this research question was:

Hypothesis 4: KM strategy has a positive influence on KM infrastructure

Objective 4: The fourth objective in this study was to examine the mediating role of KM process between KM infrastructure and individual competence

The hypothesis for examining this research question was:

Hypothesis 5: The effect of KM infrastructure on individual competence is mediated by KM process

Objective 5: The fifth objective in this study was to examine the mediating role of KM process between KM strategy and individual competence. The hypothesis for examining this research question was:

Hypothesis 6: The effect of KM strategy on individual competence is mediated by KM process.

3.3. Research Design

The research design adopted in the study is conclusive research design. A survey based research design has been followed to conduct the study, which allows the measurement of variables at a single point of time (Malhotra & Dash, 2009). The study used quantitative methods to examine the proposed interrelationships among the variable under study. Further, the research design includes multivariate analyses to explore the linkages of underlying constructs. In this study, survey method was used to collect the data from respondents. Survey method helps to explore, describe and gain understanding of social situation or problems (Groves et al, 2004) and provides an opportunity to explore a large number of respondents so that results can be generalized (Simsek & Veiga, 2000). This study presents 04 research questions and 06 hypotheses. A conclusive research design was applied to seek the answer to research questions and to test hypotheses.

For hypothesis H1 and H2, KM infrastructure is independent variable for H1 and KM strategy is independent variable for H2 while KM process is dependent variable in both the cases. For hypothesis H3, KM process is independent variable and individual competence is dependent variable. In the hypothesis H4, KM strategy is posed as an independent variable and KM infrastructure is a dependent variable. For hypothesis H5 and H6, KM process is predicted to mediate the relationship of KM infrastructure and individual competence (H5) and KM strategy and individual competence (H6) where KM infrastructure and KM strategy are independent variables, KM process is a mediator variable and individual competence is a dependent variable.

3.3.1. Sampling Frame

The unit of analysis was organizations included in the list of (CNX) IT indices adopted from national stock exchange of India (NSE) sector indices. It contains a list of IT companies. The reason behind selecting CNX IT Index is inclusion of top IT companies having more than 50 % turnover from IT related activities. This list is reviewed on semi-annual basis. This list was downloaded from www.nseindia.com on 12th day of February 2014.

3.3.2 Target Population

Previous researchers suggested studying the afore-said linkages on knowledge intensive firms. There is no exact definition of knowledge intensive industries. According to the organization for economic co-operation and development (OECD), the organization refers to those industries that are relatively intensive in their inputs of technology and/or human capital:

firms with high technology investments, high-technology industries, firms with more highly skilled labor and associated productivity gains (OECD 1996:7). As such, knowledge-intensive industries include IT, telecommunication, pharmaceutical, bio-technology and chemical firms. Adhering to the definition of OECD, present study was conducted in knowledge intensive sector. As per the report, IT sector is described as a high technology, research, and development (R&D) intensive sector. Hence, IT organizations were chosen as a study sample. Further, software professionals were chosen as respondents to conduct this study. According to Prasad et al. (2014) software professionals are engineers who write code, design, and test configuration architectures, manage system networks, analyze webs, develop portals, and do software maintenance jobs.

3.3.3. Sample Description

There are different assumptions and thumb rules for determining sample size. According to Bryant and Yarnold (1995) the subjects-to-variables ratio should not be lower than 5:1. However, some researchers (Barcley, Thompson, & Higgins, 1995; Gefen et al., 2000; Hair et al., 2010) suggest that sample size requirement is ten times the number of items in the most complex construct in the model. Sample size in this study ranges within 5-10 subjects per variable.

The sample of the study consists of software professionals working in Indian IT organizations. Mail addresses of the respondents were taken from the trusted online resource provider and survey request was posted on web communities of IT service provider firms included in IT sector indices CNX list of national stock exchange of India. A structured survey questionnaire was mailed to a total of 600 software professionals working in national capital region comprising Delhi, Gurgaon and Noida region in India. The completed surveys received were about 410 yielding response rate of 68.3 percent. During data screening process around 31 surveys were deleted due to improper responses and missing data. A total of 379 responses were recorded for the data analyses. The total numbers of items in structured questionnaire are 50 and as per the sample size assumption and rules appropriate sample size 379 assuming (5:10) subjects per variable has been taken.

3.3.4. Sampling Method

A convenience sampling procedure, a form of non-probability sampling was adopted to select the study sample (Urdu, 2005), assuming that all the employees do not have proper knowledge about KM capabilities such as infrastructure, strategy, process and individual competence.

Hence, this method of sampling is appropriate in selecting the respondents based on self-judgments.

3.4. Research Instrument

Information required for the purpose of study was obtained through both primary and secondary data sources. Primary source of data include responses from the software professionals collected through survey questionnaire structured on the basis of existing measurement scales. Secondary data source include articles, dissertations, study material, books, websites and other relevant study material.

The Likert scale was developed by Likert in 1932 to present a set of attitude statements, and follows a uni-dimensional scaling method, measuring either positive or negative responses to a statement (Trochim, 2005). Originally, the likert scale consisted of five levels of agreement or disagreement with a list of statements. In addition to the original 5-point scale, it can be extended to include 1-6, and 1-7 point scales. To conduct the present study, a seven point likert scale was selected ranging from 1-7 anchored as (1) strongly disagree, (2) disagree, (3) somewhat disagree, (4) neither agree nor disagree (5) somewhat agree, (6) agree, and (7) strongly agree.

The questionnaire designed to collect data contains five parts:

Part 1: General Information;

Part 2: Knowledge Management Infrastructure;

Part 3: Knowledge Management Strategy;

Part 4: Knowledge Management Process and;

Part 5: Individual Competence

Part 1: General Information of the Respondents

Section A of the survey includes part 1 which consist several questions pertaining to respondents' demographic profile such as gender, age, designation, experience and educational profile. The name of respondents' field was kept optional for fulfilling the criterion of anonymity of the respondents.

Section B of the survey consists of four parts that are listed below:

Part 2: Knowledge Management Infrastructure

After the demographic profile of the respondents, second part of the survey includes four dimensions of KM infrastructure comprising culture, structure, technology and people. Culture comprises of three sub-dimension i.e. collaboration, learning and trust. Structure includes centralization and formalization sub-dimensions while technology includes IT support as a underlying dimension and the fourth dimension of KM infrastructure, people includes t-shaped skills. The instrument developed by Lee and Choi (2003) were taken to measure afore-said sub-dimensions. A total of 21 items from the scale were used to measure these four dimensions in which 09 items were taken to measure culture, 06 items were taken to measure structure, 03 items were adopted to measure technology and 03 items were used to measure people dimension. From the original scale, the word 'our' was replaced by 'my' and 'company' was replaced by 'organization' for bringing clarity in keywords pertaining to individualistic orientation of the questionnaire.

Part 3: Knowledge Management Strategy

KM Strategy consists of two dimensions personalization and codification. These two dimensions were measured using a pre-existing scale developed by Choi and Lee (2002). A total of 04 items were adapted to measure personalization and 04 items were taken to measure codification dimension of the KM strategy. From the original scale of Choi and Lee (2002) system approach has been adapted as 'codification' and human approach has been taken as 'personalization' KM strategy for the present study.

Part 4: Knowledge Management Process

After collecting responses on KM infrastructure and KM strategy, the third part of survey enquires and collects information about knowledge processes within the organization. The independent variable KM process was examined on the basis of underlying mechanism of learning developed by (Huber, 1991), which consist of information acquisition, information distribution, information interpretation and organizational memory. Huber (1991) used the terms 'knowledge' and 'information' interchangeably. Later, Jimenez and Valle (2013) advanced this scale for further research using the term 'knowledge' in scale.

The scale items adapted to measure KM process were taken from the scale developed by Huber (1991) and advanced by Jimenez and Valle (2013) composed of four dimensions i.e. knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory. A total 12 items scale was taken and each dimension was measured on 03 items.

Part 5: Individual Competence

In order to measure, individual competence dimensions, which consists of three sub dimensions viz. modeling personal development, modeling self-mastery in learning and seek learning activities, a 09 items scale developed by Bernthal et al. (2004) has been adapted. In the original scale, words ‘my organization’ have been added considering the personal development and individualistic approach for better understanding of the questions.

In the questionnaire, scales adapted from existing scales and numbers of items used in the study is mentioned here in Table. 3.1 below:

Sr. No.	Constructs	Sub-Constructs	Items	Author
1	KM Infrastructure	Culture	09	Lee & Choi (2003)
		Structure	06	
		IT Support	03	
		T Shaped Skills	03	
2	KM Strategy	Personalization	04	Choi & Lee (2002)
		Codification	04	
3	KM Process	KM Process	12	Huber (1991), Jimenez & Valle (2013)
4	Individual Competence	Individual Competence	09	Bernthal <i>et al.</i> (2004)

3.5. Pilot Study

The pilot study was conducted between the timeframe of April, 14th 2014 to May, 25th 2014 on a sample of software professionals working in IT firms located in Delhi. A total of seventy respondents were participated in the pilot study, and of those 57 responses were used for analyzing the data. A major objective of the pilot study was to reduce the number of survey items, as well as to determine whether certain question could be used to measure specific underlying dimensions. One of the biggest challenges for collecting responses was to design the number of survey items. Lengthy questionnaires could extract more information from respondents but at the same time, more questions results in to fewer responses. Problem of non-response bias could occur when responses of participants differ in some way from potential

replies of those who did not participated. Therefore, it is important to increase the response rate and reduce non-response bias by reducing the survey length (Dillman et al, 2009). An exploratory factor analysis was conducted to find the pattern structure of the factors that explain the largest amount of variation in underlying variables. Based on the results of the pilot test, the number of items from the original scales was reduced so that the most internally consistent items would have to be included in the survey instrument.

3.6. Uni-dimensionality of the Constructs

3.6.1. Reliability

Survey instrument was tested using cronbach's α and reliability co-efficients have obtained. The values were noted more than 0.7 (Hair et al.,2010), which is considered to be acceptable and reliable.

Cronbach's α value for constructs is given below in the (Table: 3.2).

Table. 3.2: Instrument Reliability					
Sr. No.	Constructs	Dimensions	Items	Code	Reliability Coefficient (α)
1	KM Infrastructure	Culture	09	kmc1- kmc9	0.734
		Structure	06	str1-str6	0.904
		IT Support	03	it1- it3	0.864
		T-Shaped Skills	03	tsh1–tsh3	0.847
2	KM Strategy	Personalization	04	ps1-ps4	0.841
		Codification	04	cs1- cs4	0.819
3	KM Process	KM Process	12	kmp1- kmp12	0.948
4	Individual Competence	Individual Competence	09	ic1-ic9	0.942

3.6.2. Validity

First, it is important to develop and validate framework for knowledge elements and individual competence in the context of Indian IT industry. Without any validated scale related to KM infrastructure, strategy, process and individual competence, it would be difficult to identify the

linkages between them. Since KM is an emerging field, there are few validated scales related to KM infrastructure, strategy, process and individual competence. Moreover, this study adopted pre-established instruments to measure the study constructs. In this study, Lee and Choi (2003) scale were adopted to measure KM infrastructure dimensions. Choi and Lee (2002) scale were taken to measure KM strategy dimensions i.e. personalization and codification. Further, Huber (1991) KM process scale advanced by Jimenez and Valle (2013) were adopted and Bernthal et al (2004) scale were used to measure individual competence. This study initially attempted to validate the instruments related to KM elements and individual competence in the context of Indian IT sector. To determine the key dimensions related to KM infrastructure, strategy, process and individual competence, a confirmatory factor analysis (CFA) was conducted.

Construct validity for the scale items were established through Exploratory Factor Analysis (EFA), which reduces data dimensionality and creates dimensions (factors) by clubbing items of same nature. Generally, the cutoff value for significant factor loading exceeds beyond 0.3 (Hair et al, 1998).

The two major tests convergent and discriminant validity were applied to examine construct validity of the scale (Trochim, 2005). Convergent validity could be explained by the correlation among items, which compose scale for measuring construct. In order to check convergent validity, a factor loading and average variance explained (AVE) were examined. Bagozzi and Yi. (1988) elicit that, if the factor loadings are greater than 0.50, items are significantly loaded on their respective latent factors. Hence, there is no single definitive test to examine the discriminant validity (Kline, 2005). To examine the discriminant validity, if the values of maximum shared variance and average shared variance were lower than their respective average variance explained value therefore, it can be concluded that discriminant validity exists (Hair *et al*, 2010).

3.7. Data Collection

Data was collected through online survey to conduct this study. The questionnaire was designed and mailed online by using google forms and gmail application respectively. Responses were collected from software professionals of IT firms mentioned in NSE IT sectoral indices. The invitation mails were sent to targeted respondents. The mail included brief description of the study, questionnaire URL, researcher's contact information and anonymity details. Questionnaire included information like organization's name, designation, gender and experience of participants.

The responses were collected from 379 software professionals working in IT firms located in national capital region comprising Delhi, Gurgaon and Noida. The method adopted for data collection was online survey method based on administering questionnaire and inviting the respondents to participate in the study through sending an online link of the survey designed using Google Forms on respondents official mail addresses.

3.8. Chapter Summary

The chapter describes the methodology and research design used in the study and offers discussion on data collection procedure and data analysis method. The chapter also highlighted the sample description, research instrument used to measure the underlying variables of the study and approaches to test the hypothesis developed to accomplish the objectives of the study.

CHAPTER IV

DATA ANALYSIS AND RESULTS

4.1. Introduction

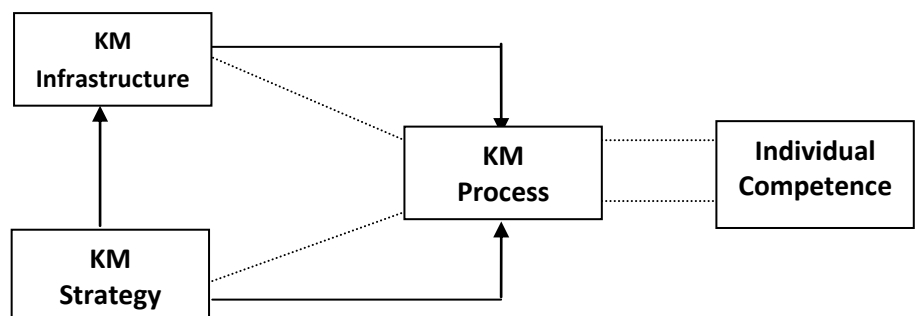
This chapter presents the study results based on empirical examination of the interrelationships among KM infrastructure, KM strategy, KM process and individual competence in the context of Indian IT sector. The underlying variables were measured using observable items, which are combined to the hypothetical constructs. The underlying variables measured for the current study were related to four dimensions of KM infrastructure (culture, structure, technology, people), two dimensions of KM strategy (personalization, codification), four dimensions of KM process (knowledge acquisition, knowledge distribution, knowledge interpretation) and three dimensions of individual competence (modeling personal development, modeling self mastery in learning, seek learning activities). The data were analyzed using statistical software SPSS 20 and AMOS 20. Descriptive statistics was used to analyze the respondents' profile. Further, reliability and validity of instrument were examined and presented in the following sections of this chapter.

Tools and techniques used for Data Analysis

- 1) SPSS, 20, (Descriptive Statistics, Exploratory factor Analysis)
- 2) AMOS 20, Confirmatory factor Analysis
- 3) PROCESS macro (Based on Regression)

Grounded over previous literature annotations, the proposed conceptual model has been presented in (Figure. 4.1.) below.

Figure.4.1. Conceptual Model



4.2. Data Screening

4.2.1. Respondents' Demographic Profile

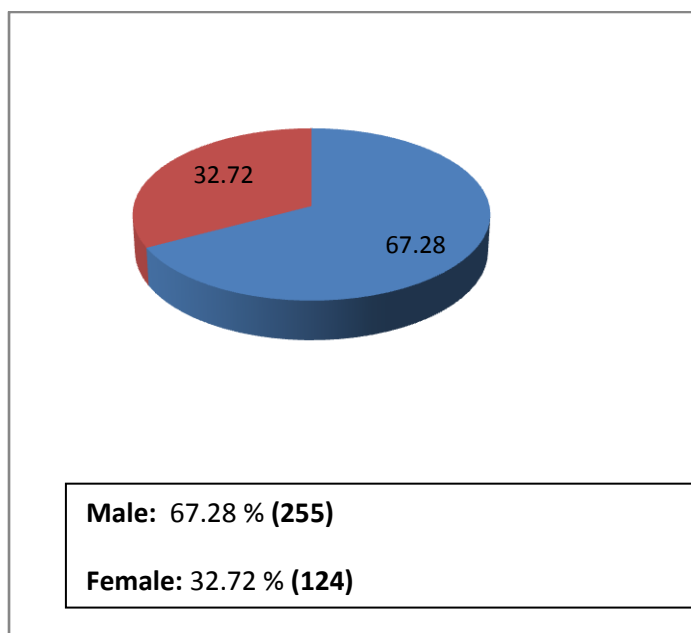
Descriptive statistics described the respondents' characteristics such as gender, age, work experience and educational profile using measures of central tendency, frequency distribution, missing data elimination, and checking outliers for the collected responses. First, the data screening was conducted for eliminating records with missing and multiple responses while preparing data for further analysis. A total of 600 survey mails were sent to the prospective respondents mail addresses, out of which only 410 responses were received back. 31 questionnaires were discarded during data screening process due to improper, missing and multiple responses. After data screening, a total of 379 responses with the response rate of 63.16 percent were considered for subsequent analysis. The description of respondents profile is depicted in the table 4.1. below:

Table 4.1 : Demographic Profile			
(n=379)	Category	Frequency	Percentage
Gender	Male	255	67.28
	Female	124	32.72
	Total	379	100
Age	Below 25 Years	87	22.95
	26-35 Years	127	33.52
	36-45 Years	98	25.86
	Above 45 Years	67	17.67
	Total	379	100
Designation	Software Engineer	109	28.76
	Q.A. Analyst	47	12.4
	Programmer	69	18.21
	Asst. Programmer	86	22.69
	Technical Leader	43	11.35
	Project Leader	25	6.59
	Total	379	100
Work Experience	< than 1 year	179	47.23
	> than 1 but < than 5 Years	128	33.77

	> than 5 Years	72	19
	Total	379	100
Educational Profile	Graduate	194	51.18
	Post Graduate	139	36.68
	Others	46	12.14
	Total	379	100

Figure 4.2 shows the gender wise distribution of respondents. From the respondents, 255 (67.28 %) were males and 124 (32.72 %) were females.

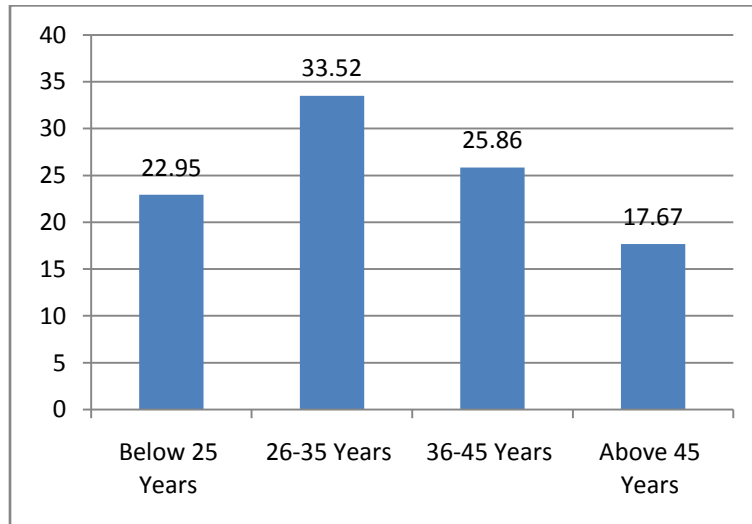
Figure 4.2: Gender Wise Classification (%)



A total of 87 (22.95 %) respondents belong to age group under 25 years, 127 (33.52 %) were between 26-35 years of age, 98 (25.86 %) were between 36-45 years of age and 67 (17.67 %) were above 45 years of age.

Figure 4.3 shows the age wise distribution of respondents.

Figure 4.3: Age Wise Classification (%)



The various designations of software professionals included software engineer 109 (28.76 %), Q.A. analyst 47 (12.4 %), software programmer 69 (18.21 %), assistant programmers 86 (22.69 %), technical leader 43 (11.35 %) and project leader 25 (6.59 %).

Figure 4.4 shows the designation wise classification of the respondents.

