Chapter Six

CONCLUDING REMARKS

In this chapter,

6.1 Contributions of this Research
6.2 Limitations of the Work
6.3 The Road Ahead
Knowing is not enough; we must apply.
Willing is not enough; we must do.
Anonymous

6.1 Contributions of this Research

The goal of this research has been to develop methodologies for KM from system perspective and underlying objective has been to identify the approaches for KM for business & educational domains. The system approach that was adopted in this thesis is a holistic view instead of adopting a mechanistic view of the problem. This emphasizes on the analysis of various building blocks and aspects of the system, and its sub-systems. A system approach makes possible identification of problem issues in a clear and comprehensive manner (like how KM can be helpful in achieving competitive advantage?), by considering tasks carried by various stakeholders of the system (like how to codify knowledge of processes carried by various people in an organization?) and interaction & inter-dependence between them.

We have been motivated by the statement- “Things good for the life are simple”. So, the objective was also to develop KM methodologies, which are simple, easy to use and understandable to facilitate KM. As need for KM is utmost required for an individual, an organization, a society and hence for the nation for competitive advantage.

Various factors affect economical competitiveness of the country and knowledge centric activities have major share in this effect. At the first stage, KM is needed for sustainable competitive advantage and we have established this with the help of Porter’s Five Forces Model [Porter, 1979] and a case of academia.

After establishing the need of KM for sustainable competitive advantage, there was an issue to identify what knowledge is to manage and where it is located in a system (or in an organization). Knowledge layers and dimensions in context of a typical organization are identified before exploration of KM
methodologies available. Then after exploration and critical analysis we proposed our KM processes to achieve KM in an organization.

Major research challenges in this work were on establishing knowledge maps as one of the methodologies for KM. Taxonomy and development model of knowledge maps has been created. Contribution is being done by suggesting innovative use of SSAD tools as knowledge maps for codifying system & process knowledge. Also, a new knowledge map for codifying dynamic knowledge has been devised. Description of contributions made, in short, has been described in the next section, chapter wise.

This section describes the ideas developed in this research, which are believed to contribute for KM from system perspective. The contributions derived in the thesis, are new and we do not find them in exhaustive survey of literature made by us, as far as to the bets of our knowledge. The contributions can be thought of methodologies for better codifying of knowledge with the effective use of knowledge maps with system perspective.

In this century, where knowledge creation, sharing and management are the challenging task for the technocrats, ICT based KM is one of the strategies for achieving sustainable competitive advantage in an organization.

In a dynamic environment, knowledge resides everywhere. Knowledge resides in products, people, processes, customers, suppliers and in all stakeholders. Solution of a problem becomes easy, when problem is known and properly defined. Hence, before knowing what we know, we must know where it will be found. Then the challenge of managing of knowledge reduces as knowledge scattered in the organization is identified. Knowledge scattered throughout the organization resides in knowledge layers. Knowledge layers can be identified within the system boundaries and between organizational system and surroundings.

Knowledge being multidimensional has several forms. These forms are called knowledge dimension, each form of knowledge may reside in several knowledge layers in the organizational system.
From the system perspective, we derived the definition of KM as- “KM is a systematic approach by developing various methodologies and technologies with the objective to make knowledge artifacts, which are located in knowledge layers of the organization, explicit and sharable.” By keeping the point of knowledge processes, definition of KM is devised as- “KM is a systematic approach for managing knowledge processes by developing methodologies and applying technologies with the objective to make knowledge artifacts, which are located in knowledge layers of the organization, explicit and sharable.” Knowledge creation, capturing & codification, transfer and use/ reuse are termed as KM processes. KM processes can be managed by various methodologies and technologies.

The process of codification of knowledge through cartographic approach uses knowledge maps as one of the methodology. From system approach knowledge map can be defined as- Knowledge map is a knowledge management method, for codifying knowledge in knowledge layers for all functional areas of an organization, people expertise and assets. Knowledge maps can be categorized on the basis of root domain, form, knowledge layers and knowledge dimensions. Codification of knowledge through knowledge map being an important KM method must be given formal treatment. B-C Model is an iterative model owing to continuous evolving spiral nature of knowledge.

