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Rajiv Kumar Sharma

Quality Management Practices in MSME Sectors

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Preface

According to the Ministry of MSMEs (India), 95% of industries are working in small-scale sector with 40% value addition in the manufacturing sector and 8% contribution to the gross domestic product (GDP). After agriculture sector, micro small and medium enterprise (MSME) sector is the second largest employer as it provides employment to an estimated 117 million people spread over 51 million enterprises (Reserve Bank of India, 2017) report. The MSMEs produce more than 8000 different products ranging from the conventional products to complicated products (in terms of high-technology intensive products). It is estimated that in terms of value, the sector accounts for 45% of the manufacturing output and 40% of the total export (Ministry of MSME's, 2017). From the current economic forecast, it is inferred that Indian economy is growing at an average of 7% per annum and is likely to become a $5 trillion economy by the year 2025. Hence, the growth of the MSMEs sector becomes indispensable as it is regarded as the backbone of India. India has all resources and possesses the necessary skills, but it still lags far behind developed nations. The foremost challenge for MSMEs is to offer novel and custom-made products using the best technology.

Over the last three decades, MSME sector has emerged as a highly vibrant and dynamic sector of the Indian economy. This sector accounts for a significant proportion of industrial enterprises, employment, national income and export in developed as well as in developing countries. Quality has been widely recognized as one of the most important discipline/strategies or competitive priority for an organizational development by the business houses. Quality Management (QM) practices have been widely used by large business houses such as Hero, Tata Motors, Maruti Suzuki, Motorola, Ford and Honda, IOCL etc, for competitive positioning but their adoption and practices in MSME's sector are not adequate, which calls for necessary attention by the researchers in this field. There is no doubt that Indian MSMEs are passing through a transitional period of high-market competition with escalating demands of consumers for getting better product and service. For the survival of MSMEs in this ever-expanding marketplace and to achieve customer satisfaction and improvement in productivity, the emergence of quality plays a vital role. Taking note of this, some MSMEs have begun to adopt QM practices as an approach to fulfill these objectives. However, there is a strong need to understand the importance of these

practices for MSMEs, so as they can improve their current business climate through improved quality of product and service, and ensure their long-term survival. Therefore, this study has multiple objectives of investigating the relationship between quality management practices and competitive positioning in MSMEs. The present study covered MSMEs in Himachal Pradesh, India.

The significance of quality for company's performance is widely established in business literature and company practices. In order to improve business performance and achieve competitiveness, numerous approaches have been pursued in literature, most remarkably and suggested approach is the concept of quality management, which has its roots since early 1900s, i.e., preindustrial revolution. In recent times, total quality management (TQM) has been a burning topic in business literature. It is a holistic approach that seeks managing quality; it required the development of quality approach and a frame or structure for its successful implementation. It augments the conventional way of doing a business based on the principle of a continual improvement of the organizational practices. More specifically, it is the application of sound management principles, quantitative methods, and management of human resources to develop all the process within an organization and meet customer requirements. It has been widely acknowledged as an essential management practice, which can play a key role in making companies to become more competitive in global economy. To succeed in business companies shall adopt quality management practices as a source of major organizational change that requires a change in the organizational culture, processes, and strategies or priorities.

In the light of this situation and global competitiveness, there is need for a deeper investigation of relationship between QM practices and MSMEs performance. It is to fill this gap, the present volume embodies a humble effort to convey such a holistic and comprehensive view of quality to acquaint the readers with the following topics of importance in form of book chapters

- Significance and importance of adopting of quality management practices among MSMEs.
- Collection of useful data pertaining to awareness regarding quality management.
- Categorizing ISO certified MSMEs on the basis of pollution control board norms.
- Assessment of the willingness of SMEs to develop their systems of quality and enhance their level of quality standards such as ISO 9000 in various MSME sectors.
- Showcase the applicability of various quality tools in MSMEs and stages in company where quality management practices are applied.
- To develop a measure based on Porter's Diamond model indicators for competitive positioning in MSMEs.
- Two case studies to summarize the benefits obtained from implementing various quality practices in SMEs.

The present volume is not intended to be a textbook on Quality or Quality Management. It is meant to express an extensive understanding of Quality system prevailing in different MSME sectors.

Chapter 1 presents the introduction to Indian micro small and medium enterprises (MSMEs), importance of quality in business processes, brief account of history of evolution of quality management, statistics required for quality management, data collection and measurement scales, measures of central tendency and summary of literature studies. Chapter 2 of the book provides the extensive discussion on tools and techniques used for the introduction of quality management practices. Chapter 3 introduces the overall research design and methodology adopted along with the design of survey instrument. Chapter 4 details the need for introducing quality management practices. Chapter 5 presents the discussion to the nature of quality management tools applied in MSMEs, stages where they applied and year of adoption of these quality practices in MSMEs. Chapter 6 presents the application of Porter's diamond model variables for assessing competitiveness among various MSME sectors. Chapter 7 evaluates the company's experience after implementing quality management practices, Chapter 8 details the analysis related to various critical success factors, which can help MSMEs in adoption of quality practices. Chapter 9 presents the comparative analysis of competitive positioning among MSME sectors.

The materials presented are mostly reflections of the author's own realizations and writings, though some materials contained in some books or reports or documents have also been used with due reference. The book also enlightens the readers with two case studies related to quality management practices.