Figure 4.4: Designation Wise Classification (%)

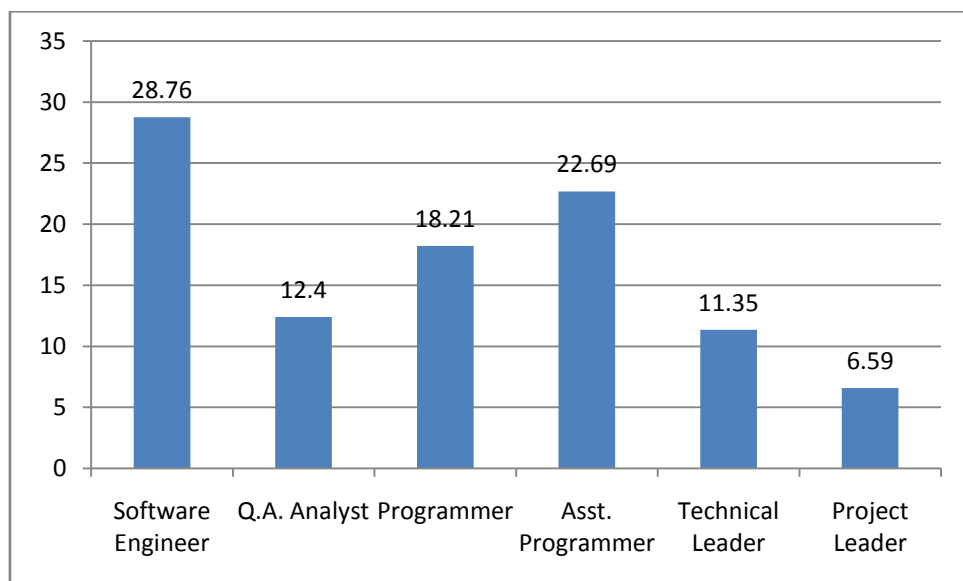
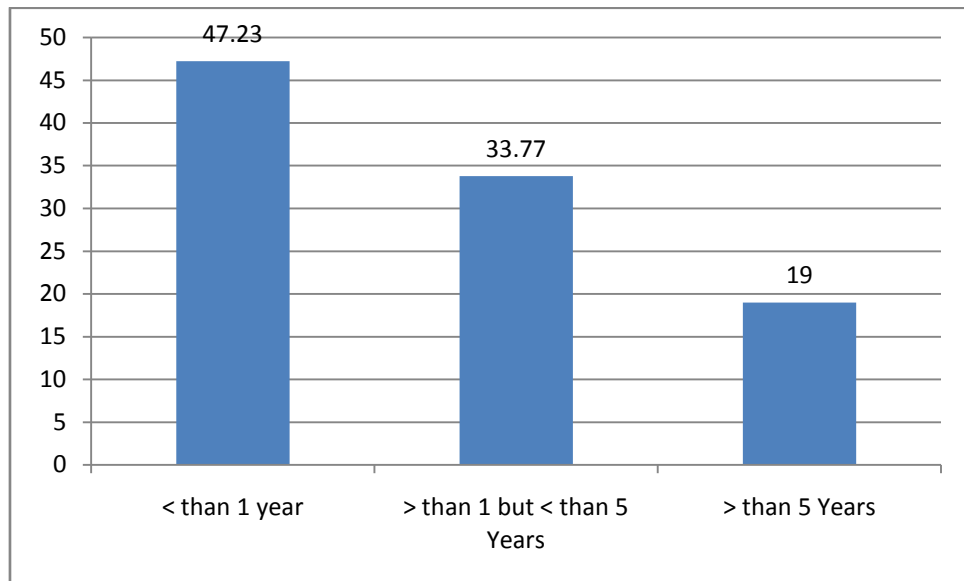


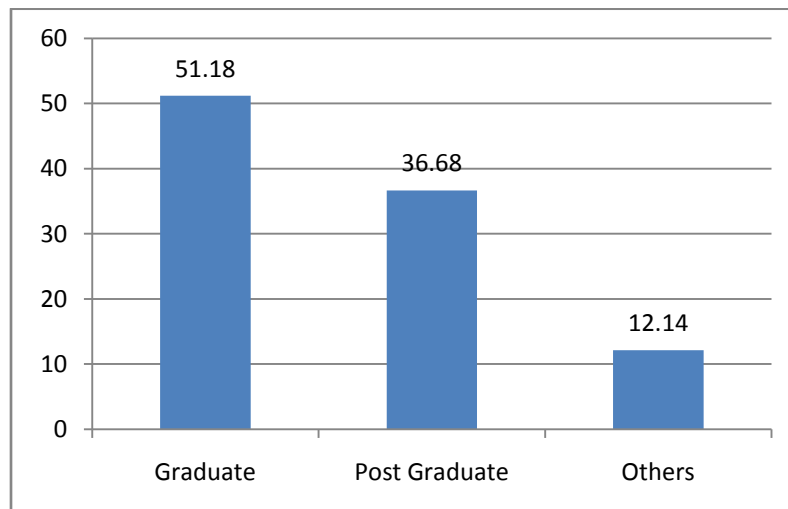
Figure 4.5 shows the experience wise distribution of the respondents. The respondents having experience for less than 1 year were 179 (47.23 %), 128 (33.77 %) respondents were experienced for more than 1 year but less than 5 years and the work experience of 72 (19 %) employees were more than 5 years.

Figure 4.5: Experience Wise Classification (%)



From the viewpoint of educational profile, 194 (51.18 %) respondents were graduates, 139 (36.68 %) were postgraduates and 46 (12.14 %) were diploma holders or completed any other certificate programs. Figure 4.6 shows the education wise classification of the respondents.

Figure 4.6: Education Wise Classification (%)



4.2.2. Normality Statistics

In order to test, the normality of data, the dataset was analyzed in SPSS and normality test was conducted for all the variable under study. Following the preset thumb rule, by (Malhotra and Dash, 2009) it was found that all the values of coefficient of normality when divided by their standard error (SE) were falling within the range of -1.96 to $+1.96$. Hence, it can be assumed that variable under study were indicating the normality of the data.

The results of normality statistics have been presented in (Table 4.2) below:

Variables n=379	Skewness			Kurtosis		
	Statistic	Standard Error (SE)	Normality Coefficient	Statistic	Standard Error (SE)	Normality Coefficient
KM Infrastructure (<i>KMI</i>)	-.145	.125	-1.16	.026	.250	-0.10
KM Strategy (<i>KMS</i>)	.193	.125	1.54	.409	.250	1.63
KM Process (<i>KMP</i>)	.212	.125	1.69	.017	.250	0.06
Individual Competence (<i>IC</i>)	.013	.125	0.10	.426	.250	1.70

4.2.3. Common Method Bias (CMB) Test

All the measures were self reported as the responses have been collected from a single source. Hence, there is a potential problem of common method bias (CMB) in the study. Following (Podsakoff et al. 2003) this research study has assessed the potential issue of common method bias using Harman's single factor test. During the test, all the items were allowed to load on a single factor using principle component analysis and un-rotated factor solution method was opted to perform the analysis.

The variance explained by single factor as a result of Harman's single factor test, was found 26 %, which is less than 50 % i.e. the minimum threshold for the presence of common method variance (Podsakoff, Mackenzie & Podsakoff, 2012); Hence, it represents that common method bias is not a problematic issue in the study.

4.2.4. Scale Validation

In this study, survey questionnaire was developed using pre-existed scales of (Lee & Choi (2003; Choi & Lee, 2002; Huber, 1991, Bernthal et al. 2004). Scales were validated following convergent and discriminant validity for the items to measure the variable under study in the Indian context. The next sections depicts the process of validation including factor analysis, validity test, confirmatory factor analysis, correlation analysis, average variance shared, maximum variance shared and model fit values for the proposed framework.

1. Knowledge Management Infrastructure Scale

After analyzing the demographic profile of the respondents, pre-existing scale developed by Lee and Choi (2003) was validated for assessing the underlying four dimensions of KM infrastructure comprising culture, structure, technology and people. Culture comprises of nine

items for measuring three sub-dimension i.e. collaboration, learning and trust. Structure includes six items for measuring centralization and formalization sub-dimensions. Technology dimension of the scale consists of three items to measure IT support as an underlying dimension and the fourth dimension of KM infrastructure, people includes three items to assess t-shaped skills. A total of 21 items from the scale were used to measure these four dimensions.

Table 4.3 shows the KM infrastructure scale items adopted to conduct the study.

Item ID	Code	Description
1	cul1	My organization members are satisfied by the degree of collaboration.
2	cul2	My organization members are supportive.
3	cul3	My organization members are helpful.
4	cul4	My organization members are generally trustworthy.
5	cul5	My organization members have reciprocal faith in other members' intention's and behaviors.
6	cul6	My organization members have reciprocal faith in others' ability.
7	cul7	My organization provides various formal training programs for performance of duties.
8	cul8	My organization provides opportunities for informal individual development other than formal training. such as work assignments and job rotation
9	cul9	My organization encourages people to attend seminars, symposia, and so on.
10	str1	My organization members can take action without a supervisor.
11	str2	My organization members are encouraged to make their own decisions.
12	str3	My organization members do not need to refer to someone else.
13	str4	In my organization, there are many activities that are not covered by some formal procedures.
14	str5	In my organization, rules and procedures are typically written.
15	str6	In my organization, members can ignore the rules and reach informal agreements to handle some situations
16	tsp1	My organization members can understand not only their own tasks but also others' tasks.
17	tsp2	My organization members can make suggestion about others' task.
18	tsp3	My organization members can communicate well not only with their department members but also with other department members.
19	IT1	My organization provides IT support for collaborative works regardless of time and place.
20	IT2	My organization provides IT support for communication among organization members.
21	IT3	My organization provides IT support for searching and accessing necessary information.

All these items were measured on a Likert scale anchored as (1- Strongly Disagree, 2- Disagree, 3-Slightly Disagree, 4-Neither Agree Nor Disagree, 5- Slightly Agree, 6-Agree and 7- Strongly agree). The reliability coefficients cronbach's alpha (α) for all the nine dimensions

of culture was ($\alpha=0.88$), six items of structure ($\alpha=0.82$), three items of technology ($\alpha=0.76$) and three items of people were (0.73). The result of cronbach's alpha for culture has been depicted in the table (4.3) below:

Table 4.4. Reliability and Item-Total Statistics (Culture)

Cronbach's Alpha = 0 .888 (09 Items)				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
cul1	29.29	32.938	.683	.873
cul2	29.27	32.739	.680	.873
cul3	29.29	32.529	.701	.871
cul4	29.41	32.046	.712	.870
cul5	29.23	35.638	.497	.887
cul6	29.27	32.124	.617	.880
cul7	29.21	33.543	.680	.873
cul8	29.41	33.418	.601	.880
cul9	29.25	34.469	.619	.878

The result of cronbach's alpha for structure dimension has been depicted in the table (4.4) below:

Table 4.5. Reliability and Item-Total Statistics (Structure)

Cronbach's Alpha = 0 .827 (06 Items)				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
str1	14.41	13.316	.551	.809
str2	14.47	12.392	.526	.817
str3	14.42	12.240	.698	.780
str4	14.05	12.209	.632	.792
str5	14.19	12.094	.665	.785
str6	14.22	12.583	.531	.814

The result of cronbach's alpha for technology dimension has been depicted in the table (4.5) below:

Table 4.6. Reliability and Item-Total Statistics (Technology)

Cronbach's Alpha = 0 .768 (03 Items)				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IT1	7.46	2.302	.413	.609

IT2	7.36	2.390	.443	.565
IT3	7.48	2.896	.584	.598

The result of cronbach's alpha for people dimension has been depicted in the table (4.6) below:

Table 4.7. Reliability and Item-Total Statistics (People)

Cronbach's Alpha = 0.731 (03 Items)				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
tsp1	4.92	3.600	.464	.615
tsp2	4.65	2.705	.494	.579
tsp3	4.75	2.982	.518	.536

2. Knowledge Management Strategy Scale

KM strategy consists of personalization and codification dimensions. In order to measure, these two dimensions existing scale developed by Choi and Lee (2002). A total of 04 items were taken to measure personalization and 04 items were taken to measure codification dimension of the KM strategy.

Table 4.8. KM Strategy Scale Items		
1	PS1	My knowledge can be easily acquired from experts and co-workers.
2	PS2	It is easy to get face-to-face advices from experts.
3	PS3	Knowledge is acquired by one-to-one mentoring.
4	PS4	Informal dialogues and meeting are used for knowledge sharing.
5	CS1	Knowledge (know-how, technical skill, or problem solving methods) is well codified.
6	CS2	Knowledge can be acquired easily through formal documents and manuals.
7	CS3	Knowledge is shared through codified forms like manuals or documents.
8	CS4	Results of projects and meetings should be documented.

All these items were measured on a Likert scale anchored as (1- Strongly Disagree, 2- Disagree, 3-Slightly Disagree, 4-Neither Agree nor Disagree, 5- Slightly Agree, 6-Agree and 7- Strongly agree). The reliability coefficients (cronbach,1951) alpha (α) for all the eight dimensions of KM strategy measurement scale are as follows: personalization (04 items, $\alpha =$

.71), codification (4 items, $\alpha = .84$). The result of cronbach's alpha for KM strategy dimensions (personalization, codification strategy) have been depicted in the table (4.9 and 4.10) below: The result of cronbach's alpha for personalization dimension is presented hereunder:

Table 4.9. Reliability and Item-Total Statistics (Personalization Strategy)

Cronbach's Alpha = 0 .711 (04 Items)				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PS1	10.50	6.494	.362	.563
PS2	10.31	5.692	.397	.537
PS3	10.13	5.471	.387	.549
PS4	9.98	6.137	.432	.515

The result of cronbach's alpha for codification dimension is presented below in the table 4.10. below:

Table 4.10. Reliability and Item-Total Statistics (Codification Strategy)

Cronbach's Alpha = 0 .842 (04 Items)				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
CS1	9.30	5.633	.456	.550
CS2	8.88	5.682	.440	.560
CS3	8.82	5.294	.373	.618
CS4	9.31	5.906	.432	.568

3. Knowledge Management Process Scale

The third variable KM process was examined on the basis of learning mechanism developed by (Huber, 1991), which consist of information acquisition, information distribution, information interpretation and organizational memory. Jimenez and Valle (2013) advanced this scale for further research using the term 'knowledge' in scale. In this scale items to measure KM process were taken from the scale developed by Huber (1991) and advanced by Jimenez and Valle (2013) composed of four dimensions i.e. knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory. A total 12 items scale was taken measuring each dimension on three items.

Table. 4.11. KM Process Scale Items

1	kmp1	My organization is in touch with external professionals and expert technicians.
2	kmp2	New ideas and approaches on work performance are experimented continuously.
3	kmp3	Organizational systems and procedures support innovation.

4	kmp4	Organization has formal mechanisms to guarantee the sharing of best practices among different fields of the activity.
5	kmp5	There are individuals within organization who take part in several teams or divisions and who also act as links among them
6	kmp6	There are individuals responsible for collecting, assembling and distributing employees' suggestions.
7	kmp7	My organizational members share the same aim to which they feel committed.
8	kmp8	My organizational members share knowledge and experiences by talking to each other.
9	kmp9	My organization offers the opportunity to learn (visits to other parts of the organization, internal training programs,...) so as to make individuals aware of other departments' duties.
10	kmp10	My organization has databases to stock its experiences and knowledge so as to be able to use them later on.
11	kmp11	My organization has directories or e-mails filed according to the field employees belong to, so as to find an expert on a concrete issue at any time
12	kmp12	My organization has up-to-date databases of its clients.

All these items were measured on a Likert scale anchored as (1- Strongly Disagree, 2- Disagree, 3-Slightly Disagree, 4-Neither Agree Nor Disagree, 5- Slightly Agree, 6-Agree and 7- Strongly agree). The reliability coefficient cronbach's alpha (α) for all the 12 items was noted as ($\alpha=0.948$) (See Table 4.12).

Table 4.12. Reliability and Item-Total Statistics (KM Process)

Cronbach's Alpha = 0 .948 (12 Items)				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
kmp1	43.77	42.970	.789	.942
kmp2	43.82	42.476	.857	.940
kmp3	43.82	42.405	.797	.942
kmp4	43.85	42.184	.844	.940
kmp5	43.76	42.592	.839	.941
kmp6	43.77	43.218	.687	.945
kmp7	43.76	44.163	.591	.949
kmp8	43.86	42.554	.752	.943
kmp9	43.89	42.601	.706	.945
kmp10	43.87	43.186	.711	.945

kmp11	43.78	43.223	.773	.943
kmp12	43.78	43.087	.734	.944

Individual Competence Scale

Individual competence dimensions, which consists of three sub-dimensions viz. modeling personal development, modeling self mastery in learning and seek learning activities, was taken from an scale developed by Bernthal et al. (2004). In the questionnaire, nine items were taken from the existing scales. To validate the scale items, reliability, validity and correlation analysis was performed on the data.

Item No.	Item Label	Item Description
1	IC1	My organization promotes actively identifying new areas for one's own personal learning.
2	IC2	My organization promotes regularly creating and taking advantage of learning opportunities.
3	IC3	My organization promotes applying newly gained knowledge and skill on the job.
4	IC4	My organization serves as a role model for taking responsibility to manage own learning and development.
5	IC5	My organization seeks feedback and uses other sources of information to identify appropriate areas for personal improvement.
6	IC6	My organization targets learning needs and takes action.
7	IC7	My organization demonstrates motivation for continuous learning.
8	IC8	My organization identifies and participates in appropriate learning activities (e.g., courses, reading, self-study, coaching, and experiential learning) that help fulfill personal learning needs.
9	IC9	My organization values and pursues lifelong learning.

All these items were measured on a Likert scale anchored as (1- Strongly Disagree, 2- Disagree, 3-Slightly Disagree, 4-Neither Agree Nor Disagree, 5- Slightly Agree, 6-Agree and 7- Strongly agree). The reliability coefficient cronbach's alpha (α) for all the 09 items was noted as ($\alpha=0.947$) (See Table 4.14).

Table 4.14. Reliability and Item-Total Statistics (Individual Competence)

Cronbach's Alpha = 0 .947 (09 Items)				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
IC1	28.68	38.086	.668	.948
IC2	28.66	36.641	.812	.940
IC3	28.61	37.105	.786	.941
IC4	28.49	37.668	.759	.943
IC5	28.79	36.564	.790	.941
IC6	28.50	37.055	.837	.939
IC7	28.43	36.765	.873	.937
IC8	28.53	37.038	.819	.940
IC9	28.49	36.922	.798	.941

The mean and standard deviation values are presented in the Table 4.15 below:

			Mean	Std. Deviation
KM Infrastructure	Structure	str1	2.78	0.942
		str2	2.91	1.034
		str3	2.93	1.086
		str4	2.84	0.976
		str5	2.76	1.009
		str6	2.80	0.940
	T Shaped Skills	tsp1	2.39	1.049
		tsp2	2.53	1.178
		tsp3	2.53	1.173
	IT Support	IT1	3.72	1.010
		IT2	3.65	1.069
		IT3	3.72	1.061
	Culture	cul1	3.78	0.929
		cul2	3.71	0.976
		cul3	3.66	1.001
		cul4	3.54	1.052
		cul5	3.73	0.949
		cul6	3.77	1.000
		cul7	3.65	0.973
cul8		3.65	0.978	
cul9		3.50	1.063	
KM Process	Knowledge Acquisition	kmp1	4.02	0.709
		kmp2	3.97	0.701
		kmp3	3.97	0.754
		kmp4	3.94	0.736
	Knowledge Distribution	kmp5	4.04	0.704
		kmp6	4.02	0.773
		kmp7	4.03	0.785
	Knowledge Interpretation	kmp8	3.93	0.779
		kmp9	3.91	0.817
	Organizational Memory	kmp10	3.93	0.754
		kmp11	4.01	0.698
		kmp12	4.01	0.743
Modeling personal development	IC1	3.47	0.932	
	IC2	3.48	0.930	
	IC3	3.53	0.909	

Individual Competence	Modeling self mastery in learning	IC4	3.66	0.880
		IC5	3.36	0.958
		IC6	3.62	0.889
		IC7	3.64	0.907
	Seek learning activities	IC8	3.61	0.885
		IC9	3.66	0.915
KM Strategy	Codification Strategy	CS1	2.67	0.979
		CS2	3.25	0.962
		CS3	2.55	1.002
		CS4	2.69	1.037
	Personalization Strategy	PS1	3.52	1.142
		PS2	3.29	1.308
		PS3	3.68	1.080
		PS4	3.66	1.020

4.3: Data Analysis

4.3.1. Factor Structure

The numbers of survey items were analyzed and chosen based on a statistically appropriate technique. For validating and finding a proper factor structure, following two statistical methods were used:

- Cronbach's alpha (α), (which measures 'corrected item-total correlation' and communalities) and;
- Exploratory Factor Analysis (EFA) (For analyzing factor structure)

A factor analysis was conducted on data collected from the respondents using principle component analysis followed by varimax rotation , which resulted in to eight factors namely culture, structure, technology, people, personalization, codification, KM process and individual competence. Values were suppressed on 0.3 to ensure the higher item loadings on the factors. Result shows the value of Kaiser Mayer Olkin (KMO) is (0.896) and significant at 0.01 level, which was noted beyond the acceptable threshold (0.7) to test the sampling adequacy. Hence, KMO as a measure of sample adequacy confirms that the sample taken for conducting the research is adequate to analyze the results (See Table 4.16).