To start work with, or before starting contribution, one has to understand and know the system. In fact knowing the structure of system is the first stage to know about the system features, processes and behavior. There are several approaches to represent system knowledge such as textual, pictorial and diagrammatic. Diagrammatic approach of knowledge representation is one of the powerful ways to codify the knowledge. Knowledge maps have some characteristics like, knowledge maps must be abstract, shared & understood easily, repeatable, meaningful, and modifiable with the ability to be validated and to be automated easily. Diagrams like DFD and Structure Chart, being used in SSAD, have potential to be used as knowledge map. On the basis of
required characteristics for knowledge maps DFD and Structure Chart can be used as knowledge map. Context Diagram (Level 0 DFD) can be used very easily for codifying system knowledge. Also, being established tool of SSAD, Context Diagram fits into the characteristics of knowledge map. People, technology and processes are the major components of an organization, by which they perform the business. Another SSAD tool, Structure Chart, which is used by software designers to represent modules of the system, can be used as a process knowledge map. Structure Chart can be called as the process knowledge map, for capturing process knowledge along with the hierarchical representation of process execution. Apart from codifying knowledge “what to do?” Structure Chart also codifies knowledge “how to do?”.

System and process knowledge map works at the top level, which shows “what the system has?” or “how to do”/ “what to do?”. However, complete understanding can come only when all the ideas and concepts related to the domain and terminology used are explained. Knowledge of all these concepts and ideas can be represented with the help of Concept Maps. Organizational framework of knowledge maps from system perspective is having two layers. In this layered framework, Concept Maps reside at bottom level and system knowledge maps and process knowledge maps are at top level (execution level). With the use of layered arrangement, access to knowledge maps can be restricted or controlled as per the policy of an organization. Concept Maps do not have any feature to represent dynamic knowledge (in which decision must be taken according to the situation). Decision Tree based Hybrid Concept Map can be used to capture dynamic knowledge.

In nutshell, we derive the following conclusion points:

- ICT based KM is one of the strategies to compete with competitive forces for sustainable competitive advantage.
- Knowledge has several dimensions and knowledge resides in various layers in the organization.
- KM can be achieved by managing knowledge processes.
• Knowledge maps can be one of the methodologies for KM process codification from system perspective.

• Knowledge map can have several types on the basis of root domain, form, knowledge dimension and knowledge layer.

• B-C Model suggests systematic and formal approach for knowledge map development.

• Context Diagram (Level 0 DFD) and Structure Chart are simple, easy to use and sharable knowledge maps for coding system and process knowledge respectively.

• In organizations, knowledge map framework exists in layers.

• Hybrid Concept Map is a new map that codifies static and dynamic knowledge both.

6.2 Limitations of the Work

Our research certainly has got limitations, as there is no innovation that is complete. Here, we summarize the limitations of our work:

• We suggested that ICT based KM as one of the strategies for competitive advantage; however, success of KM highly depends on organizational culture and technological preparedness. Contribution of these factors must be considered while suggesting KM as strategy for new contexts.

• Knowledge layers and knowledge dimensions suggested by us are theoretical model. There is a possibility to have some more knowledge layers or knowledge sub-layers and knowledge dimensions depending on business domain. Quantification of knowledge dimensions has not been carried out.

• Taxonomy of knowledge maps done on four factors, however knowledge maps may be categorized in some more factors like Computable/ non-computable, solvable/ resolvable, etc.
• Correct development of system & process knowledge maps (knowledge codification) requires perfection in expert knowledge capturing, while we have assumed approximations.

• Creating DFD and Structure Chart on paper is a little bit complicated as for bigger processes; size may exceed normal paper size. Hence, dedicated software shall be required for some processes.

• Being qualitative research, this work does not focus on mathematical formulation of the solutions suggested.

• Knowledge maps have been discussed, explored and developed only on process knowledge layer.

6.3 The Road Ahead

Our work opens several new research issues. On the basis of contributions made by us, future research can be carried out on the following issues (but not limited to):

1. Impact of organizational culture and technological preparedness of an organization, on success of KM as a strategy for sustainable competitive advantage may be evaluated.

2. We have focused only on developing methodology for codification process of KM. Also, in this methodology we focused only on knowledge maps of cartographic approach. Further investigations can be made on using this approach for other KM processes.

3. Mathematical model and algorithms on the basis of B-C Model can be developed which shall lead to an automated system. This can be enhanced with software engineering methodologies.

4. There is a possibility to develop an algorithm for the development of Context Diagram, Structure Chart and Hybrid Concept Map to facilitate development of automated system.
5. Some more knowledge maps may be explored and developed for other knowledge layers and dimensions like product knowledge layer, people knowledge layer etc. On the broader sense, there is a huge potential to explore cartographic approaches on other KM process like knowledge creation, sharing and transfer.