CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

After Japanese products invaded the global market, the human race began to adopt quality as a weapon to face competition. This marked the beginning of quality era which occurred during 1950’s. During quality era, a number of tools, techniques and approaches on achieving higher degree of quality in products and services emerged (Tari 2005). This marked the emergence ‘Total Quality Management’ (TQM) field. The human race began to address all the tools, techniques and approaches hitherto adopted to achieve higher degrees of quality under the umbrella name TQM (Bounds et al 1994; Martinez-Lorente et al 1998). This marked the beginning of TQM era which occurred during 1980s.

Although the TQM era is still sustaining, the knowledge era has started to overshadow on it during the last two decades (Call 2005; Galliers and Newell 2003). Though knowledge had been a treasure for which the humankind had been questing from ancient days, its adoptability has been very dynamic and fast only during the past one decade. This is due to the reason that during the recent years, the world has been nourishing the advancements occurring in the field of Information Technology (IT). Currently majority of the societies throughout the globe have been installing IT infrastructure such as internet, intranet, electronic data interchange and e-commerce (Tan et al 2003). Thanks to this development, knowledge era has
been brought to the forefront. Hence the modern organizations have started to concentrate on knowledge development rather than practicing routine activities.

It is a pleasant phenomenon that thanks to the proliferation of IT infrastructure, knowledge explosion has been occurring in the modern world. However, knowledge alone cannot act as a powerful mechanism to faster the development of human race. Rather the human race is required to manage knowledge by utilizing the competitive strategies (Lin and Wu 2005; Chen et al 2007). In other words, the principles of Knowledge Management (KM) shall have to be integrated with appropriate competitive strategies for achieving competitiveness and core competencies. In this context, the research work reported in this thesis was carried out. In this research work, KM principles were integrated with two techniques namely Quality Circle (QC) and Total Failure Mode Effects Analysis (FMEA). Besides, KM principles were applied on ISO 9001:2000 standard which has been facilitating the majority of the world’s modern organizations to install quality systems. As a result of these efforts, three new knowledge managed continuous quality improvement models were evolved during this research.

1.2 PROBLEM DEFINITION

The emanation of TQM field resulted in the evolution of a number of revolutionary techniques and models. Among all, the QC technique brought out significant change in the practice of achieving high degree of quality by envisaging the participation of all levels of employees in continuous quality improvement programme. In line to this development, the TQM field witnessed the employment of the technique called FMEA to facilitate an organization to achieve continuous quality improvement through prevention of failures. Meanwhile researchers started to contribute modified
FMEA models. One among them is Total Failure Mode Effects Analysis (TFMEA). This technique spontaneously involves all the functions and personnel to work as a team to prevent the recurrence of failures.

During the past three decades, the TQM field has been witnessing massive ISO 9000 certifications. Particularly, the recent ISO 9001:2000 standard is adopted by majority of the organizations in the world to implement process based quality system in the organizations. Yet, these kinds of development are found to be inadequate to face the global competitive forces in today’s knowledge intensive era. Evolution of IT has been bringing out enormous knowledge which makes human race to choose the best out of them (Tseng 2007).

In order to exploit knowledge explosion, during the past two decades, the field of KM has been growing intensively (Despres and Chauvel 1999). In this race, it becomes imperative to integrate KM principles with QC, TFMEA and ISO 9001:2000 standard. This effort will bring out synergic power of these three continuous quality improvement enablers so that the modern organizations achieve core competencies which are required to compete in today’s globally competitive market. However no models that integrate KM with QC, TFMEA and ISO 9001:2000 standard are available in both research and practice arenas so as to enable the modern organizations to achieve competitiveness.

1.3 OBJECTIVES OF THE RESEARCH

As hinted in the previous sections, the primary objective of this research was to integrate KM principles with QC, TFMEA and ISO 9001:2000 standard to bring out their synergic powers for enabling the modern organizations achieve competitiveness. During this research, this primary objective was achieved by setting the following secondary objectives.
i) To study the fundamental and advanced principles of KM.
ii) To study the theory and practice of QC technique.
iii) To design a model integrating KM principles with QC.
iv) To study the practical implications of the model integrating KM principles with QC.
v) To study the theory and practice of TFMEA technique.
vi) To design a model integrating KM principles with TFMEA.
vii) To study the practical implications of the model integrating KM principles with TFMEA.
ix) To design a model integrating KM principles with ISO 9001:2000 standard.
x) To study the practical implications of the model integrating KM principles with ISO 9001:2000 standard.