Table 4.16. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.896
Approx. Chi-Square	11798.995
Bartlett's Test of Sphericity	df
	1225
	Sig.
	.000

After entering data in to SPSS 20 for analyzing factor structure, EFA results in to a factor pattern structure, correlation table, KMO values, communalities table, Total Variance

Explained (TVE), component matrix and rotated component matrix. The TVE value was noted as 64 percent which was beyond the acceptable limit (60 percent) to determine that all the factors are explaining more than sixty- four percent variance in a combined manner.

The result of rotated component matrix has been given below (See Table 4.17).

Table 4.17. Rotated Component Matrix										
	Factors	Items	Component							
			1	2	3	4	5	6	7	8
1.	KM Process	KMP5	.853	.137	.058	.088	.020	.073	.019	.029
		KMP4	.849	.187	.001	.117	.027	.054	.065	.016
		KMP2	.846	.212	.111	.116	.001	.052	.033	.066
		KMP1	.818	.106	.113	.063	.030	.035	.014	.039
		KMP3	.815	.145	.114	.047	.035	.013	.019	.047
		KMP11	.792	.131	.086	.115	.065	.035	.042	.038
		KMP8	.765	.179	.099	.099	.031	.057	.023	.080
		KMP12	.759	.155	.066	.036	.042	.064	.038	.045
		KMP10	.732	.130	.135	.087	.049	.063	.060	.016
		KMP9	.731	.216	.040	.006	.047	.006	.010	.001
		KMP6	.717	.151	.069	.002	.012	.015	.080	.042
		KMP7	.704	.182	.077	.024	.050	.093	.043	.046
2.	Individual Competence	IC8	.182	.834	.049	.104	.012	.061	.079	.013
		IC9	.196	.826	.010	.061	.019	.045	.087	.006
		IC7	.215	.815	.016	.052	.043	.027	.096	.038
		IC2	.198	.807	.058	.189	.023	.032	.050	.010
		IC5	.153	.801	.033	.174	.050	.108	.046	.034
		IC6	.171	.799	.043	.148	.041	.033	.122	.002
		IC4	.228	.766	.064	.119	.041	.035	.092	.009
		IC3	.287	.759	.040	.179	.014	.041	.027	.019
		IC1	.284	.732	.091	.183	.029	.033	.034	.032
3.	Culture	CUL1	.089	.004	.904	.077	.008	.030	.039	.054
		CUL5	.079	.042	.896	.031	.003	.007	.001	.044
		CUL8	.051	.054	.889	.008	.012	.021	.027	.086
		CUL7	.076	.022	.889	.037	.020	.061	.005	.071
		CUL6	.068	.013	.872	.066	.042	.063	.003	.035
		CUL9	.065	.025	.850	.059	.066	.009	.011	.143
		CUL4	.174	.127	.757	.136	.108	.022	.218	.045
		CUL2	.149	.072	.727	.052	.053	.110	.171	.048
		CUL3	.130	.026	.714	.030	.053	.045	.202	.136

4.	Structure	STR1	.094	.154	.037	.891	.047	.058	.016	.006
		STR4	.115	.147	.008	.871	.044	.065	.018	.036
		STR5	.102	.112	.002	.859	.055	.065	.046	.006
		STR6	.100	.199	.009	.804	.055	.038	.077	.083
		STR2	.068	.186	.017	.709	.086	.049	.003	.171
		STR3	.043	.187	.040	.702	.002	.137	.010	.107
5.	Personalization	PS3	.057	.035	.048	.029	.866	.006	.038	.007
		PS4	.005	.067	.015	.009	.820	.066	.097	.006
		PS2	.021	.041	.059	.010	.811	.078	.005	.078
		PS1	.042	.001	.034	.065	.795	.059	.048	.001
6.	Codification	CS2	.070	.047	.024	.086	.014	.808	.005	.032
		CS1	.060	.061	.092	.060	.037	.795	.062	.075
		CS3	.081	.094	.058	.113	.014	.778	.010	.034
		CS4	.146	.075	.006	.087	.081	.774	.033	.004
7.	Technology	IT2	.093	.062	.107	.009	.035	.037	.889	.020
		IT1	.090	.012	.119	.085	.020	.021	.877	.047
		IT3	.078	.015	.100	.019	.019	.002	.827	.002
8	People	TSP3	.042	.024	.080	.129	.066	.036	.025	.880
		TSP2	.061	.003	.036	.127	.076	.064	.022	.856
		TSP1	.116	.029	.059	.093	.060	.048	.022	.823
Extraction Method: Principal Component Analysis										
Rotation Method: Varimax with Kaiser Normalization.										
a. Rotation converged in 6 iterations.										

The highlighted values represent the loading in each factor. Correlations among variable under study have been presented in Table (4.18) below:

Table 4.18. Correlation Table

	str1	str2	str3	str4	str5	str6	tsp3	tsp4	tsp5	IT1	IT2	IT3	cul1	cul2	cul3	cul4	cul5	cul6
str1	1.000																	
str2	0.437*	1.000																
str3	0.523*	0.468*	1.000															
str4	0.431*	0.365*	0.581*	1.000														
str5	0.424*	0.424*	0.553*	0.524*	1.000													
str6	0.274*	0.321*	0.438*	0.456*	0.523*	1.000												
tsp3	0.252*	0.120***	0.172*	0.144**	0.229*	0.135**	1.000											
tsp4	0.211*	0.115***	0.189*	0.257*	0.186*	0.191*	0.379*	1.000										
tsp5	0.274*	0.164**	0.197*	0.243*	0.201*	0.098***	0.413*	0.446*	1.000									
IT1	0.045	0.141**	0.049	0.005	0.153**	0.034	0.033	0.139**	0.053	1.000								
IT2	0.047	0.129**	0.102***	0.088***	0.152**	0.089**	0.063	0.172*	0.063	0.427	1.000							
IT3	0.090***	0.031	0.082	0.171*	0.133**	0.061	0.018	0.079	0.081	0.224*	0.257*	1.000						
cul1	0.137**	0.066	0.073	0.097*	0.110	0.153*	0.083	0.128	0.066*	0.090	0.229*	0.182	1.000					
cul2	0.094	0.108	0.169	0.106	0.097	0.137	0.043	0.034	0.090	0.088	0.202	0.218	0.532	1.000				
cul3	0.089***	0.033	0.099***	0.100***	0.043	0.149**	0.074	0.088***	0.101***	0.112***	0.223*	0.201*	0.538*	0.551*	1.000			
cul4	0.051	0.003	0.035	0.102***	0.107***	0.118***	0.058	0.114***	0.131**	0.152**	0.188*	0.259*	0.577*	0.524*	0.616*	1.000		
cul5	0.169*	0.088***	0.122**	0.111**	0.117**	0.153**	0.087***	0.068	0.005	0.197*	0.098***	0.214*	0.348*	0.378*	0.367*	0.399*	1.000	
cul6	0.099***	0.105***	0.096***	0.156**	0.130**	0.204*	0.011	0.221*	0.120**	0.216*	0.237*	0.204*	0.518*	0.480*	0.480*	0.534*	0.352*	1.000

* p<0.001, **p<0.01, ***p<0.05

	cul7	cul8	cul9	kmp	kmp2	kmp3	kmp4	kmp5	kmp6	kmp7	kmp8	kmp9	kmp10	kmp11	kmp12	IC1	IC2	IC3
cul7	1.000																	
cul8	0.464*	1.000																
cul9	0.454*	0.498*	1.000															
kmp1	0.201*	0.226*	0.358*	1.000														
kmp2	0.218*	0.250*	0.370*	0.789*	1.000													
kmp3	0.178*	0.258*	0.302*	0.635*	0.730*	1.000												
kmp4	0.104*	0.247***	0.342*	0.672*	0.771*	0.760*	1.000											
kmp5	0.159**	0.245*	0.260*	0.714*	0.715*	0.645*	0.729*	1.000										
kmp6	0.140**	0.237*	0.285*	0.564*	0.558*	0.546*	0.565*	0.640*	1.000									
kmp7	0.097***	0.123**	0.183*	0.518*	0.502*	0.458*	0.518*	0.545*	0.488*	1.000								
kmp8	0.163**	0.195*	0.308*	0.726*	0.859*	0.646***	0.672*	0.627*	0.468***	0.472*	1.000							
kmp9	0.092**	0.224*	0.244*	0.538*	0.633*	0.700*	0.655*	0.594*	0.489*	0.401*	0.534*	1.000						
kmp10	0.224**	0.233**	0.287*	0.567*	0.672*	0.643**	0.736***	0.583*	0.429***	0.415*	0.582*	0.598*	1.000					
kmp11	0.180***	0.260**	0.285*	0.652*	0.661*	0.604**	0.661**	0.893**	0.559**	0.512*	0.566*	0.554***	0.575**	1.000				
kmp12	0.146***	0.246**	0.301**	0.562*	0.584*	0.619***	0.635**	0.666**	0.801	0.480**	0.495**	0.555	0.492*	0.581*	1.000			
IC1	0.154**	0.190*	0.295*	0.326*	0.404*	0.347*	0.367*	0.340*	0.298*	0.297*	0.352*	0.319*	0.352*	0.306*	0.312*	1.000		
IC2	0.137**	0.151**	0.220*	0.286*	0.381*	0.281*	0.320*	0.336*	0.255*	0.245*	0.336*	0.283*	0.268*	0.294*	0.278*	0.634*	1.000	
IC3	0.127**	0.202*	0.271*	0.327*	0.433*	0.378*	0.410*	0.353*	0.304*	0.271*	0.371*	0.385*	0.356*	0.308*	0.338*	0.658*	0.750*	1.000

* p<0.001, **p<0.01, ***p<0.05

	IC4	IC5	IC6	IC7	IC8	IC9	CS1	CS2	CS3	CS4	PS1	PS2	PS3	PS4
IC4	1.000													
IC5	0.627*	1.000												
IC6	0.608*	0.721*	1.000											
IC7	0.667*	0.735*	0.801*	1.000										
IC8	0.600*	0.697*	0.936*	0.771*	1.000									
IC9	0.597*	0.687**	0.728*	0.903	0.701*	1.000								
CS1	0.189*	0.170*	0.134**	0.196*	0.140***	0.168	1.000							
CS2	0.111***	0.103***	0.098***	0.112***	0.119***	0.073	0.307*	1.000						
CS3	0.160**	0.156**	0.165**	0.164**	0.147**	0.182*	0.279*	0.337*	1.000					
CS4	0.067	0.125**	0.128**	0.134**	0.111**	0.144**	0.427*	0.322*	0.223*	1.000				
PS1	0.199*	0.195*	0.207*	0.197*	0.200*	0.205*	0.045	0.006	0.040	0.062	1.000			
PS2	0.142**	0.119***	0.155**	0.138**	0.149**	0.151**	0.091***	0.061	0.002	0.091	0.404*	1.000		
PS3	0.040	0.040	0.043	0.041	0.030	0.025	0.009	0.066	0.037	0.098***	0.195*	0.213*	1.000	
PS4	0.034	0.068	0.078	0.061	0.062	0.058	0.082	0.004	0.000	0.121**	0.190*	0.265*	0.446*	1.000

* p<0.001, **p<0.01, ***p<0.05

The main purpose of confirmatory factor analysis (CFA) was to ascertain that the items on the survey instrument measured the hypothetical constructs the survey intended to measure. The CFA was conducted for the eight constructs of knowledge management capabilities and the four constructs of organizational performance. The eight constructs of knowledge management capabilities were composed of four constructs of knowledge infrastructure capability and four constructs of knowledge process capability, and the four constructs of organizational performance.

Inter Rater Reliability Analysis

In this study, estimates of internal consistency were presented with cronbach's alpha value. According to Nunnally and Bernstein (1994) coefficient alpha value should exceed the minimum extent of 0.7 to provide good estimates and to retain the cases. Inter-item correlation matrix for the variables under study has been presented in Table 4.19 below:

Table 4.19: Inter-item Correlation Matrix												
	CR	AVE	MSV	ASV	IT	KMP	KMC	IC	STR	TSh	PS	CS
IT	0.870	0.692	0.028	0.010	0.832							
KMP	0.947	0.599	0.240	0.062	0.168	0.774						
KMC	0.931	0.611	0.039	0.016	0.156	0.197	0.782					
IC	0.938	0.629	0.240	0.065	0.082	0.490	0.122	0.793				
STR	0.898	0.603	0.140	0.043	0.066	0.239	0.045	0.374	0.777			
TSh	0.851	0.658	0.042	0.014	0.014	0.126	0.105	0.082	0.204	0.811		
PS	0.847	0.583	0.008	0.004	0.090	0.053	0.059	0.049	0.082	0.073	0.763	
CS	0.819	0.532	0.052	0.026	0.015	0.220	0.120	0.214	0.227	0.136	0.034	0.729

Note: CUL= Culture, STR=Structure, TSP= T Shaped Skills, IT- IT Support, PS= Personalization, CS=Codification, KMP=KM Process, IC= Individual Competence , SD= Standard Deviation, CR=Composite Reliability, AVE=Average Variance Extracted, MSV=Maximum Shared Variance, ASV= Average Shared Variance, Values in diagonal Bold) represents the square root of AVE, other elements (off-diagonal) shows inter-item correlation values

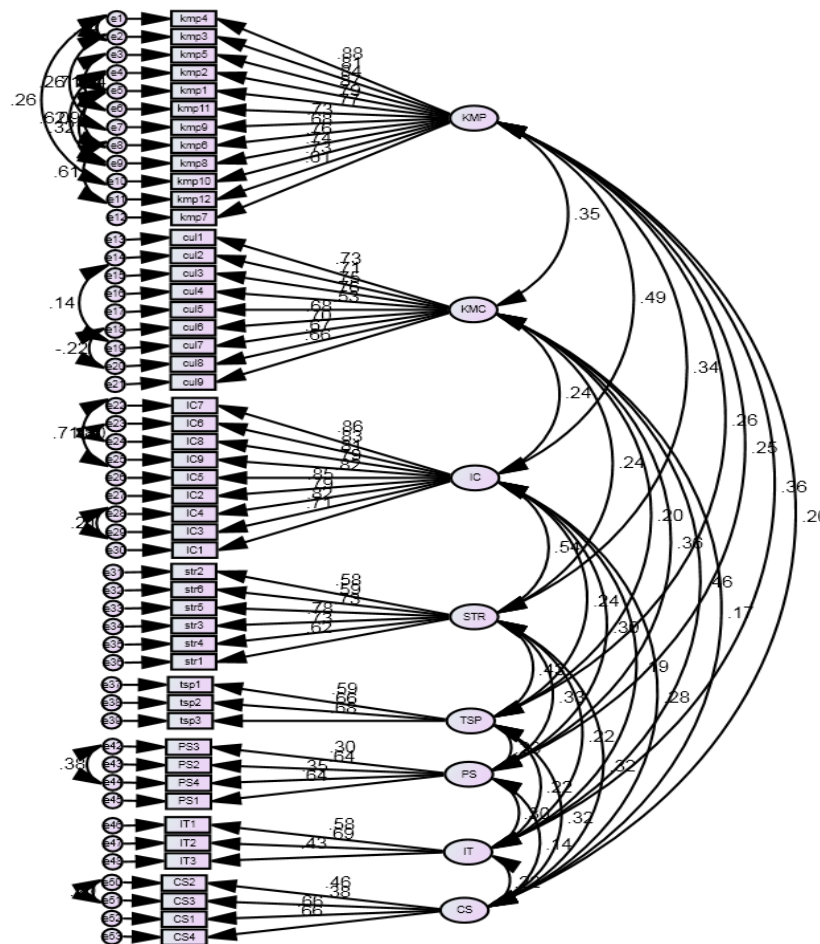
Composite reliability (CR) values were higher than common acceptance level of 0.70 (Hair *et al.*, 2006, Gefen *et al.*, 2000) reflecting the presence of internal consistency. Convergent validity was evaluated by confirming that AVE should exceed the threshold limit of 0.5 (Fornell & Larcker,1981; Segars,1997) and all AVE values were found greater than 0.5. MSV and ASV values were lower than their respective AVE therefore, it can be stated that discriminant validity exists (Hair *et al.*, 2010). In conclusion, the results presented by the

empirical analysis such as cronbach's alpha, composite reliability, convergent validity, discriminant validity, using the chi square test and confidence interval proves that variables under study are reliable and valid to measure the dimensions of KM infrastructure, KM strategy, KM process and individual competence.

4.3.2. Confirmatory Factor Analysis

The confirmatory factor analysis has been conducted based on pattern structure identified in EFA, to check the model fit. CFA analysis was conducted in AMOS 20 software inputting the loadings of rotated component matrix in pattern matrix builder. The CFA basic model has been presented below (See Figure 4.7).

Figure 4.7: CFA (Basic Model)

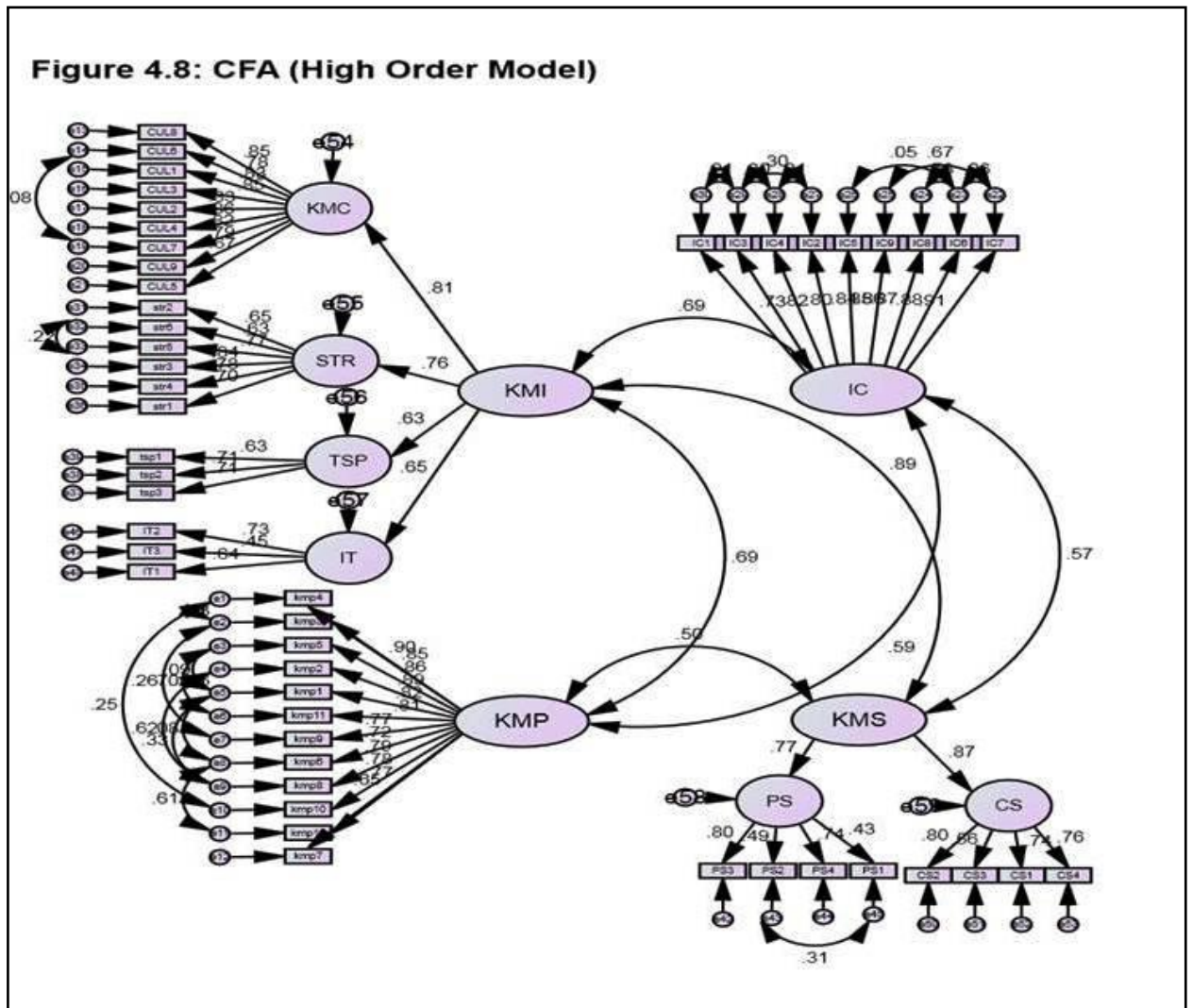


The overall model fit statistics indicates that measurement model is adequately fit and the outcomes of model CFA result shows that the result of model fit indices such as CFI, GFI,

AGFI and RMSEA (Anderson & Gerbing, 1988). The results of model fit were noted as ($\chi^2=2068.810$, Degree of Freedom [df] =1145, $p<0.01$, CMIN/df= 1.807, CFI=0.917, GFI= 0.828, AGFI= 0.809, RMSEA=0.046), which were found beyond their respective threshold such as 0.9 for CFI and around 0.85 for GFI, beyond 0.8 for AGFI and below 0.05 for RMSEA index.

