CHAPTER-6
Summary Conclusions and Suggestions

This chapter sums up this research study, discusses the hypotheses, conclusions and implications of the results and offers suggestions for future research.

6.1 Summary

Knowledge Management has emerged as a very important discipline during which both in business management as well as in related academic fields as organizations and economies perceive knowledge management as indispensable for their very survival and to have competitive edge over rivals. Knowledge Management is not just acquiring the latest information and technologies but is concerned with identifying capturing and deploying the most appropriate knowledge with the specific parameters of the functioning the organization, to realize its objectives. Organizations need to recognise that Knowledge Management is a continuous process during which more and more knowledge is added and managed over time (Parikh, 2001). The Knowledge Management cycle is divided into sequential and overlapping six processes such as knowledge creation, knowledge capture, knowledge organization, knowledge storage, knowledge dissemination and knowledge application and value. (Lawson, 2003): In this study, it is tried to test a few selected propositions regarding the interplay of various elements of Organizational Culture viz. Future Vision & Strategic Approach, Workforce Training & Development, Culture Audit process, and Intellectual Property Management with the Knowledge Management realization. Based on the results of this testing and the analyses, it is proposed to put forward certain suggestions for the practitioners of organizational management as well as for further research.
The present study commenced with giving an overview of general concepts and theoretical formulations on knowledge management, we have particularly analysed various aspects of Organizational Culture and its connection with and knowledge management and organizational effectiveness. This was our focus of the study.

An extensive review of literature was made on knowledge management, Research and Development, Organizational Culture and related subjects. The references of those studies, which are considered in the study have been provided in the appendix of the study.

The statement of the problem has been described, which is followed by the research objectives. Here the elements of Organizational Culture such as Future Vision and Strategic Approach, Workforce Training and Development, Cultural Audit and Intellectual Property Management were considered to be favorable to R&D process and Knowledge Management.

The scope of the study and the hypotheses were framed using the chosen four elements of Organizational Culture. Research design and methodology with the sampling plan and framework adopted to collect the data were determined. The type of data used was mainly the primary data collected through mailed questionnaire and web based survey of the employees of R&D Organizations and the secondary data related with the primary research work done in concern area. The pilot testing (reliability and validity) of questionnaire was carried out. The statistical tests which are used are descriptive statistics which describes the state of affairs of the data; Pearson chi-square test statistics which develops association and checks the interdependency among variables; and t-test statistics used for comparing the variables and their effect in ex-ante and ex-post periods.
One-way analysis of variance (ANOVA) of Management levels was also carried out. A regression model based on the conceptual framework was designed and tested.

The data collected was analyzed using the SPSS 20. The results of the data analysis have rejected the null hypotheses and the outcome of various test statistics applied has already been discussed with their respective interpretation and implications in the earlier chapters.

The association between Organizational Culture and Knowledge Management in the Indian R&D Organizations with respect to the analysis of previous literature and the analysis of the present study has also been discussed.

6.2 Conclusions

Now the conclusions drawn on the basis of theoretical framework as well as the empirical study (the analysis of questionnaire) and supporting it with related literature available in respective areas are discussed as follows:

6.2.1 Organizational Culture and Knowledge Management

There are two fundamental approaches to Knowledge Management: the process approach and the practice approach. The process approach attempts to codify Organizational knowledge through formalized controls, processes, and technologies (Hansen et al., 1999). Firms following the process approach may employ unambiguous policies governing how knowledge is to be collected, stored, and disseminated throughout the Organization. The process approach often requires the use of information technologies, such as intranets, data warehousing, knowledge repositories, decision support tools, and groupware to improve the quality and speed of knowledge creation and distribution within the Organizations (Ruggles, 1998).
In the present knowledge intensive era organizations consider Human Resource as most crucial asset in contemporary business. Organizations have started to manage their Intellectual Capital and Knowledge as assets of the Organization. Similarly, as Organizations have embraced the group approach to work processes, the value of sharing knowledge in an effective manner has become extremely important. Inculcating knowledge sharing culture is now thought to be essential to enable and support exchange of tacit knowledge between individuals and groups/teams as an effective means of managing organizational knowledge. As the connections between Organizational Culture and knowledge management have become obvious, the researchers have embarked on assessing the aspect of Human Resource practices in bringing about desired changes in the Organizational Culture.

