ABSTRACT

The research reported in this thesis has linked two major developments that the world has been witnessing from the end of twentieth century. One of the developments is the rampant quest for obtaining ISO 9001:2000 certification by the organisations throughout the world. Another development is the extension of the boundaries of organisations in the form of including larger number of suppliers. As a result, during the recent period, management of the suppliers is increasingly discussed under the terminology supply chain management (SCM). Today it is very difficult to see any congregation that assembles to discuss the competitive strategies dispersing without discussing about ISO 9001:2000 certification and SCM. Despite these developments, the fruitfulness of ISO 9001:2000 certification is not adequately nourished along the supply chains. This is due to the reason that ISO 9001:2000 standard does not adequately cover the SCM aspects of the organisation. Although the term 'supplier' is addressed in ISO 9001:2000 standard, it is not sufficient to create a virtual organisation with a close integration of supply chain networks. In order to overcome this deficient state, a model named ISO 9001:2000 based supply chain quality management system (ISO-SCQMS) has been evolved in the research reported in this thesis.

ISO-SCQMS was designed by integrating SCM constructs with the ISO 9001:2000 standard. During this research, these SCM clusters were identified from the researches reported in the literature. These SCM constructs were subsequently grouped into clusters. These clusters and constructs of SCM were analysed carefully to study the suitability of their incorporation into the appropriate clauses of the ISO 9001:2000 standard. It was found out that some of the SCM clusters and constructs would not fit into the existing clauses of the ISO 9001:2000 standard. Hence, thirteen new

sub-clauses were required to be added into ISO 9001:2000 standard to incorporate these SCM clusters and constructs.

After designing ISO-SCQMS, it was subjected to implementation studies in two typical Indian ISO 9001:2000 certified companies by names MIL control Limited (hereafter refereed as MIL) and Vajra Rubber Products Limited (hereafter referred as VRPL). The implementation studies in both MIL and VRPL were begun by studying the ISO 9001:2000 based documentation adopted by them. This was a tough task as the style of documentation widely varied in these two companies. This aspect made the implementation studies different from one another. In both implementations studies, the elements of documentation were carefully studied and wherever possible, the stipulations of ISO-SCQMS were integrated into them. In continuation with this exercise, stipulations of the new sub-clauses of ISO-SCQMS were also included. Though the nature of elements of documentation varied in both companies, there were nodes which enabled the integration of the stipulations of ISO-SCQMS with that of ISO 9001:2000 standard based quality management system (QMS). Thus the integration of the requirements of ISO-SCQMS were carried out without facing any major difficulty in the documents of ISO 9001:2000 standard based QMS available in both companies.

After conducting implementation studies on ISO-SCCQMS, a decision support system (DSS) by name DES-SCHAIQS (stands for Decision support system for Supply CHAin Quality management System) was designed. DES-SCHAIQS was developed as a data-driven system where the requirements of the supply chain quality management system (SCQMS) contained in the sub-clauses of ISO-SCQMS were converted into questions and stored in database. Weights were given to each question based on the importance of and difficulty in implementing these requirements. On behalf

of Management Representatives (MRs), the author of this thesis responded to these questions. These responses were also stored by DES-SCHAIQS in its database. Subsequently the report was generated by DES-SCHAIQS which indicated the percentage adoption of the requirements specified in the five major clauses of ISO-SCQMS.

The experience of pursuing the research being reported in this thesis indicated that the constructs of SCM as identified and validated by researchers could be used for designing effective and efficient SCQMS. This task can be made practically viable through the implementation of ISO-SCQMS which would serve as the model for integrating these SCM constructs with the widely installed ISO 9001:2000 based QMS in the organisations. Furthermore by using DES-SCHAIQS, the assessment of the ingredients of ISO-SCQMS in both MIL and VRPL was carried out before and after the anticipated implementation of ISO-SCQMS. In both cases, the pre-implementation assessments helped in bringing forward the deficiencies in the existing ISO 9001:2000 based QMS. The post implementation assessments were useful in arriving at the effectiveness of the implementations of ISO-SCQMS. Both pre-assessment and post-assessment studies in both companies were conducted successfully and efficiently using DES-SCHAIQS.

While concluding the research, it has been suggested that future researchers may work by keeping DES-SCHAIQS as the foundation and add additional features like pictorial displays and suggestions for improvement. Furthermore, future researchers may use DES-SCHAIQS as the tool for aiding the successful implementation of ISO-SCQMS. The thesis is concluded by stating that the use of DES-SCHAIQS in several ISO-SCQMS implementation projects will reveal the potential areas for improving the performance and features of DES-SCHAIQS as well as that of ISO-SCQMS.