4.3.3. Confirmatory Factor Analysis

Exploratory factor analysis for all the eight latent variables (see Table 4.17) were performed, which was later grouped in to factors viz. culture, structure, people, technology, personalization, codification, KM process and individual competence through analyzing confirmatory factor analysis. Further, first order CFA was conducted and model fit indices were reported. The first order model has been presented in (Figure 4.8) below:



The values of model fit were noted as ($\chi^2=1793.06$, Degree of Freedom [df] =1131, $p<0.001$, CFI=0.941, GFI= 0.841, AGFI= 0.821, RMSEA=0.039) ranges above value beyond 0.9 for CFI and around 0.85 for GFI, beyond 0.8 for AGFI and below 0.05 for RMSEA index. All the fit

indices found beyond their respective common acceptance level, which suggests that model, fitted the data adequately.

4.4. Hypotheses Testing

4.4.1. Conditional Process Analysis (PROCESS) Results

Regression results for the interrelationship among KM infrastructure, KM process and individual competence

Conditional process analysis technique has been adopted to test the interrelationships among KM infrastructure, KM process and individual competence. PROCESS macro (Hayes, 2013) based on multiple regression has been used to test the proposed hypotheses and mediation effects. For analyses, the in-built (mediation model) model 4 designed by (Hayes, 2013) has been used to predict the interrelationship and mediating effects among variables. The values of imputed factors were entered in to the model for analyzing the probable mediation effect of KM process between the relationship of KM Infrastructure and Individual competence .

Here, Table 4.20 shows the results or conditional process analysis. In model 4, X represents the independent variable i.e. KM infrastructure, Y represents, the dependent variable i.e. individual competence and M represents the mediating variable i.e. KM process. The result of PROCESS represents direct, indirect and total effects for the analyzed linkages. It also shows the results of sobel test and bootstrap analysis considering a sample of 1000 at 95 percent confidence interval.

Table 4.20. Regression Results using Conditional Process analysis (PROCESS)

***** PROCESS Procedure for SPSS Release 2.13.1 *****

Model = 4

Y = IC
X = KMI
M = KMP,

Sample size 379

*****DIRECT AND TOTAL EFFECTS*****

Outcome: KMP R-sq-.4778

	Coeff (B)	SE	t	p
KMI	.7294	.0393	18.5739	.0000

Outcome: IC R-sq-.4640

	Coeff (B)	SE	t	p
KMP	.2948	.0601	1.6259	.0000
KMI	.7526	.0635	11.8604	.0000

***** TOTAL EFFECT MODEL *****

Outcome: IC R-sq.4602

	Coeff (B)	SE	t	p
KMI	.8239	.0460	17.9296	.0000

*****INDIRECT EFFECTS*****

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
Bootstrap KMP	.2713	.0572	.0682	.1580

Normal theory tests for indirect effect

	Effect	SE	Z	p
SOBEL	.2713	.0541	6.6174	.0000

Number of bootstrap samples for bias corrected bootstrap confidence intervals: 1000

Level of confidence for all confidence intervals in output: 95.00

Regression results for the interrelationship among KM strategy, KM process and individual competence

To analyze the linkages between KM strategy, KM process and individual competence conditional process analysis techniques has been adopted. The mediation effect of KM process between the relationship of KM strategy and individual competence has been analyzed using PROCESS macro based on multiple regression. The in-built (mediation model) model 4 designed by (Hayes, 2013) to test the interrelationship and mediating effects among variables has been used for analyses. The values of imputed factors were entered in the model 4 for predicting the probable mediation effect of KM process between the relationship of KM Infrastructure and Individual competence.

Table 4.21 shows the results or conditional process analysis. In model 4, X represents the independent variable i.e. KM strategy, Y represents, the dependent variable i.e. individual competence and M represents the mediating variable i.e. KM process. The results of PROCESS analysis represents direct, indirect and total effects for the analyzed linkages. It also shows the results of sobel test and bootstrap analysis considering a sample of 1000 at 95 percent confidence interval.

Table 4.21. Regression Results using Conditional Process analysis (PROCESS)

***** PROCESS Procedure for SPSS Release 2.13.1 *****

Model = 4
 Y = IC
 X = KMS
 M = KMP,

Sample size 379

*****DIRECT AND INDIRECT EFFECTS*****

Outcome: KMP R-sq .1556

	Coeff (B)	SE	t	p
KMS	.4775	.0573	8.3334	.0000

Outcome: IC R-sq .3614

	Coeff (B)	SE	t	p
KMP	.4363	.0516	8.4517	.0000
KMS	.4745	.0625	7.5912	.0000

***** TOTAL EFFECT MODEL *****

Outcome: IC R-sq.2400

	Coeff (B)	SE	t	p
KMS	.6828	.0626	10.9125	.0000

***** INDIRECT EFFECTS *****

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
KMP	.2084	.0360	.1491	.2904

Normal theory tests for indirect effect

	Effect	SE	Z	p
	.2084	.0352	5.9130	.0000

Number of bootstrap samples for bias corrected bootstrap confidence intervals: 1000

Level of confidence for all confidence intervals in output: 95.00

The next section presents the interpretation of results analyzed through conditional process analysis.

4.4.2. Research Hypothesis 1

A multiple regression based technique, conditional process analysis (PROCESS) was used to analyze the results of research hypothesis 1, which aims to predict the relationship between four sub dimensions of KM infrastructure. i.e. culture, structure, people and technology and the four sub dimensions of KM process namely knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory. The adjusted R^2 indicated that KM infrastructure elements accounts for (.47) % variance in acquiring, distributing, interpreting and memorizing knowledge at the individual level in organizations. To analyze the t- statistics, value is calculated by dividing the regression coefficient (B) by standard error. It was noted significant ($B= 0.7294$, $SE=.0393$, $t= 18.5739$ $p=0.00$). In terms of the relative importance of

these predictors, it can be summarized that overall relationship between KM infrastructure and KM process was found positively significant as predicted in research hypothesis 1(See Table 4.20).

4.4.3. Research Hypothesis 2

Conditional process analysis (PROCESS), a multiple regression based technique was used to analyze the results of research hypothesis 2, which aims to predict the relationship between two sub dimensions of KM strategy. i.e. personalization, codification and the four sub dimensions of KM process namely knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory. The adjusted R^2 indicated that KM strategy elements accounts for (.15) % variance in acquiring, distributing, interpreting and memorizing knowledge at the individual level in organizations. To analyze the t- statistics, value of regression coefficient (B) is divided by the standard error. Results shows that value were found significant and noted as ($B=0.4775$, $SE=0.0573$, $t=8.3334$, $p=0.0000$). In terms of the interrelationship between these two predictors under study, it can be summed up that the overall relationship between KM strategy and KM process was found positively significant as predicted in research hypothesis 2 (See Table 4.21).

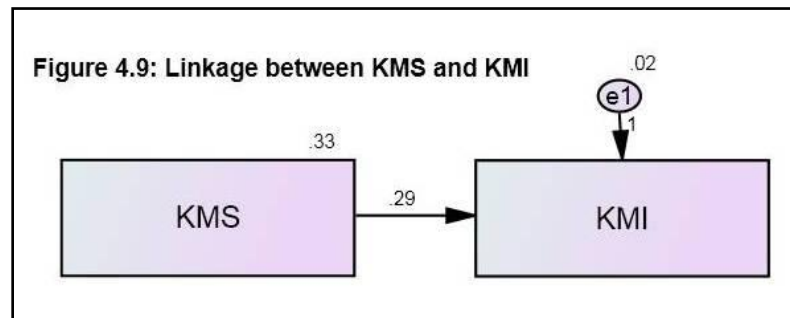
4.4.4. Research Hypothesis 3

To examine the hypothesis 3, a multiple regression based technique, conditional process analysis (PROCESS) was used to analyze the results, which aims to examine the relationship between four sub dimensions of KM process (knowledge acquisition, knowledge distribution, knowledge interpretation, organizational memory) and three sub-dimensions of individual competence (Modeling personal development, Self mastery in learning, Seek learning activities). The adjusted R^2 indicated that KM process elements accounts for (.46) % variance in developing individual level competencies in organizations. To analyze the t- statistics, value is calculated by dividing the regression coefficient (B) by standard error. Result of process analysis was noted as $B= 0.2948$, $SE=0.0601$, $t=1.6259$, which was found significant at $p<.01$ level. In terms of the relative importance of these predictors, it can be summarized that overall relationship between KM process and individual competence was found positively significant as predicted in research hypothesis 3.

4.4.5. Research Hypothesis 4

In order to test the hypotheses 4, regression analysis was performed, which aims to explore the relationship between two sub dimensions of KM strategy. i.e. personalization, codification and four sub dimensions of KM infrastructure. i.e. culture, structure, people and technology. The

adjusted R^2 indicated that KM strategy elements accounts for (.33) % variance with relation to culture, structure, technology and people elements of KM infrastructure. To analyze the t-statistics, value is calculated by dividing the regression coefficient (B) by standard error. It was noted significant ($B= 0.289$, $SE=.011$, $t= 25.321$, $p=0.00$). In terms of the relative importance of these predictors, it can be summarized that overall relationship between KM strategy and KM infrastructure was found positively significant as predicted in research hypothesis 4 (See Figure 4.9).



4.4.6. Research Hypothesis 5

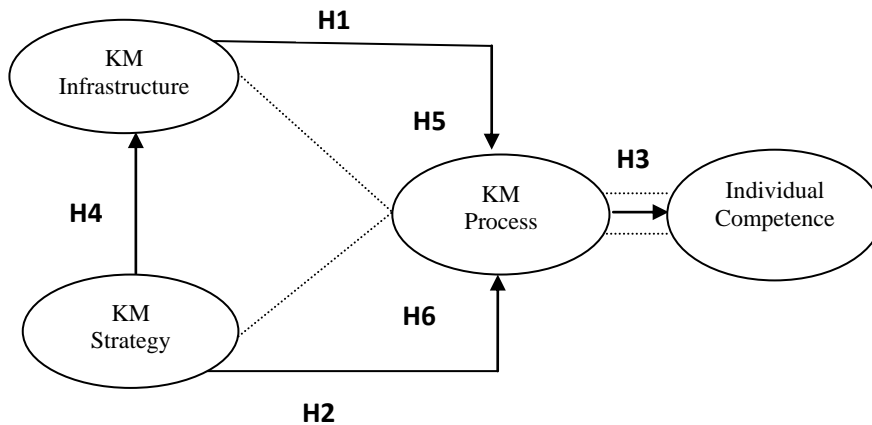
Result shows that KM process predicts individual competence as ($B= 0.2948$, $SE=0.0601$, $t=1.6259$, $p=.00000$) (See Table 4.20) because B value is positive it can be assumed that relationship is positively directed and this relationship controlled KM infrastructure and validated hypotheses 3. Next, KM infrastructure influenced Individual competence indirectly through the effect of KM process as hypothesized in H5. Result of two tailed significance test (assuming a normal distribution) illustrates a significant indirect effect ($B=0.2713$) and bootstrap analysis with 95 % confidence interval (CI) was noted as (LLCI=0.0682 and ULCI=0.1580) that does not include zero, which reflects the significance level. Further, the total effect of KM infrastructure on individual competence was noted as ($B= 0.8239$, $SE= 0.0460$, $t=17.9296$, $p=0.000$). Indirect effect of KM infrastructure on individual competence through controlling KM process ($B= 0.1382$, $t= 2.3233$, $p=0.000$) is still significant at $p<0.01$. Hence, it can be concluded that KM process mediates the relationship between KM infrastructure and individual competence and the predicted relationship has been identified as a partial mediation among undertaken variables. Therefore hypotheses (H1, H3 and H5) were supported.

4.4.7. Research Hypothesis 6

Regression result for hypotheses H2, H3 and H6 are exhibited in Table 4.21. Result shows that KM Strategy predicts KM process significantly as ($B=0.4775$, $SE=0.0573$, $t=8.3334$,

$p=0.0000$) and because B is positive it shows that the relationship is positively directed as hypothesized in H1. Result shows that KM process predicts individual competence as ($B=0.4363$, $SE=0.0516$, $t=8.4517$, $p=0.00$) because B value is positive it can be assumed that relationship is positively directed and this relationship controlled KM strategy and validated H3. KM Strategy influenced Individual competence indirectly through the effect of KM process as hypothesized in H5. Result of two tailed significance test (assuming a normal distribution) illustrates a significant indirect effect ($B=.2084$) and bootstrap analysis with 95 % confidence interval (CI) was noted as (LLCI=0.1491 and ULCI=0.2904) that does not include zero, which reflects the significance level. Further, the total effect of KM strategy on individual competence was noted as ($B=0.6828$, $SE=.0626$, $t=10.9125$, $p=.0000$). Indirect effect of KM strategy on individual competence through controlling KM process ($B=0.2084$, $SE=0.0352$, $t=5.9130$, $p=0.0000$). Hence, it can be concluded that KM process mediates the relationship between KM strategy and individual competence partially. Therefore hypotheses (H1, H3 and H6) were supported. The hypothesized model is presented in (Figure 4.10) below:

Fig.4.10. Hypothesized Model



4.5. Summary of the Results

All the proposed interrelationships among variable undertaken in the study were found significant and validated through empirical methods. The summary of the proposed hypotheses has been presented in the Table 4.22 below. Results for both the direct and mediation linkages have been mentioned in the table.

Table 4.22. Hypotheses Results (Summary)			
Direct Linkages		<i>B/ Sig.</i>	Result
H1	KM Infrastructure → KM Process	0.73 (p<0.001)	Supported
H2	KM Strategy → KM Process	0.48 (p<0.001)	Supported
H3	KM Process → Individual Competence	0.29 (p<0.001)	Supported
H4	KM Strategy → KM Infrastructure	0.79 (p<0.001)	Supported
Mediation Linkages			
H5	KM Infrastructure → KM Process → Individual Competence	0.75 (p<0.001)	Supported
H6	KM Strategy → KM Process → Individual Competence	0.47 (p<0.001)	Supported

4.6. Chapter Summary

The chapter presented the detailed analyses and results of the study. Further, the details of statistical analyses as descriptive statistics, multiple regression and conditional process analysis have been provided in the study. The details of data screening, scale validation, factor analysis, and model fit have also been provided. The summary of results obtained in the study are presented in the tabular format in the later part of the chapter.

CHAPTER V

DISCUSSION AND CONCLUSION

5.1. Introduction

The review of extant literature and synthesis of KM elements within the conceptual framework visualizes the linkages between KM infrastructure, KM strategy, KM process and individual competence. In the organizations, analysis, actions and policy implementations are always executed by people, who continually contribute to knowledge practices through learning and adapting changes that occurred in the system during a time span.

This chapter entails the discussion by elucidating the linkage and comparing the study results with previous research findings. The next section presents discussion on the findings of research hypotheses followed by theoretical and practical implications of the study. Accomplishment of research objectives has been described in the subsequent section. Third section presents theoretical and practical implications of the study. Fourth section presents the limitations of the study followed by future research directions for the researchers. Later part presents the conclusion of the chapter indicating the key accomplishment and findings of the study.

5.2. Discussion

The study provides valuable insights in to the knowledge and competence management literature by exploring the linkages among KM infrastructure, KM strategy, KM process and individual competence. Kor and Mahoney (2005) conducted a study on dynamic management and governance of resource and found that internal knowledge and capabilities of the organization are critical and significant in effective allocation of financial and human resources among competing research & development projects. The underlying concept behind this fact is that managers can more accurately predict the likelihood of success among multiple avenues of R&D investments with tacit knowledge of employees' skills, abilities and competences and thus allocate resources to various projects and job assignments in which organization is more likely to gain competitive advantage. Hence, the concept of optimum utilization of resources need to be followed properly by practitioners while implementing KM strategies and facilitating KM infrastructure to the workforce, particularly in knowledge intensive sectors. Another significant finding of the study was that knowledge intensive organizations with KM system implementation have a higher success level and retain most of the knowledge in codified or non- codified (abstract) form in comparison to other organizations with low level of KM system implementation.

In other words, the findings indicate that IT organizations tend to emphasize highly on acquisition, sharing, interpreting and storing knowledge among employee due to their specific need of continuous knowledge up-gradation. Along with the knowledge process implementations, the study highlighted the role of competent personnel to cope up with the changes and face the routine as well as non-routine challenges during the job. Shen and Darby (2006) pronounce that the complex and dynamic environment requires flexibility to devise and it might be restrained by lack of properly trained and skilled personnel.

In line with the findings of balanced view approach, discerned by (Choi & Lee, 2002) this study suggests that successful implementation of KM strategies in IT sector focuses the knowledge flow toward balance of both the approaches .i.e. personalization and codification strategy. This refers to use of personalization as well as codification strategy in a balanced proportion for acquiring, distributing, interpreting and storing knowledge in organizations. There is a mismatch between the findings of (Hansel et al. 1999), who suggest using KM strategy one at a time predominantly over other to obtain outcomes that would be more beneficial.

Based on the data collected from the software professionals in a highly knowledge intensive sector, the research identifies critical findings that software engineers, programmers, Q.A. analyst and many other software professional need to collaborate among others and learn during work to develop their skills and competence. It can also be taken in to consideration by organizations before implementing KM practices in organizations.

5.2.1. Accomplishment of the Objective 1

The first objective was to study the relationship among KM infrastructure, KM strategy and KM process, which is further subdivided in to two parts:

1.a) To explore the relationship between KM infrastructure and KM process

In the study, the research hypothesis to test this relationship was framed as:

H1: KM infrastructure has a positive influence on knowledge process

The research finding shows the positive impact of independent variable KM infrastructure on dependent variable KM process at a significant level.

1.b) To explore the relationship between KM strategy and KM process

The hypothesis for exploring the linkages between KM strategy and KM process has been devised as:

H2: KM strategy has a positive influence on KM process

The research finding for the hypothesis 2 shows the positive impact of independent variable KM strategy on dependent variable KM process at a significant level.

5.2.2. Accomplishment of the Objective 2

The second objective was to find out the relationship between KM process and individual competence.

The hypothesis for this research question was framed as:

H3. KM process has a positive influence on individual competence

The study results for the hypothesis 3 presents the positive influence of independent variable KM process on dependent variable individual competence.

Summarizing the study findings, it can be concluded that the results of above mentioned hypotheses (H1, H2, H3) in a combine form find out the answer to the first research question of the study which was to find the kind the relationship, which exist among KM infrastructure, KM strategy, KM process and individual competence. Therefore, the study reveals that there is a significant positive relationship among the variables undertaken in this study.

After reviewing the study findings, it can be said that the result of above-mentioned hypothesis (H3) explores the reply to second research question of the study, which was to find the relationship among KM process and individual competence with reference to Indian IT sector. Therefore, the study result shows that there is a significant positive relationship between KM process and individual competence.

5.2.3. Accomplishment of the Objective 3

The third objective of this study was to investigate the relationship between KM strategy and KM infrastructure. The research hypothesis framed to examine the proposed linkage between KM strategy and KM infrastructure was formulated as:

H4: KM strategy has a positive influence on KM infrastructure

The study findings for the hypothesis 4 present the positive relationship between independent variable KM strategy and dependent variable KM infrastructure.