The analysis of our study also support and validate the previously stated relationship between Organizational Culture and the success of knowledge management in an organization. In the chapter IV, with some statistical measures (t-test, Pearson chi-square test and descriptive statistics) it was proved that Organizational Culture plays a dominant role in the implementation of knowledge management. The organizations which are having good scores in their Organizational Culture scale are able to successfully implement the knowledge management in their respective organizations, and vice versa.

6.2.1.1 Future Vision and Strategic Approach of an R&D Organization and Knowledge Management

Knowledge Management Implementation is not possible in a single step and has to be implemented in a phased manner (Kochikar, 2000, Mohanty and Chand, 2005, Pee and Kankanhalli, 2009). For the successful knowledge management implementation, it is imperative to draw out a roadmap with the short-term and long-term objectives, goals and
checkpoints to navigate its efforts till their objectives and goals are achieved. (Hubert and Lemons, 2010). There should be a reliable instrument for assessing an organization’s and drawing up a strategy for long-term development (Ehms and Langen, 2002). A clear vision and strategic approach leads to dynamic knowledge management practice as Klimko, (2001) has suggested while presenting his Knowledge Management Maturity Models (KMMM). For the Knowledge Management function to be effective, the importance of leadership for guiding the organization for the creation of synergies among the different Knowledge Management aspects has to be promoted in the organization.

As we state our hypothesis that the Future Vision and Strategic Approach of an Organization has positive effect on implementation of Knowledge Management, was proved with the help of statistical measures like independent sample t-test and cross-tabulation test statistics. These test statistics (shown in chapter IV) reveal that the role of Future Vision and Strategic Approach of an Organization is very significant and prominent in the efficient and effective implementation of Knowledge Management in a research oriented Organization.

6.2.1.2 Workforce Training and Development of an R&D Organization and Knowledge Management

In this study the importance of “Communities of Practice”, which are organic self-organized groups of individuals who are dispersed geographically or organizationally but are in touch regularly to discuss subjects of shared interest is noted (Lave and Wenger 1991). In order to survive in the knowledge-based economy of the business world, organizations need to achieve competitive advantage by generating specific knowledge which is unique to one’s organization and is difficult to imitate by other organizations. Innovative Human Resource Development (HRD) models can create intellect,
specifically required resources, for the organization (Lepak and Snell, 1999). Such HRD practice includes training to enhance employee skills and other modes of knowledge and expertise enhancement and utilization (Lepak and Snell, 1999). Organization must utilize effective Human Resource strategies to suitably change or re-align the culture of the organization if they aim to integrate knowledge and skills of their members. Strong and positive HRD with knowledge management practices can help the organizations to combine into their knowledge storehouse the knowledge and skills gained of its employees for redeployment as and when necessary. Moreover, successful regulations, guidance and strategies developed for Human Resource strengthen job satisfaction, belongingness to the Organization, and willingness to share experiences (Stevens et al, 2006). The task of Human Resource Development is made easy by a well managed Knowledge Management system. It acts as a central mechanism that leverages Human Resource Development. It provides an edge to the Human Resource by providing a sound understanding of the environment, organizational, team and individual contexts supporting any Organization.

Training and Development of employees in an Organization has its positive and significant impact on the implementation and success of Knowledge Management processes in a research oriented organization. Previous studies have also advocated the need for a continuous and innovative Training and Development processes in an organization for effective and efficient implementation of Knowledge Management. Training and Development of employees, decision-making involvement, support for personal initiative, and goal communication are four dimensions to Human Resource Development. Training and Development of employees is important because the firm is
not likely to find organization-specific and unique skills while hiring (Lepak and Snell, 1999). Therefore, these skills related to core competence of the organization need to be developed internally. Additionally, employee development helps to shape employee’s behavior and attitudes in such a way as to make them consistent with organizational goals. Decision-making involvement helps foster ongoing commitment from employees, which in turn affects performance (Arthur, 1994, Huselid et al., 1997; Lepak & Snell, 1999). Support for personal initiatives can empower employees. Personal initiatives involve extra role behaviors such as more responsibility taking, working independently, and controlling one’s own work independently. Empowering employees enhances business outcomes (Arthur, 1994; Huselid et al., 1997). The goal of communication is to provide information to a person or the group in a fashion which enables the person or group to integrate the new information into their own tacit knowledge and use it in making decisions. Finally, goal planning, high investment in training and development programs, job enrichment and work design, and other HRD activities have proven effectiveness in augmenting an organization’s core competencies and human capital. The present study took the dimensions of Training and Development of employees, decision making involvement, personal initiative and goal communication as measures of assessing Human Resource Development practice of R&D organization. Also the test statistics (chapter IV) reveal that the role of Workforce Training and Development in an organization is very significant and prominent. So it can be concluded that Workforce Training and Development along with Research and Development in Training and Development process plays a key and dominant role in success of Knowledge Management in research oriented Organization.
6.2.1.3 Cultural Audit process of an R&D Organization and Knowledge Management