The above secondary objectives can be grouped under four categories. In the first category, studying the principles of KM was the core objective. In the second category, developing a model integrating KM principles with QC was a major objective. In the third category developing a model integrating KM principles with TFMEA was a major objective. In the fourth category, developing a model integrating KM principles with ISO 9001:2000 standard was a major objective.

1.4 RESEARCH METHODOLOGY

The research reported in this thesis was carried out by following the methodology shown in Figure 1.1. As shown, this research work began by studying the principles of KM. In order to assess the trend of applying KM, the literature was surveyed in the databases such as emeraldinsight (address:www.emeraldinsight.com) and sciencedirect
This preliminary work enabled the author of this thesis to grasp the fundamental principles of KM.

![Research methodology diagram]

**Figure 1.1 Research methodology**
During the preliminary stage of work, two major KM principles were grasped. One principle is that the processing of data results in information, which on applying intelligence results in knowledge (Greiner et al 2007). The second principle is that KM involves the creation and sharing of knowledge in organizations (Hicks et al 2006). These two principles were applied in the subsequent stages of this research. These stages proceeded in three parallel directions.

In the first direction, the KM principles were appended with QC concept. This marked the design of a KM integrated QC model. In the second direction KM principles were integrated with TFMEA technique. This resulted in the design of KM integrated TFMEA model. Both these models were subjected to implementation study in a compressor manufacturing company.

In the third direction, KM principles were appended with ISO 9001:2000 standard which is addressed in this thesis as Knowledge Managed ISO 9001:2000 based Quality System. This model was subjected to implementation study in a public sector company located in India.

The hallmark of KM projects is the development of KM portal (Lindvall et al 2003). Hence, development of portals formed a major scope of this research work. In fact, three portals for the three models were developed during this research work.

The implementation studies of the three models indicated their practical compatibility. Yet, it was discernable that the industrial sectors in the world are required to carry out preparative activities for ensuring the successful implementation and nourishment of the authentic benefits of the three models. Hence the experiences gained during the conduct of the
implementation studies were utilized to evolve roadmaps for successfully implementing the three models.

The author of this thesis developed an impression that both researchers and practitioners have to go a long way in making the three models fully operational in industrial scenario. Hence this research ended by suggesting the future imperatives to be fulfilled through the joint working of researchers and practitioners.

1.5 CHAPTER ORGANISATION

The organization of this thesis is pictorially depicted in Figure 1.2.

Figure 1.2 Chapter organisation
As shown, this thesis is organized in seven chapters. Followed by the introduction chapter, the literature surveyed throughout this research work is presented in chapter 2. In this chapter, the origin, growth and trend of application of KM principles, QC concept, TFMEA technique and ISO 9001 certification are appraised by citing the peer reviewed articles appeared in reputed international journals.

Followed by that, the Knowledge Managed QC, TFMEA and ISO 9001:2000 models are presented in chapters 3, 4 and 5 respectively. The results of conducting this research are appraised and discussed in chapter 6. The implementation procedures for successfully implementing the three models developed during this research formed the core portion of this chapter.

The thesis is concluded in chapter 7 in which the contributions of this research are appraised and the vast scope to proceed further in the direction of this research is cited.

1.6 CONCLUSION

During the recent years, the human race is currently witnessing the integration of IT in KM models (Dove 1999; Mohamed et al 2006; Ngai et al 2008). This has created a situation that, the knowledge is available in plenty and extractable from numerous sources and hence managing it is increasingly becoming a challenge. Meanwhile quality continues to be a weapon in the world to face the global competition. Hence both researchers and practitioners of today are required to integrate KM with the powerful techniques and models adopted to achieve continuous quality improvement. The research being reported in this thesis was pursued to contribute in this direction. The rudimentary features of this research and the presentation aspects of this thesis have been described in this introduction chapter. The subsequent chapters of this thesis elaborately present the research work.