By summing up the study findings, it can be concluded that the results of research hypothesis 4 investigated the answer to the third research question of the study, which was to find the probable relationship, which exist among KM strategy and KM infrastructure. Therefore, the study reveals that there is a significant positive interrelationship between the variables KM strategy and KM infrastructure

5.2.4. Accomplishment of the Objective 4

The fourth objective in this study was to examine the mediating role of KM process between KM infrastructure and individual competence. To identify the proposed relationship the following research hypothesis has been framed and examined:

H5: The effect of KM infrastructure on individual competence is mediated by KM process

The study findings for the hypothesis 5 reveal the existence of partial mediation effect of the KM process between the relationship of independent variable KM infrastructure and dependent variable individual competence.

5.2.5. Accomplishment of the Objective 5

The fifth objective in this study was to examine the mediating role of KM process between KM strategy and individual competence. The hypothesis for this objective was framed and tested as:

H6: The effect of KM strategy on individual competence is mediated by KM process

The study findings for the hypothesis 6 presented the existence of partial mediation effect of the KM process between the relationship of independent variable KM strategy and dependent variable i.e. individual competence.

By summing up the study findings, it can be concluded that the results of research hypotheses (H5 & H6) in a combine form found the reply to fourth research question of the study, which was to find out the probable mediation relationship among independent variables i.e. KM infrastructure , KM strategy and dependent variable i.e. individual competence in different hypothesized relationships.

The study reveals that KM process exerts a positive influence on individual competence and partially mediation the relationship between KM infrastructure and KM strategy. It was also explored that KM process mediated partially between the relationship of KM strategy and individual competence.

Therefore, the responses were analyzed and findings were propounded successfully to find out the answers to various research questions under study. The findings supported the proposed hypotheses undertaken in the study.

Previous studies suggested organizations to understand the importance of culture that helps in building the trustworthy relationships and social networks in a workplace and create a collaborative environment to promote knowledge sharing and exchange among employees. The

study provides insights on the role of culture, structure, technology and people in enhancing knowledge processes within and across organizations. It also indicated the role of personalized and codified knowledge in acquiring, sharing, interpreting and storing knowledge. The proposed under the study provides a detailed enquiry on the relationship among knowledge elements and individual competence.

Organizational can make proper use of and can nurture their human resource to enhance and develop their individual competence. Communication among employees also plays a pivotal role in predicting the effectiveness of knowledge sharing. Further, continuous interactions among employees will help organizations to implement knowledge activities successfully. The practice of information sharing accumulates the knowledge and helps organizations to improve knowledge culture and social ties among people.

The theoretical framework and its empirical findings have some important implications for organizations as well. In today's ever-changing ambiguous environment, managing employee competent, highly skilled technical, professional and managerial skills is a major challenge for organizations, particularly in the 21st century where tight labor markets are prevalent and the economy is experiencing a slowdown (Batt and Valcour 2003).

The advantages that the infrastructure capabilities bring can be described using four categories to reflect knowledge management processes: knowledge-based culture, structure, technology, and human resource. The knowledge-based culture has been proven to be supportive for knowledge-related processes. Further, organizational structure grants the firm the necessary capability to adapt to a knowledge intensive environment. Knowledge-based technology is important to establish new knowledge and provide rapid retrieval of knowledge resource. Knowledge-based employees play a very important role in shaping KM activities because they can be more innovative in various tasks. In a unpredictable market scenario, it becomes important for organizations to understand the impact of human resource in portraying a positive image of organizations to attract the employee and develop them.

To test Hypotheses 1 to 6, the researcher used multiple regression analysis, where more than one predictor is jointly regressed against the dependent variable. The F statistic and its significance level are known tests of the significance of the overall regression model, and the R^2 provided the proportion of the variance in the dependent variable that can be explained by the independent variables. For significant models, the t statistic value was tested for the importance of each individual predictor in the study.

Additionally, results supported a positive and significant relationship between KM strategy and KM infrastructure at the organization and individual levels. In other words, the stronger the culture values in existence at the organization or individual levels are, the more successful the existing KM system would exist. Results also supported a positive and strong relationship between organizations that have personalization and codification approach for the flow of knowledge. These results further highlight the KM infrastructure and KM strategy as a strong predictors of KM process, which continually leads to development of individual competence.

It was observed that face-to-face interactions like meetings and conferences are the main methods for sharing everyone's knowledge in the company internally (Mundra et al., 2011). Organizations must create operational systems and processes to capture, audit, store and disperse knowledge effectively (Erwee et al, 2012). In contrast, other views are that as knowledge exists within individual employees and in a composite sense within the organization, it is required to develop strategies for tapping into the collective intelligence and skills of employees (Bollinger & Smith, 2001; Behrend & Erwee, 2009). Further, Mundra et al (2011) elicit that to bridge the gap, raised due to globalization, it is highly imperative to use advanced technology to control, coordinate and innovate businesses. However, IT gained much importance allowing organizations to manage knowledge globally.

Previous researcher (Reynolds, 2003; Behrend & Erwee, 2009; Skadiang, 2009) found that the associations between KM-oriented strategy, KM culture and KM process imply that when organizations implement a KM initiative, they need to do so synergistically by holistically addressing all issues pertaining to strategy, culture, strategy and process rather than tackle issues in bits and peices. Dayasindhu (2002) conducted a research in the perspective of Indian software industry and indicated the vital need of knowledge transfer in organization both at national & even international level and his findings are in line with Nonaka and Takeuchi's knowledge spiral. Organizations that create knowledge on an ongoing basis are likely to develop dynamic and unique capabilities that potentially underpin continuous organizational. Accordingly, organizations are more likely to build on previous knowledge and generate new knowledge constantly if they embrace a high level of knowledge and learning capabilities (Chaturvedi & Chataway, 2006).

Bhatnagar (2006) says that most organizational value, whether financial or non-financial, is created by the competent members of an organization who 'know-what', 'knowhow' and 'know-why' and the competent employees can be anyone from the top to the bottom levels of the organization. In slightly different words, an organization's ability to innovate, create and use the energies of its people becomes critical in the knowledge economy.

The existing literature does not provide a comprehensive theoretical framework for knowledge intensive organizations, particularly in emerging markets, like India (Budhwar et al, 2006). The unique features of the Indian workforce in the IT services sector suggests that research specific to the Indian context should be of benefit to both practitioners and academics in the human resource management (HRM) field, particularly with the continuing shift of the global economy from manufacturing to knowledge-based service industries (Budhwar & Sparrow, 2002; Thite & Russell, 2010). For this reason, the global IT industry shifted its focus from simply managing human resources to managing talents strategically in the mid-1990s as a result of the severe shortage of skilled IT professionals globally (Schuler et al, 2011; Chadee & Raman, 2012).

Drawing on organizational capability theory, Gold et al. (2001) suggests several approaches to KM effectiveness from the perspective of organizational capability and elicit that a firm's predisposition to effectiveness of knowledge management lies in its knowledge management infrastructure and process capabilities. Further, exploiting existing competences tend to yield more immediate and certain returns (Sethi and Sethi, 2009).

An organization's capability to survive in current environment depends on its ability to exploit current technologies and resources to secure efficiency benefits and creating variation and continuous improvement through incremental innovation (Rabeh et al. 2013). Most studies have examined the relations between IT, knowledge processes and performance in isolation. We can distinguish between three categories of studies depending on the relations on which they focus. The first focuses on IT's role as enabler of knowledge processes (Alavi and Leidner, 2001). The second category examines the direct relation between IT and performance (Bhatt and Grover, 2005; Patrakosol and Lee, 2009) and the third category examines the relations between knowledge processes and organizational performance (Lin and Kuo, 2007; Ho, 2008; Zack et al., 2009). But an integrative model was still missing to explore linkages among these variables and individual competence. There is a need for studies that simultaneously analyze the relation between IT competency and knowledge processes and the relations between both these constructs and performance. To bridge the gap, this study develop a research model that interconnects knowledge infrastructure, strategy, knowledge management processes and individual competence. According to Spicer and Sadler-Smith, "Learning may be seen as a distinctive meta-competence at the individual and organizational levels (i.e., learning is an enabling process-individuals and organizations use it to learn other, lower-order competencies)" (p. 134). However, firms may leverage this organizational and human resource (meta) competence in order to become a learning organization (Kamochi, 1999).

According to Tippins and Sohi (2003), IT competency is defined as how the organizations uses technologies to manage its information effectively. While IT is a general term fundamentally used to refer to programs, computers and telecommunications, the term technical competency is broader and refers to the use of these technologies to satisfy the firm's information needs (Mithas et al., 2011). In this context, Hartle argues that competency as 'a characteristic of an individual that has been shown to drive superior job performance' (1995: 107) includes both visible 'competencies' of 'knowledge and skills' and 'underlying elements of competencies', like 'traits and motives'. Bharadwaj and Menon (2000) indicates that the core competency relies on the competence of individuals and the organizational systems. Accordingly, Scott and Bruce (1994) have made several efforts to identify individual characteristics that can improve competencies.

KM Infrastructure and KM Process

In this study, there were four dimensions of KM infrastructure: culture, structure, technology and people. The second variable under study is KM process, which consists of four dimensions knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory. Based on the regression models tested, the findings indicated that all the dimensions of KM infrastructure i.e. culture, structure, technology and people were significant positive explanatory variables of knowledge management process. Various researchers (Aujirapongpan, 2010; Islam et al., 2011, Kushwaha & Rao, 2015; Lee & Choi, 2003) confirmed the findings of this study that the knowledge infrastructure capabilities were significantly related with knowledge management process.

KM Strategy and KM Process

Regarding the knowledge management strategy, the findings indicated that both personalization and codification orientation strategies were positive and significant explanatory predictors of knowledge management process. The findings were consistent with (Choi & Lee, 2002; Kushwaha & Rao, 2015) and Shaabani et al (2012) findings. The results also revealed that the influence of codification strategy and personalization strategy on knowledge management process was positively directed. This finding supported Keskin (2005), who found that system orientation strategy was more important for KM performance than human orientation strategy. This study was the first that examined the relationships among codification strategy, personalization strategy and KM process capability.

KM Process and Individual Competence

Findings about the relationship between knowledge management process (knowledge acquisition, distribution, interpretation and organizational memory), and individual competence indicated that four dimensions of KM process and three dimensions of individual competence were significant positive explanatory variables of knowledge management process capability. The decentralization dimension was a significant positively related. The findings were supported from Nonaka and Takeuchi (1995).

KM Strategy and KM Infrastructure

Few studies had investigated the relationships among knowledge management strategy and knowledge management infrastructure. Therefore, this study attempted to provide new knowledge dimensions in this area. In this study, software professionals were targeted to examine infrastructure and strategic orientations and result were found positively directed from KM strategy to KM process dimensions.

Mediating Role of KM Process between the linkage of KM Infrastructure and individual competence

The study was the first study to hypothesize that knowledge management process mediates the relationships between knowledge management infrastructure and individual competence. The results indicated that knowledge management process capability was found to be not only a mediator between knowledge management infrastructure (culture, structure, technology, people) and individual competence but also predicted a strong relation between infrastructure capabilities and individual competence.

Mediating Role of KM Process between the linkage of KM Strategy and Individual Competence

No studies were found that investigated the mediating effects of KM process on KM strategy and individual competence. This study found that the influence of KM strategy on Indian software companies was with a balance of personalization and codification strategy. This study also found that organizations with both degree of codification and personalization orientation strategy had no significant difference in KM process comparisons. Therefore, this partially supported view indicates that organizations should have a balance between the two knowledge management strategies.

The result shows that all the proposed hypotheses were supported.

First is, KM infrastructure has a positive influence on knowledge process in Indian IT sector. Role of infrastructure dimensions e.g. culture, structure, technology and people are found to be highly significant with KMP aspects. In line with the previous study findings, this study shows

KMI has a positive impact on KMP. However, information system literature signifies that infrastructure capability can enhance the KM process (Gold et al, 2001; Lee and Choi, 2003).

Second is, KM strategy has a positive influence on KM process. Sharing, creating, acquiring and disseminating knowledge is possible through mechanisms of either codification or personalization approaches. Huber's learning construct facilitates grasping new knowledge, utilizing the acquired knowledge and storing knowledge in the form of databases, documents and archives for further re-use. Hence, this could be understood that KM strategies implemented in organizations have a positive influence on activities of software professional in acquiring, sharing and transferring knowledge.

Third, KM process has a positive influence on individual competence which means that acquisition and creation of new knowledge through any medium e.g. experience, documentation or socialization will ultimately enhance the competence of software professionals by adding value to their existing knowledge. Mason (2003) asserts that the significance of KM depends not only on the application of IT but also on the individuals' skills toward implementing plans and applying their knowledge (Mason, 2003).

Fourth is, KM strategy has a positive influence on KM infrastructure. In line with the findings of Davenport and Prusak (1998), who explored that KM strategy facilitates KMI to leverage desired benefit in the long-term; this study shows that KMS exerts a significant positive impact on KMI.

Fifth, the effect of KM infrastructure on individual competence is mediated by KM process. In order to enhance competence of software professionals, KM process mediates in gaining knowledge through proper congruence of KMI dimensions. KM systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer, and application" (Alavi & Leidner, 2001, p.114). Therefore, it can be said that KMP mediated the relationship of KMI and IC.

Sixth is, the effect of KM strategy on individual competence is mediated by KM process. Knowledge activities are driven by either person to person or person to document approach. However, the influence of KMS on IC is mediated by KMP.

5.3. Study Contribution

5.3.1. Theoretical Implications

The study findings reveal the theoretical and practical significance of the study for software professionals. Further, a discussion on study contribution to the further development of the

theory and research practices in the area of developing and managing individual competence has been presented. Competence development at the individual level requires adequate KM capabilities and congruent environment to deal with the issues of knowledge acquisition, sharing, interpreting and storing for further re-use. Organizations need to facilitate collaborative learning culture and advance technology for KM system implementation, in order to make the access of knowledge more flexible easier. In addition, the presence of trust, collaboration and learning intention may help the new entrants in IT organizations for developing their competence through various KM processes. The concept of self-determination theory might also plays a significant role in developing employees' intention to learn and this behavior can be en-kindled by offering opportunities to fulfill personal goals through monetary or non -monetary incentives.

First, the study suggested that development of individual competence relies on key predictors present in organizations such as collaborative culture, flexible organizational structure, updated technology, skilled people, balance in strategic orientations between personalization and codification of knowledge in acquisition, distribution, interpretation and memorizing knowledge facts. These factors help to enkindle people behavior to learn and create new knowledge within and across organizations. The organizations need to continuously promote and maintain up building of knowledge among their employees. It is highly required precondition to survive and deal with new challenges particularly in the knowledge intensive sector, where sudden changes are always predictive to be happening in the system, procedures and technology due to real time up-gradation processes.

In order to build a strong human capital, not working on KM processes is no longer a solution for knowledge intensive organizations. Organization need to continually maintain and promote the knowledge acquisition, distribution, interpretation and memorizing to develop the competence at individual level.

5.3.2. Practical Implications

The results of the study provide valuable information that could be used to make improvement in routine organizational practices. At first, this study contributes to individual learning research by investigating influence of infrastructure and strategy on Huber's learning constructs. The most significant implication is that individual competence is affected by KM elements. Throughout this study a number of KM elements have been examined and analyzed, In addition to adding to the existing literature, this study help professionals to define their learning activities successfully and to lead them to develop individual competence more effectively.

1. To enhance individual level competence, organizations could place a greater emphasis on improving underlying dimensions of KM infrastructure: collaboration, trust, learning culture, formalization, centralization, t-shaped skills and IT support.

2. KM strategy is more important for knowledge management capabilities and infrastructure dimensions. However, the influence of both the strategies with a balance in personalization and codification strategy should lead to more effective KM process implementation. According to these findings, organizations should strengthen both the strategies in a balance proportion.

3. Practitioners are required to understand that it is not sufficient to influence individual competence by merely acquiring, disseminating, interpreting and storing knowledge. A policy to apply the created and existing knowledge should be framed.

4. Although less centralized organizational structure allows sharing more knowledge, the study found that in software companies, a comparatively more centralized structure is helpful in knowledge acquisition, distribution, interpretation and organizational memory.

5. IT provides an effective media for sharing and application of knowledge. If practitioners pay too much attention on technology and ignore other dimensions, KM process implementation may not be successful.

Finally, this study has important implications for practitioners in view of the fact that it identifies elements for influencing KM process, which subsequently leads to individual performance.

LIMITATIONS OF THE STUDY

5.4. Limitations of the Study

This research is not free from limitations like other researches. Though, this study may provide some insight into the relation between infrastructures, strategy, process and individual competence, it suffers from some limitations.

The major limitations of the study are mentioned below:

1. First the data collection is limited to software professionals, other categories of IT employees (Network, architecture & H/W) were not included, which limits the generalizability of study finding to this particular segment only.
2. The results obtained and inferences drawn were based on cross-sectional research design. Although, the previous literature supports and establishes cross sectional research design as a helpful techniques in collecting data from large samples however, cross sectional research designs are not fit in establishing the relationship of causality. For instance, in the present research the influence of KM infrastructure and strategy might not be due to the only impact of culture, structure, technology, people, personalization and/or codification. It may also be because of other factors not considered in the study.
3. This study considers infrastructure capabilities dimensions mentioned by Lee and Choi (2003) and does not integrate any other KMI dimension.
4. Due to time constraints, the scope of study was limited to New Delhi and NCR region and the study sample included software professional (Software Engineers, senior s/w engineers, programmers, assistant programmers, QA analyst, technical leader and project leaders).
5. Though, various competences are required to fulfill job assignments at different levels, this study comprises only with the self-development and learning dimensions of individual competence.
6. Although the researcher has checked the probable issue of common method however, this cannot be assured specifically when responses have been collected one time. But the study findings and implications have been drawn in the light of strong theoretical annotations.
7. This research has examined the probable two linkages of mediating effect among KM infrastructure, KM strategy and individual competence. There could be some other mediators to establish the linkages among afore-said variables.

8. The respondents self- serving bias is another limitation of the study.
9. The data collected for the current research study was industry specific as no other industry were surveyed that also causes the problem of generalizability in the study.

In spite of some limitations within the study, it is obvious from the findings that present study offers valuable insights in to the key dimensions and interrelationships among knowledge elements, individual competence and learning perspectives, in order to develop capabilities and to cope up with the routine and non-routine challenges. The study provides strong evidence that KM elements such as KM infrastructure, strategy and process could improve employee's individual competence.

FUTURE RESEARCH DIRECTIONS

5.5. Future Research Directions

1. Future research horizon could be extended by studying the relationship of KMI, KMP and KMS with technical and managerial competence in the similar or different context.
2. Personalization and codification KM strategies are chosen specifically for this study. However the future research studies can extend this horizon by exploring these linkages with other infrastructure dimensions and/or KM strategy dimension and it may also be interesting to study the effect of KMI and KMS with other organizational outcomes such as knowledge performance, human capital management, talent retention etc
3. Future studies should try to increase the sample to include a wider distribution of employees across a more disparate geographical area, including perhaps some Western and other countries to gain a more global perspective.
4. Future research studies could emphasize on longitudinal research design to draw more valid conclusions.
5. It would be interesting to study the impact of infrastructure and strategy on organizational level learning dimensions.
6. This study has explored new opportunities for future research; this study investigated only culture, structure, technology and people as sub-dimensions of KM infrastructure. The impact of these variables can be studied separately to find out the more vivid results.
7. Future researcher can also focus on the scale development and validation for measuring KM infrastructure, KM strategy, KM process and individual competence as few measures has been developed for measuring these variables in Indian context.
8. Another important consideration for future research studies can be the inclusion of trust, collaboration and learning in the framework to test the impact of this variable on KM processes.

CONCLUSION

In the present knowledge era, there is an overwhelming requirement of competent software professional in Indian IT industry. The purpose of this study was to explore the linkages between KM elements and individual competence. Nowadays, world is connected through advanced technology and most of the processes are fully digitalized. IT industry always confronts with the challenges of developing and managing skills and competencies of the workforce particularly for those who are directly involved in software development activities, in order to align with the advancement and technological up-gradations. This study attempts to develop a holistic framework that will help to understand importance of knowledge elements in enhancing individual competence and it will also put emphasis on significance of individual competence to achieve and sustain organizational competitiveness.

5.7. Chapter Summary

The chapter presents discussion on the study findings and elaborates the accomplishment of research objectives. It entails the previous research findings to validate the results. Several theoretical and practical implications of the study have also been presented. Next, study limitations and future research suggestions are provided to guide the future researchers to pursue further research in this arena. The chapter concludes that all the dimensions of KM infrastructure and KM strategy have influenced KM processes that lead to individual competence of software professionals in IT companies. Hence, organizations need to revisit the predictors affecting competence at individual level.