Since the organizations today are knowledge-based organizations. They need to continuously update organizational knowledge. These require special skills, performance and commitment from both the employees and management. An organization's knowledge is the central part where its mechanisms, core processes and strategies are rooted. The organizations need to know the kind of knowledge which exists in the organization. Further, knowledge requires classification and 'correlations' with the organizational objectives. This necessitates Employee Training and Development (Greengard (1998), Cohen and Backer (1999), Moffett et al. (2003). Decision making involvement helps foster ongoing commitment from employees, which in turn affects performance (Arthur, 1994, Huselid et al., 1997; Lepak and Snell, 1999).

Today's fast-paced and changing world rewards groups that are flexible and focus on customer needs. Access to new information, ability to respond quickly to diverse portfolio, change, and renew skills can reduce stress and facilitate needed adaptations. Organizations of all kinds—including those establishing their culture for the first time jointly with facilitators as and when need to assess the existing Organizational Culture and plan, shape or change the culture, using tools like electronic surveys and cultural audits, dialog, Future Vision & Strategic plans, Workforce Training and Development, and formation of teams, groups, communities of practice and learning organizational skills (Holowetzki, 2002). Evidently, there is a strong need to review the cultural processes and activities which are happening in an organization.

In most of the organizations, managers are under pressure to reduce costs and improve productivity. In his study, Hill (2006) has given a practitioner's perspective on
some of the challenges of improving workforce productivity and point out to some emerging technical solutions that can be used to support an activity-centric approach to managing work and productivity. Hill has suggested an array of valuable innovative business processes to improve workforce productivity. Such processes are not adequately supported by traditional enterprise applications, which require that these processes be strongly formalized. To enhance innovative processes, companies need an alternative approach that gives business people greater direct influence over process definitions and enables them to weave together essential network services at the time of need. The authors call this the democratization of business processes. The rise of loosely coupled information systems and emergence of online services on the Web have created new expectations about information sharing, new methods of finding and navigating information and interacting with participating services and new ways of establishing trust. These systems are completely decentralized, yet highly interconnected. With the rise of potential capabilities, companies need to redesign and reassemble their business processes in a more flexible way. An activity-centric approach promises the ability to organize artful work productively while preserving user choice over the services employed. Working through the computer network and World Wide Web gives rise to a conducive environment and competent mediums for effectual distributed team work which concentrates on the issues of Knowledge Management (Gundry et al., 1996).

In the implementation and successful working of Knowledge Management process, the role of information systems is very dominant and relevant. The organizational knowledge in the form of procedures, infrastructures and technical and managerial tools is distributed for leveraging information and knowledge inside and across establishments. If
in an organization, the managers become successful to circulate the useful and relevant information among all its employees with the help of information technology process then it become very easy to successfully implement the Knowledge Management processed in that organization. In our analysis, we have shown statistical measures regarding the relationship between information systems and Knowledge Management. The statistics also proves the positive impact of better information systems on knowledge management systems. The propagation of the work into manageable business processes leads to reuse of knowledge and gives a competitive advantage. As we state our hypothesis that cultural audit process plays a very significant role in the determination of implementation of knowledge management, has proved with the help of statistical measures like independent sample t-test and cross-tabulation test statistics. The test statistics (chapter IV) reveals that the role of Culture Audit process is very significant and prominent in the efficient and effective implementation of knowledge management in a research oriented Organization.