REFERENCES:

1. Ac sente, D. (2010). Literature review: A representation of how future knowledge worker is shaping the twenty-first century workplace. *On the Horizon*, 18(3), 279-287.
2. Adler, N.J. (1994). Competitive frontiers: Women managing across borders. *Journal of Management Development*, 13(2), 24-41.
3. Aggarwal, U & Bhargava, S.(2010). Predictors and outcomes of relational and transactional psychological contract. *Psychological Study*, 55(3), 195-207.
4. Alavi, M. & Leidner, D.E (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly* 25 (1), 107-136.
5. Allen, T. J. (1977). *Managing the flow of technology: Technology transfer and the dissemination of technological information within the R&D organization*. Cambridge, MA: MIT Press.
6. Anantatmula, V.S.(2007). Linking KM effectiveness attributes to organizational performance. *VINE: The Journal of Information and Knowledge Management Systems*, 37(2), 133-149.
7. Anantatmula,V. & Kanungo, S. (2008). Role of IT and KM in improving project management performance. *VINE: The Journal of Information and Knowledge Management Systems*, 38 (3), 357-369.
8. Anderson, J.C., & Gerbing, D.W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103, 411-423.
9. Anna, B. (1997). Exploiting organizational knowledge in the learning organization. *Work Study*, 46 (6) , 202-206.
10. APQC (1999). Creating knowledge-sharing culture. *American Productivity & Quality Center*, 1-12. Retrieved from http://www.providersedge.com/docs/km_articles/creating_a_k-sharing_culture-APQC.pdf.
11. Argyris, C. & Schon, D.A. (1997). *Organizational Learning: A Theory of Action Perspectives*, 77/78, Reading, MA: Addison-Wesley.
12. Armistead, C.(1999). Knowledge management and process performance. *Journal of Knowledge Management*, 3(2), 143-154.
13. Aujirapongpan, S.,Vadhanasindhu, P.,Chandrachai, A. & Cooparat, P.(2010). Indicators of knowledge management capability for KM effectiveness. *VINE: The Journal of Information and Knowledge Management Systems*, 40(2), 183-203.

14. Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94.
15. Bahra, N. (2001). *Competitive knowledge management*. Palgrave, New York, NY.
16. Bair, J. H., & O'Connor, E. (1998). The state of the product in knowledge management. *Journal of Knowledge Management*, 2(2), 20-27.
17. Baker, M. & Barker, M.(1997). Leveraging human capital. *The Journal of Knowledge Management*, 1(1), 63-74.
18. Baral, R. & Bhargava, S. (2010). Work-family enrichment as a mediator between organizational interventions for work-life balance and job outcomes. *Journal of Managerial Psychology*, 25 (3), 274-300.
19. Barb, C.G. (1997). Users loathe to share their know-how. *ComputerWorld*, 31(46), 6.
20. Barclay,D..Thompson,R. & Higgins,C. (1995). *The partial least squares approach to causal modeling: Personal computer adoption and use as an illustration*. In: *Technology Studies: Special issue on research methodology* , 2, 285-309.
21. Barnes, J. & Liao,Y.(2012). The effect of individual, network, and collaborative competencies on the supply chain management system. *International Journal of Production and Economics*, 140, 888-899.
22. Barney, J.B.(1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
23. Barney, J. B.(1999). How a firm's capabilities affect boundary decisions. *Sloan Management Review*, 40(3), 137-145.
24. Baskerville, R. & Dulipovici, A. (2006). The theoretical foundations of knowledge management. *Knowledge Management Research & Practice*, 4(2), 83–105.
25. Batt, R., & Valcour, P.M. (2003). Human resource practices as predictors of work–family outcomes and employee turnover. *Industrial Relations: A Journal of Economy and Society*, 42(2), 189–220.
26. Behrend, F.D. & Erwee, R. (2009). Mapping knowledge flows in virtual project teams with social network analysis. *Journal of Knowledge Management* , 13(6), 99-114.
27. Bergenhenegouwen, G.J. , Horn, H.F.K & Mooijman,E.A.M.(1996). Competence development -A challenge for HRM professionals: core competences of organizations as guidelines for the development of employees. *Journal of European Industrial Training*, 20(9), 29-35.
28. Bernthal, P. R., Colteryahn, K., Davis, P., Naughton, J., & Rothwell, W. J. (2004). *ASTD Competency Model Mapping the Future: New workplace learning and performance competencies*. Alexandria, VA: ASTD.

29. Berry, D. C., & Broadbent, D. E. (1984). On the relationship between task performance and associated verbalizable knowledge. *The Quarterly Journal of Experimental Psychology* (36), 209-231.
30. Berry, D. C., & Broadbent, D. E. (1987). The combination of explicit and implicit learning processes in task control. *Psychological Research* (49), 7-15.
31. Bettiol, M., Di Maria, E. & Grandinetti, R. (2012). Codification and creativity: Knowledge management strategies in KIBS. *Journal of Knowledge Management*, 16(4) 550-562.
32. Bhal, K.T. (2006). LMX-citizenship behavior relationship: justice as a mediator. *Leadership & Organization Development Journal*, 27(2), 106-117.
33. Bharadwaj, S. & Menon, A. (2000). Making innovation happen in organizations: Individual creativity mechanisms, organizational creativity mechanisms or both? *Journal of Production Innovation Management*, 17(6), 424-34.
34. Bhatnagar, J. (2006). Measuring organizational learning capability in Indian managers and establishing firm performance linkage: An empirical analysis. *The Learning Organization* 13(5), 416-433.
35. Bhatt,G.D. (2000). Organizing knowledge in the knowledge development cycle. *Journal of Knowledge Management*, 4(1), 15-26.
36. Bhatt, G.D. (2002). Management strategies for individual knowledge and organizational knowledge. *Journal of Knowledge Management*, 6(1), 31-39.
37. Bhatt, G.D. & Grover, V. (2005). Types of Information Technology capabilities and their role in competitive advantage: An empirical study. *Journal of Management Information Systems*, 22(2), 253-77.
38. Bhatt, G.D, Gupta, J.D. & Kitchens, F. (2005). An exploratory study of groupware use in knowledge management process. *The Journal of Enterprise Information Management*, 18(1), 28-46.
39. Bierly,P. & Chakrabarti, A. (1996). Generic knowledge strategies in the US pharmaceutical industry. *Strategic Management Journal*, 17(10), 123-135.
40. Birasnav M. & Rangnekar S.(2010). Knowledge management structure and human capital development in Indian manufacturing industries. *Business Process Management Journal*, 16(1), 57-75.
41. Birkenholz, R.J. (1999). *Effective Adult Learning*, Interstate Publishers, Danville, IL
42. Birkinshaw, J. (2001). *Making sense of knowledge management*, *Ivey Business Journal*, 65(4), 32.
43. Bohn, R.E. (1994). Measuring and managing technological knowledge. *Sloan Management Review*, Fall, 61-73.

44. Bolisani, E.,Borgo, S. & Oltramari, A.(2012). Using knowledge as an object: Challenges and implications. *Knowledge Management Research & Practice*,10, 202–205.
45. Boliveau, B., Bernstein, E.H. & Hsieh , H.J. (2011). Knowledge management strategy, enablers, and process capability in US software companies. *Journal of Multidisciplinary Research*, 3(1), 25-46.
46. Bollinger, A.S. & Smith, R.D. (2001). Managing organizational knowledge as a strategic asset. *Journal of Knowledge Management* 5(1), 8-18.
47. Bontis,N. & Fitzenz, J.(2002). Intellectual capital ROI: A casual map of human capital antecedents and consequents. *Journal of Intellectual Capital*, 3(3), 223-247.
48. Bosua, R. and Venkitachalam, K. (2013). Aligning strategies and processes in knowledge management: A framework. *Journal of Knowledge Management*, 17(3), 331-346.
49. Boyatzis, A.R. (1982). *The Competent manager: A model for effective performance*, Wiley, New York, NY.
50. Bryant, F. & Yarnold,P. (1995). *Principal-components analysis and exploratory and confirmatory factor analysis*. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding multivariate statistics* (pp. 99-136). Washington, DC: American Psychological Association.
51. Budhwar, P.S. & Sparrow, P.R.(2002). An integrative framework for understanding cross-national human resource management practices. *Human Resource Management Review*, 12(3), 377-403.
52. Budhwar, P.S., Varma, A., Singh, V. & Dhar, R. (2006). HRM systems of Indian call centres: An exploratory study. *International Journal of Human Resource Management*. 17(5), 881-897.
53. Carneiro, A. (2001). The role of intelligent resources in knowledge management. *Journal of Knowledge Management*, 5(4), 358-367.
54. Caruana, A., Morris, M.H. & Vell, A.J. (1998). The effect of centralization and formalization on entrepreneurship in export firms. *Journal of Small Business Management*, 16-29.
55. Chakraborty,S. & Mandal, S. (2011). Dynamic knowledge management: A breakthrough in the traditional watch-glass perspective in the Indian IT sector context. *Review of Knowledge Management*, 1(1), 38-53
56. Chang, T.C. & Chuang, S.H. (2011). Performance implications of knowledge management processes: Examining the roles of infrastructure capability and business strategy. *Expert Systems with Applications*, 38(5), 6170-6178.

57. Chaudhuri, S. (2011). *Knowledge management in Indian IT industries*. 3rd International Conference on Information and Financial Engineering IPEDR, 12, IACSIT Press, Singapore.
58. Chadee, D. & Raman, R.(2012). External knowledge and performance of offshore IT service providers in India: The mediating role of talent management. *Asia Pacific Journal of Human Resources*, 50(4); In press.
59. Chaturvedi, K. & Chataway, J. (2006). Strategic integration of knowledge in Indian pharmaceutical firms: Creating competencies for innovation. *International Journal of Business Innovation and Research* 1(1/2), 27-50.
60. Chatti, M.A. (2012). Knowledge Management: A personal knowledge network perspective. *Journal of Knowledge Management*, 16(5), 829-844.
61. Chawla, D. & Joshi, H.(2011). Impact of knowledge management on learning organization practices in India. *The Learning Organization*, 18(6), 501-516.
62. Chawla, D & Joshi, H. (2010). Knowledge management practices in Indian industries-A comparative study. *Journal of Knowledge Management*, 14(5),708-725.
63. Chawla, D. & Joshi,H. (2010a). Knowledge management initiatives in Indian public and private sector organizations. *Journal of Knowledge Management*, 14(6), 811-827.
64. Chiva. R.,Algre, J.& Lapiedra, R.(2007). Measuring organizational learning capability among the workforce. *International Journal of Manpower*, 28(3/4), 224-242
65. Cho, T. (2011), *Knowledge management capabilities and organizational performance: An investigation into the effects of knowledge infrastructure and processes on organizational performance*, Urbana, University of Illinois.
66. Choi, C. J. & Hilton, B. (2005). Knowledge resources: Critical systems thinking, viable system model and 'gifts'. *System Research in Behavioral Science*, 22(6), 561-564.
67. Choi, B. & Lee, H. (2002). Knowledge management strategy and its link to knowledge creation process. *Expert Systems with Application*, 23, 173-187.
68. Choi, B. & Lee, H.(2003). An empirical investigation of KM styles and their effect on corporate performance. *Information & Management*, 40, 403-417.
69. Chuang, S., Liao, C. & Lin, S. (2013). Determinants of knowledge management with information technology support impact on firm performance. *Information Technology and Management*, 14 (3), 217-230.
70. Civelli, F. (1998). Personal competencies, organizational competencies, and employability. *Industrial and Commercial Training*, 30(2), 48-52.
71. Clancey,W.J. (1993). Guidon manage revisited: A socio technical approach. *Journal of Artificial Intelligence in education*, 4(1), 5-34.

72. Clarke, T. & Rollo, C.(2001). Corporate initiatives in knowledge management. *Education+Training*, 43(4/5), 206-214.
73. Coltman,T. (2007). Can superior CRM capabilities improve performance in banking. *Journal of Financial Services Marketing*, 12(2),102-114.
74. Collins, D. J., & Montgomery, C. A. (1995). Competing on resources: Strategy in the 1990s. *Harvard Business Review*, 73(4), 118-128.
75. Cronbach, L. J. 1951. Coefficient alpha and the internal structure of tests. *Psychometrika* 16:297-334.
76. Crossan, M.M. & Apaydin, M. (2010). A multi-dimensional framework of organizational innovation: A systematic review of the literature. *Journal of Management Studies*. 47(6), 1154-1191.
77. Daft, R.L. & Weick, K.E. (1984). Toward a model of organizations as interpretation systems. *Academy of Management Review*, 9(2), 284-295.
78. Dalkir, K. (2007). *Characterization of knowledge sharing channels on the Internet*. Chapter V In, *Building the knowledge society on the Internet: Making value from Information exchange*. Ettore Bolisani.
79. Damsgaard, J. & Scheepers, R. (2001). Harnessing intranet technology for organizational knowledge creation. *Australian Journal of Information Systems*, 4-15.
80. Davenport, T.H. & Prusak, L. (1998). *Working Knowledge: How organizations manage what they know*. Harvard Business School Press, Boston, MA.
81. Davenport,T. H. Jarvenpaa, S.L. & Beers, M.C.(1996). Improving knowledge work processes. *Sloan Management Review*, 37(4), 53-66.
82. Dawson, R. (2000). Knowledge capabilities as the focus of organizational development and strategy. *Journal of Knowledge Management*, 4 (4) 320-327.
83. Dayasindhu, N. (2002). Embeddedness, knowledge transfer, industry clusters and global competitiveness: A case study of the Indian software industry. *Technovation*. 22, 551-560.
84. Deist, F.D. & Winterton, J.(2005). What Is competence? *Human Resource Development International*, 8(1), 27- 46.
85. De Pablos, P. O. (2002). Knowledge management and organizational learning: Topologies of knowledge strategies in Spanish manufacturing industry from 1995 to 1999. *Knowledge Management*, 6(1), 52-62.
86. Desouza, K. C., & Vanapalli, G. K. (2005). The role of incentives in knowledge management: How to enhance knowledge transfer. In K. C. Desouza (Ed.), *New frontiers of knowledge management*. (pp. 76-98). New York, NY: Palgrave McMillan Ltd.

87. Dierickx, I. & Cool, K (1989). Asset stock accumulation and the sustainability of competitive advantage. *Management Science*. 35: 1504-1513.
88. Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). *Internet, mail, and mixed-mode surveys: The tailored design method*. Hoboken, NJ: John Wiley & Sons, Inc.
89. Donoghue, L., Harris, J. & Weitzman, B. (1999). Knowledge management strategies that create value. *Outlook Journal*, 1, 48-53.
90. Draganidis, F. & Mentzas, G. (2006). Competency based management: A review of systems and approaches. *Information Management & Computer Security*, 14(1), 51-64.
91. Drucker, P. F. (1995). *People and performance: The best of Peter Drucker on management*. Routledge.
92. Dubois, D. (Ed.) (1998). *The competency casebook*. Amherst, MA: HRD, & Silver Spring MD: International Society for Performance Improvement.
93. Dunford, R. (2000). Key challenges in the search for the effective management of knowledge in management consulting firms. *Journal of Knowledge Management*, 4(4), 295-302.
94. Earl, M. (2001). Knowledge management strategies: Toward a taxonomy. *Journal of management Information System*, 18(1), 215-233.
95. Edvinsson, L. (2000). Some perspectives on intangibles and intellectual capital. *Journal of intellectual capital*, 1(1), 12-16, MCB University Press.
96. Edvinsson, L. & Sullivan, P. (1996). Developing a model for managing intellectual capital. *European Management Journal*, 14(4), 356-364.
97. Egbu, C. (2004). Managing knowledge and intellectual capital for improved organizational innovation in the construction industry: An examination of critical success factors. *Engineering, Construction and Architectural Management*, 11(5), 301-315.
98. Ekaterini, G. (2011). A qualitative approach to middle managers' competences. *Management Research Review*, 34(5), 553-575.
99. Engestrom, Y. (1987). *Learning by expanding, an activity theoretical approach to developmental research*. Helsinki Finland; Orienta-Kosultit.
100. Erwee, R, Skadiang, B. & Roxas, B. (2012). Knowledge management culture, strategy and process in Malaysian firms. *Knowledge Management Research & Practice*, 10, 89-98.
101. Eskerod, P. (1998). *The human resource allocation process when organizing by projects*. In Lundin, R.A & Midler, C. (Eds.), *Projects as arenas for renewal and learning processes*, Kluwer academic publisher, Boston, 125-131.
http://link.springer.com/chapter/10.1007/978-1-4615-5691-6_12#page-1.

102. Fahey, L., & Prusak, L. (1998). The eleven deadliest sins of knowledge management. *California Management Review*, 40(3), 265-276.
103. Fornell, C., & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.
104. Freeze, R.D., & Kulkarni, U.(2007). Knowledge management capability: Defining knowledge assets. *Journal of Knowledge Management*, 11(6), 94-109.
105. Gammelgaard, J. & Ritter, T.(2005). The knowledge retrieval matrix: Codification and personalization as separate strategies. *Journal of Knowledge Management*, 9(4), 133-143.
106. Ganesh , M.P. & Gupta, M. (2015). Impact of procedural justice perception on team commitment: Role of participatory safety and task routineness. *Journal of Advances in Management Research*, 12(2), 176-191.
107. Garavan,T.N. & McGuire, D.(2001). Competencies and workplace learning: Some reflections on the rhetoric and the reality. *Journal of Workplace Learning*, 13(4), 144-163.
108. Gefen, D., Straub, D. & Boudreau, M.C(2000). Structural equation modeling and regression: Guidelines for research practice. *Communication of the Association for Information System*, 4(7), 1-79.
109. Ghosh, S. & Mondal, A.(2009). Indian software and pharmaceutical sector IC and financial performance. *Journal of Intellectual Capital*, 10(3), 369-388.
110. Godbout,A.J. (2000). Managing core competencies: The impact of knowledge management on human resource practices in leading edge organization. *Knowledge and process management*, 7(2), 76-86.
111. Goel, A.K.,Sharma, G.R., & Rastogi, R.(2010). Knowledge management implementation in NTPC: An Indian PSU. *Management Decision*, 48(3), 383-395.
112. Goh, D.H.,Chua, A.Y., Luyt, B. & Lee, C.S. (2008). Knowledge access, creation and transfer in e-government portals. *Online Information Review*, 32(3), 348-369.
113. Gold A.H., Malhotra A. & Segars A.H (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems*, 18(1), 185-214.
114. Graham, A.B. & Pizzo, V.G. (1996). A question of balance: Case studies in strategic knowledge management. *European Management Journal*, 14(4), 338-346.
115. Grant, R. M. (1996). Prospering in dynamically-competitive environment: Organizational capability as knowledge integration. *Organization Science*, 7(4), 375–387.
116. Groves, R., Fowler, F. Couper, M., Lepkowski, J., Singer, E. & Tourangeau, R. (2004), *Survey methodology*, Hoboken, NJ: John Wiley & Sons.

117. Gupta, B., Iyer, L. S., & Aronson, J. E. (2000). Knowledge management: practices and challenges. *Industrial Management & Data Systems*, 100(1), 17-21.
118. Hair, J. F., Anderson, R.E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5th ed.). New Jersey: Prentice Hall.
119. Hair, Jr., J.F., Black, W.C., Babin, B.J., Anderson, R.E., & Tatham, R.L. (2006). *Multivariate data analysis* (6th Edition.), Pearson-Prentice Hall, Upper Saddle River, NJ.
120. Hair JF, William CB, Barry JB, & Rolph EA (2010). *Multivariate data analysis* 7th edition. Prentice Hall, Upper Saddle River, NJ.
121. Hamel, G. (1991). Competition for competence and inter-partner learning within international strategic alliances. *Strategic Management Journal*, 2(S1), 83-103.
122. Hamel, G. & Prahalad, C. K. (1994). *Competing for the Future*, Cambridge, MA: Harvard Business School Press.
123. Hansen, M.T., Nohria, N. & Tierney, T. (1999). What's your strategy for managing knowledge? *Organizational Learning*, Harvard Business School Press, Boston, MA, 1-10.
124. Hartle, F. (1995) *How to re-engineer your performance management process*, London: Kogan Page.
125. Hayes, A. F. (2013). *Introduction to mediation, moderation and conditional process analysis*. New York: Guilford Press.
126. Heisig, P. (2009). Harmonization of knowledge management: Comparing 460 KM frameworks around the globe. *Journal of Knowledge Management*, 13(4), 4-31.
127. Hirsh, W. & Strebler, M. (1991). *Defining managerial skills and competences*. *Gower Handbook of Management Development*, 79-96.
128. Ho, L.A. (2008). What affects organizational performance? The linking of learning and knowledge management. *Industrial Management & Data Systems*, 108(9), 1234-54.
129. Ho, C.T (2009). The relationship between knowledge management enablers and performance. *Industrial Management & Data Systems*, 109(1), 98-117.
130. Hodgson, G. M. (1998). Competence and contract in the theory of the firm. *Journal of Economic Behavior & Organization*, 35(2), 179-201.
131. Holden, N.J. (2004). *National culture and diversity of knowledge-sharing styles*. Proceedings of the KMAP 2004, Taipei.
132. Holsapple, C. W. & Jones, K. (2004). Exploring primary activities of the knowledge chain. *Knowledge and Process Management*, 11(3), 155-174.
133. Homer, M. (2001). Skills and competency management. *Industrial and Commercial Training*, 33(2), 59-62.

134. Hustad, E., & Munkvold, B. E. (2005). IT-supported competence management: A case study at Ericsson. *Information Systems Management*, 22(2), 78-88.
135. Hsieh, H.J. (2007), *Organizational characteristics, knowledge management strategy, enablers, and process capability: Knowledge management performance in U.S software companies*, Doctor of philosophy, Lynn University.
136. Huang, T., Chi, S. & Lawler, J. (2005). The relationship between expatriates' personality traits and their adjustment to international assignments. *International Journal of Human Resource Management*, 16(9), 1656-1670.
137. Huber, G.P. (1991). Organizational learning: The contributing processes and the literatures. *Organization Science*, 2(1), 88-115.
138. Iansiti, M. (1993). Real-world R & D: Jumping the product generation gap. *Harvard Business Review*, 71(3), 138-147.
139. Islam, M.Z., Jasimuddin, S.M. & Hasan, I. (2015). Organizational culture, structure, technology infrastructure and knowledge sharing. *VINE: The Journal of Information and Knowledge Management Systems*, 45 (1), 67-88.
140. Jasimuddin, S.M., Klein, J.H. & Connell, C. (2005). The paradox of using tacit and explicit knowledge: strategies to face dilemmas. *Management Decision*, 43(1), 102-112.
141. Jelavic, M., F.C.I.M. (2011). Competence management in high-technology organizations. *The Canadian Manager*, 36(1), 21-22.
142. Jimenez, D.J. & Valle, R.S (2013). Studying the effect of HRM practices on the knowledge management process. *Personnel Review*, 42(1), 28-49.
143. Kamochi, K. (1999). *Strategic human resource management within a resource-capability view of the firm*. In R. S. Schuler & S. E. Jackson (Eds), *Strategic human resource management* (90- 109). Oxford: Blackwell.
144. Kandampully, J.(2002). Innovation as the core competency of service organization: The role of technology, knowledge and networks. *European Journal of Innovation Management*, 5(1), 18-26.
145. Kang, S. C., Morris, S.S. & Snell, S.A.(2003). *Extending the human resource architecture: Relational archetypes and value creation*. (CAHRS working paper# 3- 13 Ithaca, NY Cornell University, School of Industrial and Labor relation, Center for Advanced Human Resource Studies.
146. Kang, S. C., Morris, S.S. & Snell, S.A.(2007). *Relational archetypes, organizational learning and value creation: Extending the human resource architecture*. *Academy of Management Review*, 32 (1), 236-256.

147. Kao, J.J. (1996). *The art and discipline of business creativity*. Harper Business, New York, NY.
148. Kaplan, R.S. & Norton, D.P. (1992). *The balanced scorecard- Measures that drive performance*. Harvard Business Review.
149. Karkoulian, S., Messarra, L.C. & McCarthy, R. (2013). The intriguing art of knowledge management and its relation to learning organizations. *Journal of Knowledge management*, 17(4), 511-526.
150. Karthikeyan, S., Bhagat, M. & Kannan, N.G. (2012). Making the HR outsourcing decision-Lessons from the resource based view of the firm. *International Journal of Business Insights and transformation*, 5(1), 87-95.
151. Keskin, H. (2005). The relationships between explicit and tacit oriented KM strategy, and firm performance. *Journal of American Academy of Business*, 7(1), 169.
152. Kim, D. H. (1998). *The link between individual and organizational learning*. In D. A. Klein (Ed.), *The Strategic Management of Intellectual Capital* (41-62). Newton, MA: Butterworth-Heinemann.
153. Kline, R.B. (2005). *Principles and practice of structural equation modeling*. New York, NY: Guilford Press.
154. Kogut B. & Zander U. (1996). What firms do? Coordination, identity and learning. *Organizational Science*, 7(5), 502-518.
155. Kor, Y. Y., & Mahoney, J. T. (2005). How dynamics, management, and governance of resource deployments influence firm-level performance. *Strategic Management Journal*, 26(5), 489-496.
156. Kumar, J.A & Ganesh, L.S. (2011). Balancing knowledge strategy: Codification and personalization during product development. *Journal of Knowledge Management*, 15(1), 118-135.
157. Kushwaha, P. & Rao, M.K. (2015). Integrative role of KM infrastructure and KM strategy to enhance individual competence: Conceptualizing knowledge process enablement. *VINE: The Journal of Information and Knowledge Management System*, 45(3), 376-396.
158. Lee, C. & Yang, S. (2000). Knowledge value chain. *Journal of Management Development*, 19(9), 783-793.
159. Lee, H. & Choi, B. (2003). Knowledge management enablers, processes, and organizational performance: An integrative view and empirical examination. *Journal of Management Information Systems*, 20(1), 179-228.
160. Lee, S., Kim, B.G. & Kim, H. (2012). An integrated view of knowledge management for performance. *Journal of Knowledge Management*, 16(2), 183-203.

161. Lee, Y.C. & Lee, S.K. (2007). Capabilities, processes, and performance of knowledge management: A structural approach. *Human Factors and Ergonomics in Manufacturing*, 17(1), 21-41.
162. Lehesvirta, T. (2004). Learning processes in a work organization: From individual to collective and/or vice versa? *Journal of Workplace Learning*, 16(1/2), 92-100.
163. Leonard-Barton, D. (1995). *Wellsprings of knowledge: Building and sustaining the sources of innovation*. Boston: Harvard Business School Press.
164. Liao, S.H. Chang, W.J., Hu, D.C. & Yueh, Y. (2012). Relationships among organizational culture, knowledge acquisition, organizational learning, and organizational innovation in Taiwan's banking and insurance industries. *The International Journal of Human Resource Management*, 23(1), 52-70.
165. Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 140, 1- 55.
166. Lin, C.Y. & Kuo, T.-H. (2007). The mediate effect of learning and knowledge on organizational performance. *Industrial Management & Data Systems*, 107(7), 1066-83.
167. Lindvall, M., Rus, I. & Sinha, S. (2002). *Technology support for knowledge management*. Fraunhofer center for experimental software engineering, College park, Department of Computer Science, University of Maryland.
168. Lopes, I., Martins, M. & Nunes, M., (2005). Towards the knowledge economy: The technological innovation and education impact on the value creation process. *The Electronic Journal of Knowledge Management*, 3(2), 129-138.
169. Lustri, D, Miura, I. & Takahansi, S. (2007). Knowledge management model: practical application for competency development. *The Learning Organization*. 14 (2), 186-20.
170. Madhavan, R. & Grover, R. (1998). From embedded knowledge to embodied knowledge: New product development as knowledge management. *Journal of Marketing*, 62(4), 1-12.
171. Maier, R. & Remus, U. (2003). Implementing process oriented knowledge management strategies. *Journal of Knowledge Management*, 7(4), 62-74.
172. Malhotra, Y. (1998). *Knowledge management and business model innovation*: Idea Group Publishing, US.
173. Malhotra, Y. (2005). Integrating knowledge management technologies in organizational business processes: Getting real time enterprises to deliver real business performance. *Journal of Knowledge Management*, 9(1), 7-28.
174. Malhotra, N. K., & Dash, S. (2009). *Marketing research: An applied orientation*, 5/e. Pearson Education India.

175. Marquardt, M.J. (1996), *Building the Learning Organization: A Systems Approach to Quantum Improvement and Global Success*, McGraw-Hill, New York, NY.
176. Marques, D.P. & Simon, F.J.G. (2006), The effect of knowledge management practices on firm performance. *Journal of Knowledge Management*, 10 (3), 143-156.
177. Mason, R. M. (2003). Culture free or culture Bound: A boundary spanning perspective on learning in Knowledge management System. *Journal of Global Information Management*, 11(4), 20-36.
178. Mayer, R. C., Davis, J. H. & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709-734.
179. Mayo, A. (2000). The role of employee development in the growth of intellectual capital. *Personnel Review*, 29(4), 521-533.
180. McClelland, D.C.(1973). Testing for competence rather than intelligence. *American Psychologist*, 28(1), 1-4.
181. McCuiston, V.E. & Jamrog, J.J. (2005). Knowledge management implementation: HR executives speak out. *Journal of Applied Management and Entrepreneurship*, 10(1), 20-39.
182. McElroy, M. W. (2000). Integrating complexity theory, knowledge management and organizational learning. *Journal of Knowledge Management*, 4(3), 195-203.
183. Mciver, Derrick(2011). *Knowledge-in-practice: Exploring the influence of knowledge management processes on performance*. Doctor of Philosophy, The University of Texas. San Antonio.
184. Meso, P. & Smith, R. (2000). A resource-based view of organizational knowledge management systems. *Journal of Knowledge Management*, 4(3), 224-234.
185. Michellone, G. & Zollo, G. (2000). Competencies management in knowledge-based firms. *International Journal of Technology Management*, 20(1/2), 134-55.
186. Miller, D.C. & Salkind, N.J.,(2002). *Handbook of research design and social measurement*. 6th edition, Sage Publications.
187. Mills, A. & Smith, T. (2011). Knowledge management and organizational performance: A decomposed view, *Journal of Knowledge Management*, 15(1), 156-171
188. Mintzberg, H.(1979). *The structuring of organizations*. Prentice Hall, Engelwood, Cliffs,NJ.
189. Mirchandani, D. & Pakath, R. (1999). Four models for a decision support system. *Information & Management*, 35(1), 31-42.
190. Mishra B. & Bhaskar, A. U. (2011). Knowledge management process in two learning organizations. *Journal of Knowledge Management*, 15(2), 344-359.

191. Mithas, S., Ramsubbu, N. & Sambamurthy, V. (2011). How information management capability influences firm performance. *MIS Quarterly*, 35(1), 237-56.
192. Mohamed, M., Stankosky M. & Murray, A.(2006). Knowledge management and information technology: can they work in perfect harmony? *Journal of Knowledge Management*, 10(3), 103-116.
193. Montano, B, Liebowitz, J., Buchwalter,J., Mccaw, D.,Newman, B. & Rebeck K.J.(2001). A systems thinking framework for knowledge management. *Decision Support Systems*, 31(1), 5-16.
194. Mundra, N., Gulati, K. & Vashisth, R.(2011). Achieving competitive advantage through knowledge management and innovation: Empirical evidences from the Indian IT sector. *The IUP Journal of Knowledge Management*, 9(2),7-25.
195. Murray, P. (2003). Organisational learning, competencies and firm performance: Empirical observations. *The Learning Organization*, 10(5), 305-316.
196. Nielsen,C. & Montemari, M.(2012). The role of human resources in business model performance: the case of network-based companies. *Journal of Human Resource Costing & Accounting*, 16(2), 142-164.
197. Niu, K.H. (2010). Organizational trust and knowledge obtaining in industrial clusters. *Journal of Knowledge Management*, 14(1), 141-155.
198. Nold, H.A.(2012). Linking knowledge process with firm performance: Organizational culture. *Journal of Intellectual Capital*, 13(1), 16-38.
199. Nonaka, I. (1991). *The knowledge creating company*. Harvard Business Review, pp.96-104.
200. Nonaka. I & Takeuchi, H. (1995). *The Knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford University Press.
201. Nonaka, I. & Toyama, R. (2003). The knowledge-creating theory revisited: Knowledge creation as a synthesizing process. *Knowledge Management Research and Practice*, 1(1), 2-10.
202. Nonaka, I., & Toyama, R. (2004). *Knowledge creation as a synthesizing process*. In H. Takeuchi & I. Nonaka (Eds.), *Hitotsubashi on knowledge management* (pp. 91-124). Singapore: Wiley.
203. Nordhaug, O. & Gronhaug, K. (1994). Competences as resources in firms., *The International Journal of Human Resource Management*, 5(1), 89-106.
204. Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York, NY: McGraw-Hill.

205. OECD, (1996). *The Knowledge Based Economy*. In *OCDE/GD(96)102*. Paris: Head of Publication Services.
206. Omerzel, D.G., Antoncic, B. & Ruzzier, M. (2011). Developing and testing a multidimensional knowledge management model on Slovenian SMEs. *Baltic Journal of Management*, 6(2), 179-204.
207. Padmavathy. C., Balaji M.S. & Sivakumar, V.J. (2012). Measuring effectiveness of customer relationship management in Indian retail Banks. *International Journal of Bank Marketing*. 30(4), 246-266.
208. Palo, S. & Panigrahi, S. (2004). Managing change during a transition period. *Development and Learning in Organizations: An International Journal*, 18(6), 7-9.
209. Pan, S. & Scarbrough, H. (1998). A socio-technical view of knowledge-sharing at Buckman laboratories. *Journal of Knowledge Management*, 2(1), 55-66.
210. Pan,S. & Scarbrough, H. (1999). Knowledge management in practice: An exploratory case study. *Technology Analysis & Strategic Management*, 11(3), ABI/INFORM Complete, 359.
211. Patrakosol, B. & Lee, S. (2009). IT capabilities, inter-firm performance and the state of economic development. *Industrial Management & Data Systems*, 109(9), 1231-47.
212. Pemberton, J.D. & Stonehouse, G.H.(2000). Organizational learning and knowledge assets: An essential partnership. *The Learning Organization*, 7(4), 184-193.
213. Pilbeam, S., & Corbridge, M. (2006). *People resourcing: Contemporary HRM in practice* (3rd ed.). Essex – England: Printice Hall.
214. Pillania, R. (2005). New knowledge creation scenario in Indian industry. *Global Journal of Flexible Systems Management*, 6(3/4), 49-57.
215. Prasad, T. (2006). Communication effectiveness: A case of Narayana Murthy's resignation from chairmanship of Bangalore international airport limited. *Vision: The Journal of Business Perspective*, 10(2), 53-56.
216. Prasad, S.H.C., Suar, D. & Taraban, R. (2014). Antecedents and moderators of software professionals' performance. *Sage Open*. 1-17.
217. Pinho, I., Rego A. & Cunha M.P. (2012). Improving knowledge management processes: A hybrid positive approach. *Journal of Knowledge Management*, 16(2), 215-242.
218. Pitt, M. & Clarke, K, (1999). Competing on competence: A Knowledge perspective on the management of strategic innovation. *Technology Analysis and Strategic Management*, 11(3), 301-316.

- 219.** Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology*, 63, 539-569-355.
- 220.** Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879-903.
- 221.** Popadiuk, S. & Choo, C. W. (2006). Innovation and knowledge creation: How are these concepts related? *International Journal of Information Management*, 26(6), 302-312.
- 222.** Prahalad, C. K. & Hamel, G. (1990). *The core competence of the corporation*. Harvard Business Review, May-June, pp. 79-91.
- 223.** Probst, G., Raub, S. & Ramhardt, K. (2000). *Managing knowledge: Building blocks for success*, John Wiley & Sons, Chichester.
- 224.** Prusak, L. (1997). *Knowledge in organizations*. 1st edition. ISBN-10: 0750697180, Routledge publication
- 225.** Quast, L. (2012). *Why knowledge management is important to the success of your company*. <http://www.forbes.com/sites/lisaquast/2012/08/20/why-knowledge-management-is-important-to-the-success-of-your-company/>.
- 226.** Quinn, J., Coleman, R., Macmillan, S. & Barraclough, D. (1997). *The 1995 revision of the joint US/UK geomagnetic field models*. II: MainField, J. Geomag. Geoelectr., 49, 245-261.
- 227.** Quintas, P., Lefere, P. & Jones, G. (1997). Knowledge Management: A strategic agenda. *Journal of Long Range Planning*, 30(3), 385-391.
- 228.** Qureshi, S., Briggs R.O. & Hlupic V. (2006). Value creation from intellectual capital: Convergence of knowledge management and collaboration in the intellectual bandwidth model. *Group Decision and Negotiation*, 15, 197-220.
- 229.** Rabeh, H.A.D., Jimenez-Jimenez, D. & Martinez-Costa, M. (2013). Managing knowledge for a successful competence exploration. *Journal of Knowledge Management*. 17(2), 195-207.
- 230.** Rajan, C.A. & Baral, R. (2015). Adoption of ERP system: An empirical study of factors influencing the usage of ERP and its impact on end user, *IIMB Management Review*, 27, 105-117.
- 231.** Ramanand, N. V. (2001). *Knowledge Management*, Udyog Pragati, NITIE, 25 (3) July, - Sep, 66- 70.
- 232.** Reagan, P.M. (1994). Transform organizations using competency development. *Journal of Compensation and Benefits*, 95(5), 25-34.

233. Rechberg, I.D.W. & Syed, J.(2014). Appropriation or participation of the individual in knowledge management. *Management Decision*, 52(3), 426-445.
234. Reynolds, M.S. (2003). *Engendering virtual team commitment to knowledge management and creation in a professional service organizational context*. Research paper, DBA program, University of Southern Queensland, 1-25.
235. Riggins, F.J., H.S. & Rhee, H.S. (1999). Developing the learning network using extranets. *International Journal of Electronic Commerce*, 4(1), 65-83.
236. Roberts, J. (2000). From know-how to show-how? Questioning the role of information and communication technologies in knowledge transfer. *Technology Analysis and Strategic Management*, 12(4), 429-443.
237. Robbins S.P. (1990), *Organization Theory: Structure designs and applications*. 4th ed. Englewood Cliffs, NJ: Prentice-Hall, Inc.
238. Rouse, W.B. & Morris, N.M. (1985). On looking into the black box: prospects and limits in the search for mental models. *Psychological Bulletin*. 100(3), 349-363.
239. Ruggles, R. (1998). The state of the notion: Knowledge management in practice. *California Management Review*, 40(3), 80-89.
240. Sarkar, S. (2013). Rejuvenating 'knowledge' in organization: The competence management approach. *Prestige International Journal of Management and Research*, 5/6(2), 61-68.
241. Scheepers, R., Venkitachalam, K. & Gibbs, M.R. (2004). Knowledge strategy in organizations: Refining the model of Hansen, Nohria and Tierney. *Journal of Strategic Information Systems*.13 201–222.
242. Schilling MA (2005). *Strategic Management of Technological Innovation*. Tata McGraw-Hill, Boston,MA.
243. Schlegelmilch, B.B. & Penz, E. (2002). Knowledge management in marketing. *The Marketing Review*, 3(1), 5-19.
244. Schuler, R.S., Jackson S.E. and Tarique, I.(2011). Global talent management and global talent challenges: Strategic opportunities for IHRM. *Journal of World Business*, 46(4), 506-516.
245. Schulz, M. & Jobe, L.A. (2001). Codification and tacitness as knowledge management strategies: An empirical exploration. *Journal of High Technology Management Research*, 12, 139-165.
246. Scott, J.E. (2000). Facilitating inter-organizational learning with Information Technology. *Journal of Management Information Systems*, 17(2), 81-111.