6.2.1.4 Intellectual Property Management of an R&D Organization and Knowledge Management

Intellectual Property Management is a key factor for the success of any research Organization. An organization's competitive advantage and its market value are increasingly dependent on its intangible assets, such as the exclusive knowledge embedded in the organization, core competencies, and other unique organizational capabilities (Lawler, 2005). It has become very essential for an organization to have their intellectual property rights on these assets. If organizations are not able to possess these rights, then they will not be able to achieve better competitiveness amongst its competitors. An organization possesses collective knowledge in the form of its
manpower, patents, techniques, blueprints and dealings which constitute the intellectual
capital of the Organization (Duffy, 1999). The accumulated knowledge is very valuable
as it helps in the further growth of the organizations’ combined knowledge (Gibbs, 2003)
assets. From our statistical and theoretical analysis, it has been proved that organization
capable of safeguarding Intellectual Property assets will be able to enjoy advantages in
their knowledge management activities and Intellectual Property management has its
positive and significant impact on the implementation of knowledge management
processes in an Indian R&D Organization.

Considering the theoretical and empirical analysis, it can be concluded that the success of
Knowledge Management is driven by mainly these factors of Organizational Culture; the
Future Vision and Strategic Approach of an Organization in route by Research and
Development in day to day management activities and decision making; Research and
Development in Human Resource Management processes by way of Training and
Development process; Research and Development in the information sharing,
accumulation and internalization processes; knowledge creation and its effective usage
in decision making by Cultural Audit process; and efficient and effective usage of
Intellectual Property Management systems. So if a research oriented Organization
focuses to control these above mentioned factors in their favorable manner then the
Organization be able to apply the Knowledge Management process successfully in their
Organization and also can gain better competitive advantage amongst its competitors.
6.3 Implication of the study

From the results of this study, it emerges that organizations need to develop an Organizational Culture in order to be able to better manage their knowledge resources and repositories. The regression analysis done in chapter IV has proved this point in respect of R&D organizations.

- The implementation and success of Knowledge Management is dependent on the Future Vision and Strategic Approach of an Organization which can be accomplished by R&D in Management Activities like setting up of goal, communication of the goal and regularly monitoring them in respective Organization. The usage of R&D in management activities is frequent in research Organizations.

- It is essential for research oriented organizations to adopt Future Vision and Strategic Approach in harnessing the immense possibilities for renewal of knowledge for organizational effectiveness.

- R&D in Human Resource Management activities is frequent in Research Organizations. Effective training and development of employees in an organization has its positive and significant impact on the implementation and success of knowledge management processes in a research oriented Organization.

- Workforce training and skill development on its own is not effective unless it is coupled with organization specific knowledge of real world experience of desired applications.
• There is extensive usage of IT for managing knowledge resources in the research Organizations. There is frequent sharing of knowledge amongst stakeholders of respective R&D organizations. There is high value of knowledge creation in the research oriented Organizations.

• There is high knowledge protection in the research Organizations.

• The Intellectual Property Management has its positive and significant impact on the implementation of knowledge management processes in an organization.

• The usage of Intellectual Property Management is not much frequent in research organizations. Hence it must be encouraged and made compulsory for every Indian R&D organizations by evolving a system of Intellectual Property Management.

• The role of culture audit process is very significant and prominent in the efficient and effective implementation of knowledge management in a research oriented Organization. The usage of R&D in information management systems is not much frequent in research Organizations which imply that the cultural audit is not regular in those organizations. In the implementation and successful working of knowledge management process, the role of information systems is very dominant and relevant. If in an Organization, the managers become successful to efficiently flow the information with the help of information technology process then it becomes very easy to implement the knowledge management processes in Organization. This activity should be enhanced for the success of knowledge management processes in a research oriented Organization.
• The best-practices, guiding doctrines and policies of the R&D organizations form a basis for the success of knowledge audit.

• Indian R&D Organizations have to develop a true work culture with emphasis on setting of an organizational goal, plan training of employees in organization specific topics, harvesting its Intellectual assets and carrying out the culture audit process to refresh the organizational knowledge.

Thus the Organization which builds a knowledge culture by defining their Future Vision & Strategic Approach, having goals for Cultural Competence at all levels, be it individual level, Program level, or Organizational level, conducts Training of the workforce as per the results of cultural and knowledge audit carried out and harvests its Intellectual Property, gains competitive advantage through implementation of knowledge management.

6.4 Benefits of the study

The accomplishment of Knowledge Management in the Indian R&D Organizations would extend benefits to several R&D organizations in terms of knowledge benefits, intermediate benefits, Organizational benefits, and National benefit.

The knowledge benefits include being able to retrieve best and latest thinking, faster access to knowledge, better knowledge sharing, skill development, training, knowing who's doing what within the Organization and uniformity of job product across the departments of the Organizations. The information and knowledge created as outcome of using improved and well-organized processes through Knowledge Management can help in decision making in R&D Organizations. Improvements and efficiency of organizational processes can be possible through saving time and manpower utilized for
searching for documents, doing away with many non-value-adding steps in the processes and adding to the efficiency of employees occupied in specific tasks.

There are also several intermediate benefits from the findings of the present study. These are leveraging new information, knowledge, and processes for organizational learning of work, product designs, reuse of these and consumer preferences. Faster problem-solving, quicker new hires, and minimizing duplication of work and preempting the need to re-invent the already invented processes are among the intermediate benefits which will enable the organizations to achieve greater competency, proficiency and effectiveness. The organizational benefits include improved and rapid innovation and new product development, better user focus and satisfaction, reduced information failure, and enhanced output and superior performance.

The above listed benefits will impact the way an Organization strives to achieve its objectives, many of which are of national importance for example, improvement in the quality of education, development of research schemes and programmes, to bring about the good of the society. In a persistently budding and cutthroat competitive environment, Organizations must incessantly progress in the area of creating pioneering products and service that would meet the continuously growing needs and requirements of their patrons. For the success of any Organization, big or small, investment from customers is the only way ahead.

The findings of the study could help Indian R&D Organizations assess the likelihood that whether the Knowledge Management plans will be successful to increase the Organization’s competitive advantage in relationship to the current Organizational Culture.
The implementation of successful knowledge management in individual Indian R&D organizations and establishment of linkages of knowledge management base among all the Indian R&D organizations would lead to a creation of a National Technology Base (Sahoo, 2008). This will benefit decision making in respect of future R&D ventures by keeping track of the available know-how in the country through this National Technology Base vis-a-vis expertise and infrastructure required for the project. This way the available National Technology resources can be exploited and extra work of reinvention of wheel can be avoided.

6.5 Suggestions for future study

Based on the results of this study, the following suggestions for further research are proposed:

• The sample consisted of the respondents who were Scientists and Technical Officers in R&D Organizations who provided their perspectives on the Knowledge Management Implementation process in their respective R&D organizations. Hence the results cannot be generalized to all the employee segments of the R&D organizations. Future research should also be directed to lower levels of hierarchy within R&D organizations to include their perceptions and views.

• This study also did not do any impact analysis of different types of Organizational Cultures. This opens up another area of research for future where more than one Organizational Cultures can be studied and their impact analysed on the Knowledge Management Implementation process in the R&D Organizations.
• This study did not identify any elements of Organizational Culture which act as barriers for the Knowledge Management implementation in R&D organization. In future research this also may be included in the sample. This study did not investigate differences between the measured variables with respect to respondent's demographic characteristics. There may be variations in the subjects with different demographic characteristics leading to different responses and behaviour. Further analysis of measured variables with respect to characteristics such as age and regions is recommended.

• The study showed that majority of the respondents has adopted various levels of knowledge management. This provides an opportunity to investigate the different experiences of the R&D organization with different knowledge management solutions and do a comparative analysis with respect to the effectiveness of knowledge management adoption.

• Training as shown in the study requires more focus and intervention on the quality aspect. It affords an opportunity for the researchers to evaluate other non formal methods that contribute to training amongst the employees to capture the tacit wisdom.

• The change management in the Organizational Culture required for the Knowledge Management implementation in R&D Organization has been excluded from the study and can form a basis for further research about the migration process and how to mitigate the pains associated with it.
Further research may be conducted to study whether a centralised structure for Knowledge Management implementation is better.