247. Segars, A. H.(1997). Assessing the Uni-dimensionality of measurement: A paradigm and illustration within the context of information systems research. *Omega, International Journal of Management Science*, 25(1), 107-121.
248. Seleim, A. & Khalil, O. (2007). Knowledge management and organizational performance in the Egyptian software firms. *International Journal of Knowledge Management*, 3(4), 47-66.
249. Sena, J.A. & Shani, A.B (1999). *Intellectual capital and knowledge creation: Toward an alternative framework*. In Liebowitz J. (Ed.). *Knowledge Management Handbook* , 8(1), CRC press. New York, NY. 8-16.
250. Senge, P.(1990). *The Fifth Discipline: The art and practice of the learning organization*, Doubleday Currence, New York, NY.
251. Sethi, R. & Sethi, A. (2009). Can quality-oriented firms develop innovative new products? *Journal of Product Innovation Management*, 26, 206-21.
252. Shaabani, E., Ahmadi, H., & Yazdani, H. (2012). Do interactions among elements of knowledge management lead to acquiring core competencies? *Business Strategy Series*, 13(6), 307-322.
253. Shen, J. & Darby, R. (2006). Training and management development in Chinese multinational enterprises. *Employee Relations*, 28(4), 342- 362.
254. Simonin, B.L.(1997). The importance of developing collaborative know-how: An empirical test of the learning organization. *Academy of Management Journal*. 40(5), 1150-1174.
255. Simsek, Z., & Veiga, J. (2000). The electronic survey technique: An integration and assessment. *Organizational Research Methods*, 3, 92-114.
256. Singh, A. & Soltani, E. (2010). Knowledge management practices in Indian Information Technology companies. *Total Quality Management*, 21(2), 145-57
257. Singh, H. & Zollo, M. (1998). *The impact of knowledge codification, experience trajectories and integration strategies on the performance of corporate distributions*. The Wharton School(WP).
258. Singh, S, Kodwani, A.D. & Agarwal, R.K. (2013). Role of lifestyle orientation and perceived organizational functioning in psychological empowerment of IT professionals. Benchmarking: *An International Journal*, 20(3), 396-418.
259. Skadiang, B. (2009). *Dimensions of organizational knowledge management: A study on Malaysian managers using the multidimensional USQ KM scale*. DBA dissertation, University of Southern Queensland, Australia.

260. Smith, T (2006). *Knowledge management and its capabilities linked to the business strategy for organizational effectiveness*. PhD Thesis. Nova Southeastern University.
261. Snehota, I. & Hakansson, H.(1995). *Developing relationships in business networks*. Londres: Routledge.
262. Spencer, L. & Spencer, S. (1993). *Competency at work: Models for superior performance*. John Wiley & Sons, Inc., New York, NY.
263. Spender, J.C. (1996a). Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal*, 17 (Winter Special Issue), 45-62.
264. Spender, J.C. (1996b). Organizational knowledge, learning, and memory: Three concepts in search of a theory. *Journal of Organizational Change*, 9, 63-78.
265. Sproull, L., & Kiesler, S. (1991). *Connections: New Ways of Working in the Networked organization*. Cambridge, MA: The MIT Press.
266. Srikantaiah, T. & Koenig, M. (2000). *Knowledge management for the Information professional*. Medford, NJ: Information Today, Inc.
267. Stonehouse G.H. & Pemberton, J.D.(1999). Learning and knowledge management in the intelligent organization. *Participation and Empowerment: An International Journal*, 7(5), 131-144.
268. Spicer, D. P., & Sadler-Smith, E. (2006). Organizational learning in smaller manufacturing firms. *International Small Business Journal*, 24(2), 133-158.
269. Staples, D.S. & Webster, J. (2008). Exploring the effects of trust, task interdependence and virtualness on knowledge sharing in teams. *Information Systems Journal*, 18(6), 617-640.
270. Stoof A (2005). *Tools for the identification and description of competencies*. Doctoral Dissertation, Open University of the Nederland, Heerlen.
271. Sveiby K.(1997). *The new organizational wealth: Managing and measuring knowledge base assets*. Berrett Koehler Publishers, San Francisco.
272. Swan, J., Newell, S., Scarbrough, H. & Hislop, D. (1999). Knowledge management and innovation: Networks and networking. *Journal of Knowledge Management*, 3(4), 262-275.
273. Szabo, L. & Cseprezi, A.(2011). Competences found important for knowledge sharing: investigation of middle managers working at medium- and large-sized enterprises. *The IUP Journal of Knowledge Management*, 9(3), 41-58.
274. Tangaraja, G., Rasdi, R., Ismail, M. & Samah, B.A. (2015). Fostering knowledge sharing behaviour among public sector managers: A proposed model for the Malaysian public service. *Journal of Knowledge Management*, 19(1),121-140.
275. Teece, D.J. (2000). Strategies for managing knowledge assets: The role of firm structure and industrial context. *Long Range Planning*, 33(7), 35–54.

- 276.** Teece, D., Pisano, G. & Shuen, A.(1998). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.
- 277.** Theriou, G.N. and Chatzoglou, P. (2014). The impact of best HRM practices on performance-Identifying enabling factors. *Employee Relations*, 36(5), 535-561.
- 278.** Thite, M. & Russell, B. (2010). Work organization, human resource practices and employee retention in Indian call centers. *Asia Pacific Journal of Human Resources*. 48(3), 356-374.
- 279.** Thompson, A. (2005). Creating need-to-have portals: Addressing the real-world barriers at KBR production services. *Knowledge Management Review*, 8(4), 24-8.
- 280.** Tippins, M.R. and Sohi, R.S. (2003). IT competency and firm performance: Is organizational learning a missing link? *Strategic Management Journal*, 24(8), 745-61
- 281.** Tiwana, A. (2000). *The Knowledge management toolkit*. Prentice Hall, Englewood Cliffs, NJ
- 282.** Trochim, W. M.(2005). *The Research Methods Knowledge Base*, 2nd Edition.
- 283.** Tsai, A. (2014). An empirical model of four processes for sharing organisational knowledge. *Online Information Review*, 38(2), 305-320.
- 284.** Tseng, S. and Lee, P. (2014). The effect of knowledge management capability and dynamic capability on organizational performance. *Journal of Enterprise Information Management*, 27(2) 158-179.
- 285.** Tsoukas, H. & Mylonopoulos, N.(2004). Introduction: knowledge construction and creation in organizations. *British Journal of Management* .15(S1), S1-S8.
- 286.** Tsui, E. (2005). The Role of IT in KM where are we now and where are we heading? *Journal of Knowledge Management*, 9(1), 3-6.
- 287.** Tziner, A. & Eden D. (1985). Effects of crew composition on crew performance: Does the whole equal the sum of its parts? *Journal of Applied Psychology*, 70(1), 85-93.
- 288.** Ulrich, D., Glinow, M.A.V. & Jick, T. (1993). High-impact learning: Building and diffusing learning capability. *Organisational Dynamics*, 22(2), 52-66.
- 289.** Urdan, T.C. (2005). *Statistics in plain English* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- 290.** Van der Spek, R., & Spijkervet, A. (1997). *Knowledge management: Dealing intelligently with knowledge. Knowledge management and its integrative elements*, Leibowitz J, Wilcox J(eds), CRC press; New York.
- 291.** Venkatraman, N. & Henderson, J.(1998). Real strategies for virtual organizing. *Sloan Management Review*. 40(1), 33-48.

292. Venkitachalam, K. & Busch, P. (2012). Tacit knowledge: Review and possible research directions. *Journal of Knowledge Management*, 16(2), 356-371.
293. Vera, D., & Crossan, M. M. 2002. *Organizational learning and knowledge management: Toward an integrative framework* In M. Easterby-Smith, & M. A. Lyles (Eds.), *The Blackwell Handbook of Organizational Learning and Knowledge Management*. Malden, MA.
294. Walsh, J.P. & Ungson, G.R.(1991). Organizational Memory. *The Academy of Management Review*,16(1), 57-91.
295. Waterman, D.A. (1986). How do expert systems differ from conventional programs? *Expert Systems*, 3(1), 16-19.
296. Waychal, P., Mohanty, R.P. & Verma, A.(2011). Leading indicators of innovation as a competence for individuals: An empirical study. *Journal of Advances in Management Research*, 8(2), 301-322.
297. Wiesner, R., McDonald, J & Banham, H.C. (2007). Australian small and medium sized enterprises (SMEs): A study of high performance management. *Journal of Management & Organization*, 13(3), 227-248.
298. Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5, 171-180.
299. West, P.(1994). The learning organization: Losing the luggage in transit. *Journal of European Industrial Training*, 18(11), 30-38.
300. Wiig, K.M. (1997). Knowledge management: An introduction and perspective. *The Journal of Knowledge Management*, 1(1), 6-11.
301. Wikstrom,S. & Norman, R.(1994). *Knowledge and Value- A New Perspective on Corporate transformation*, Routledge, London.
302. Wilson, T.D.(2002). The nonsense of knowledge management. *Information Search*, 8(1).
303. Wright, K. (2005). Personal knowledge management: Supporting individual knowledge worker performance. *Knowledge Management Research & Practice*, 3, 156-165.
304. Wright, P.M., Dunford, B.B. & Snell, S.A. (2001). Human resources and the resource based view of the firm. *Journal of Management*, 27(6), 701-21.
305. Xie, Y. (2009). *An empirical analysis of the antecedents of knowledge management strategies*. PhD Thesis. Nova Southeastern University.
306. Yan, Y, Chong, C.Y. & Mak S.(2010). An exploration of managerial discretion and its impact on firm performance: Task autonomy, contractual control, and compensation. *International Business Review*, 19, 521-530.

307. Yang, C. & Chen, L.C. (2007). Can organizational knowledge capabilities affect knowledge sharing behavior?. *Journal of Information Science*, 33(1), 95-109.
308. Yemeshvary, A., Upadhyay, A., Upadhyay, A.K. & Palo, S.(2013). Strategy implementation using balanced scorecard achieving success through personal values of leaders and employees. *Management and Labour Studies*. 38(4) 447-469.
309. Zack, M.H. (1999). Developing a knowledge strategy. *California Management Review*, 41(3), 125-145.
310. Zack, M., McKeen, J. & Singh, S. (2009). Knowledge management and organizational performance: An exploratory analysis. *Journal of Knowledge Management*, 13(6), 392-409.
311. Zand, D. E. (1972). Trust and managerial problem solving. *Administrative Science Quarterly*, 17(2), 229-239.
312. Zheng X., Diaz, I., Tang, N. & Tang, K (2014). Job insecurity and job satisfaction The interactively moderating effects of optimism and person-supervisor deep-level similarity. *Career Development International*, 19(4), 426-446.
313. Zhou, H. & De Wit, G. (2009). Determinants and dimensions of firm growth. *SCALES EIM Research Reports (H200903)*.

WEBLOGRAPHY

[Http://articles.economictimes.indiatimes.com/2015-02-27/news/59585092_1_economic-survey-e-commerce-market-export-market](http://articles.economictimes.indiatimes.com/2015-02-27/news/59585092_1_economic-survey-e-commerce-market-export-market).

[Http://www.cii.in/sectors.aspx?enc=prvePUj2bdMtgTmvPwvisYH+5EnGjyGXO9hLECvTuNsPZ832qW+yl1BSgqz7RX88](http://www.cii.in/sectors.aspx?enc=prvePUj2bdMtgTmvPwvisYH+5EnGjyGXO9hLECvTuNsPZ832qW+yl1BSgqz7RX88).

[Http://www.nseindia.com/products/content/equities/indices/sectoral_indices.htm](http://www.nseindia.com/products/content/equities/indices/sectoral_indices.htm) on 12th day of february 2014.

ANNEXURE-1

Survey Participation Request

Indian Institute of Technology, Roorkee
Department of Management Studies

Dear Respondent,
Greetings!

Subject: Regarding participation in a survey of the Indian IT Industry

Skills and competences are highly required to complete assigned job responsibilities. Apart from this, organizational performance depends on knowledge sharing and skill enhancement within the organization. I am a doctoral student from Indian Institute of Technology, (IIT) Roorkee.

In order to fulfill my doctoral degree requirement, I am conducting a research in "Knowledge Management" in the Indian IT Industry that will help to retrace areas of improvement in managing knowledge within the organization. Since you are employed as a software professional in an IT service provider firm in India, I would appreciate your participation in this research. Enclosed questionnaire is designed to examine the facts related to knowledge elements such as KM infrastructure, KM strategy, KM process and individual competence. You are invited to participate in this research effort.

This Survey is completely unconstrained and confidential.

Please go through the link to submit your response.

https://docs.google.com/forms/d/12zuJOaoFvaQgl9T8H0jQMkXb0KcVQbGT_MIRef6BPC4/viewform

Yours Sincerely

Pooja Kushwaha
(Research Scholar)
Department of Management Studies
Indian Institute of Technology, Roorkee
Roorkee- 247667, Uttarakhand
E.mail- poojaddm@iitr.ernet.in

ANNEXURE 2

Survey Questionnaire

This survey will take approximately 10 minutes to complete. Please read the instruction given below.

Instruction:

- 1) Read the questions carefully before assigning any value.
 - 2) Please indicate the degree which better describes actual situation in your organization
 - a) **1** indicates to a very little extent b) **7** indicates to a very great extent
- Your participation will be highly appreciated.*

Section A: General Information								
Name (Optional).....								
Gender: Male <input type="checkbox"/> Female <input type="checkbox"/>								
Age: Below 25 Years <input type="checkbox"/> 26-35 Years <input type="checkbox"/> 36-45 Years <input type="checkbox"/> Above 45 Years <input type="checkbox"/>								
Designation <input style="width: 150px; height: 20px;" type="text"/>								
Experience (in Years): Below 1 Year <input type="checkbox"/> > 1 Year but < 5 years <input type="checkbox"/> More than 5 years <input type="checkbox"/>								
Educational Profile: Graduate <input type="checkbox"/> Post Graduate <input type="checkbox"/> Others <input type="checkbox"/>								
Section B								
		Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Neither Agree nor Disagree (4)	Slightly Agree (5)	Agree (6)	Strongly Agree (7)
Part 1: Knowledge Management Infrastructure								
1	My organization members are satisfied by the degree of collaboration.	1	2	3	4	5	6	7
2	My organization members are supportive.	1	2	3	4	5	6	7
3	My organization members are helpful.	1	2	3	4	5	6	7
4	My organization members are generally trustworthy.	1	2	3	4	5	6	7
5	My organization members have reciprocal faith in other members' intention's and behaviors.	1	2	3	4	5	6	7
6	My organization members have reciprocal faith in others' ability.	1	2	3	4	5	6	7
7	My organization provides various formal training programs for performance of duties.	1	2	3	4	5	6	7
8	My organization provides opportunities for informal individual development other than formal training. such as work assignments and job rotation	1	2	3	4	5	6	7
9	My organization encourages people to attend seminars, symposia, and so on.	1	2	3	4	5	6	7

10	My organization members can take action without a supervisor.	1	2	3	4	5	6	7
11	My organization members are encouraged to make their own decisions.	1	2	3	4	5	6	7
12	My organization members do not need to refer to someone else.	1	2	3	4	5	6	7
13	In my organization there are many activities that are not covered by some formal procedures.	1	2	3	4	5	6	7
14	In my organization rules and procedures are typically written.	1	2	3	4	5	6	7
15	In my organization members can ignore the rules and reach informal agreements to handle some situations	1	2	3	4	5	6	7
16	My organization members can understand not only their own tasks but also others' tasks.	1	2	3	4	5	6	7
17	My organization members can make suggestion about others' task.	1	2	3	4	5	6	7
18	My organization members can communicate well not only with their department members but also with other department members.	1	2	3	4	5	6	7
19	My organization provides IT support for collaborative works regardless of time and place.	1	2	3	4	5	6	7
20	My organization provides IT support for communication among organization members.	1	2	3	4	5	6	7
21	My organization provides IT support for searching and accessing necessary information.	1	2	3	4	5	6	7
Part 2: Knowledge Management Strategy								
22	My knowledge can be easily acquired from experts and co-workers.	1	2	3	4	5	6	7
23	It is easy to get face-to-face advices from experts..	1	2	3	4	5	6	7
24	Knowledge is acquired by one-to-one mentoring.	1	2	3	4	5	6	7
25	Informal dialogues and meeting are used for knowledge sharing.	1	2	3	4	5	6	7
26	Knowledge (know-how, technical skill, or problem solving methods) is well codified.	1	2	3	4	5	6	7
27	Knowledge can be acquired easily through formal documents and manuals.	1	2	3	4	5	6	7
28	Knowledge is shared through codified forms like manuals or documents.	1	2	3	4	5	6	7
29	Results of projects and meetings should be documented	1	2	3	4	5	6	7
Part 3: Knowledge Management Process								
30	My organization is in touch with external professionals and expert technicians.	1	2	3	4	5	6	7
31	New ideas and approaches on work performance are experimented continuously.	1	2	3	4	5	6	7
32	Organizational systems and procedures support innovation.	1	2	3	4	5	6	7
33	Organization has formal mechanisms to guarantee the sharing of best practices among different fields of the activity	1	2	3	4	5	6	7
34	There are individuals within organization who take part in several teams or divisions and who also act as links among them	1	2	3	4	5	6	7
35	There are individuals responsible for collecting, assembling and distributing employees' suggestions	1	2	3	4	5	6	7

36	My organizational members share the same aim to which they feel committed.	1	2	3	4	5	6	7
37	My organizational members share knowledge and experiences by talking to each other	1	2	3	4	5	6	7
38	My organization offers the opportunity to learn (visits to other parts of the organization, internal training programs,...) so as to make individuals aware of other departments' duties	1	2	3	4	5	6	7
39	My organization has databases to stock its experiences and knowledge so as to be able to use them later on	1	2	3	4	5	6	7
40	My organization has directories or e-mails filed according to the field employees belong to, so as to find an expert on a concrete issue at any time	1	2	3	4	5	6	7
41	My organization has up-to-date databases of its clients.	1	2	3	4	5	6	7
Part 4: Individual Competence								
42	My organization promotes actively identifying new areas for one's own personal learning.	1	2	3	4	5	6	7
43	My organization promotes regularly creating and taking advantage of learning opportunities.	1	2	3	4	5	6	7
44	My organization promotes applying newly gained knowledge and skill on the job.	1	2	3	4	5	6	7
45	My organization serves as a role model for taking responsibility to manage own learning and development.	1	2	3	4	5	6	7
46	My organization seeks feedback and uses other sources of information to identify appropriate areas for personal improvement.	1	2	3	4	5	6	7
47	My organization targets learning needs and takes action.	1	2	3	4	5	6	7
48	My organization demonstrates motivation for continuous learning.	1	2	3	4	5	6	7
49	My organization identifies and participates in appropriate learning activities (e.g., courses, reading, self-study, coaching, and experiential learning) that help fulfill personal learning needs.	1	2	3	4	5	6	7
50	My organization values and pursues lifelong learning.	1	2	3	4	5	6	7

ANNEXURE 3

Reminder E- Mail

Subject: Reminder for survey participation

Dear Respondent,

Greetings!

Two weeks ago, a mail was sent regarding participation in an online survey of a study on Indian software professional entitled “*Examining the influence of knowledge elements on individual competence*”. Your participation in this survey is highly important as it will help to define and retrace new areas of knowledge and competence management, particularly in the IT sector.

Please go through the following survey link to participate:

https://docs.google.com/forms/d/12zuJOaoFvaQgl9T8H0jQMkXb0KcVQbGT_MIRef6BPC4/viewform

Your participation will be highly appreciated.

Thank You,

Pooja Kushwaha
Doctoral Candidate
Department of Management Studies
Indian Institute of Technology, Roorkee
Roorkee, Uttarakhand, 247667

ANNEXURE 4
List of Publications

Papers Published in International Journals:

1. Pooja Kushwaha and M.K. Rao (2015). Integrative role of KM infrastructure and KM strategy to enhance individual competence: Conceptualizing knowledge process enablement. *VINE: The Journal of Information and Knowledge Management System, Emerald Publications*, Vol. 45, No. 3, pp. 376-396. *SCOPUS INDEXED*
2. Pooja Kushwaha and M.K. Rao (2017, Forthcoming) HR practices, learning culture and human capital: A study on Indian business and professional service sector. *Global Business Review. Sage Publication. SCOPUS INDEXED (0.2 Impact Factor)*

Papers in Conference Proceedings:

1. Vandana Tamta and Pooja Kushwaha (2014). A Panoramic view of personal competence through interactional justice and knowledge sharing. *International Journal of Business Management and Leadership*, Vol. 5 No. 1, pp. 167-180, ISSN 2231-122X.
2. Pooja Kushwaha and M.K. Rao. (2015). Organizational culture, learning behavior and commitment level: Identifying key performance drivers, Proceedings of *2nd HR Summit and International Conference on Emerging Challenges of HR: VUCA Perspectives, Indian Institute of Management, Raipur.*
3. Pooja Kushwaha and M.K. Rao (2014). Exploring the role of organizational culture to empower interpersonal trust: A theoretical approach toward knowledge sharing. Paper presented at *Global Conference on Managing in Recovering Markets (GCMRM), Management Development Institute, Gurgaon.*
4. Pooja Kushwaha and M.K. Rao. (2014). Enabling KM process through infrastructure capabilities to affect knowledge performance: A conceptual model. Paper presented at *Sixth International Conference on Excellence in Research and Education, Indian Institute of Management, Indore.*