Hamirpur, India Rajiv Kumar Sharma

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Dr. Rajiv Kumar Sharma is presently working as an Associate Professor and has also served as the Head of Department of Mechanical Engineering NIT Hamirpur (H.P). He obtained his B.Tech. (Hons) from SLIET Longowal (CFTI), Punjab, M.Tech. (Hons) in Industrial and Production Engineering with Gold Medal from Thapar University Patiala and doctoral degree (Ph.D.) from Indian Institute of Technology; IIT Roorkee-247667.

Till so far he has guided 05 Ph.D. theses, 25 M.Tech. Thesis and more than 50 UG projects in various areas of engineering. He has research and teaching experience of more than 15 years and about 100 publications in international journals of repute. He is also on Editorial Board of many reputed journals such as International Journal of Quality and Reliability Management, TQM Journal, Emerald Publishers; International Journal of Strategic Business Alliance, Inderscience Publishers, Advances in Production Engineering & Management, Production Engineering Institute (PEI), University of Maribor, Maribor, Slovenia European Union (EU). He has completed sponsored research projects from UGC and DST. His research interests include Supply chain and Logistics, Flexible manufacturing systems, statistical quality control, system reliability and maintenance, quality engineering, six sigma, lean manufacturing and Industry 4.0.

Chapter 1
Quality Management and MSMEs

Highlights

- *Micro, small and medium enterprises (MSMEs) are regarded as "life blood of modern economies" as one of the main dynamic forces of economic development, which stimulates private ownership and entrepreneurial skills.*
- *According to the Ministry of Small and Medium Enterprises, India, 95% of industrial units are in small-scale sector with 40% value addition in the manufacturing sector and 8% contribution to the Indian gross domestic product (GDP).*
- *Indian MSMEs are passing through a transitional period of high market competition with increasing demands of customers for getting improved product and service.*
- *For the survival of MSMEs in this ever-expanding marketplace, customer satisfaction, enhancement in productivity, changing organizational culture and globalization of world trade, the implementation and practice of quality management plays fundamental role in their competitive positioning.*
- *The chapter presents details to*
  - *Importance of MSMEs in Indian economy, their classification and importance of quality.*
  - *Evolution of quality management.*
  - *Statistics for quality management.*
  - *Summary of literature studies.*

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1.1 Introduction

Considered to be the *"life blood of modern economies"* and regarded as "*one of the main driving forces"* of economic development, MSMEs hold opposing views from large business houses in various aspects such as management style, production operations, capital availability, purchase and procurement procedures, inventory and quality control systems, and negotiating power. MSMEs are quite flexible and can adjust quickly to varying market demand conditions and supply situations. They generate employment opportunities and make noteworthy contribution to exports and foreign trade stimulating private ownership and entrepreneurial skills to a great extent. The accomplishments of large organizations in producing or improving the quality of products or services mostly depend on the quality of products or components supplied to them by the supplier firms. Usually, the component suppliers are small- and medium-sized business organizations. Therefore, MSMEs face substantial pressure to achieve ISO 9000 quality management certification, a widely known and popular quality system certification standard.

The foremost challenge for MSMEs is to offer novel and custom-made products using the best technology. For success in businesses, MSMEs in all sectors must build up effective strategies in terms of cost, quality and services at shortest possible time (Porter 1990) to provide better values to the customers. There is no doubt that MSMEs have made noteworthy contribution toward technical and scientific growth, with increase in export potential. Various key sectors such as food and beverage processing, agriculture, engineering, electrical, electronics, electromedical equipment, textiles and garments, chemicals and pharmaceuticals, processed food, textiles, information technology, gems and jewelry, chemicals, ayurvedic products, leather and leather goods have recognized their domestic as well as global presence.

1.2 MSMEs Classification

MSMEs sector has come into sight as a highly energetic and self-motivated sector of the Indian economy over the last three decades. According to Ministry of MSMEs (India), 95% of industries are working in small-scale sector with 40% value addition in the manufacturing sector and 8% contribution to the gross domestic product (GDP). After agriculture sector, MSME sector is the second-largest employer as it provides employment to an estimated 117 million persons spread over 51 million enterprises (Reserve Bank of India 2017 report). The MSMEs produce more than 8000 different products ranging from the conventional products to complicated products (in terms of high-technology intensive products). It is estimated that in terms of value, the sector accounts for 45% of the manufacturing output and 40% of the total export (Ministry of MSME's 2017). From the current economic forecast, it is inferred that Indian economy is growing at an average of 7% per annum and is likely to become a $5 trillion economy by the year 2025. Hence, the growth of the MSMEs sector becomes

Table 1.1 MSMEs classification[a]

Classification	Description
Micro enterprise	The investment in Plant and Machinery or Equipment does not exceed 1 crore rupees and turnover does not exceed 5 crore rupees
Small enterprise	The investment in Plant and Machinery or Equipment does not exceed 10 crore rupees and turnover does not exceed 50 crore rupees
Medium enterprise	The investment in Plant and Machinery or Equipment does not exceed 50 crore rupees and turnover does not exceed 250 crore rupees

[a]*Source* https://www.msme.gov.in

indispensable as it is regarded as the backbone of India. India has all resources and possesses necessary skills, but it still lags far behind developed nations.

According to MSMEs Development Act 2006 (Ministry of Small and Medium Enterprises, India), the enterprises are categorized based on ceiling for plant, machinery or equipments. The details are presented in Table 1.1. MSMEs are complementary to large industries as subsidiary units, which contribute enormously to the socioeconomic growth of the country. In the last two decades, MSMEs working in different sectors have successfully set up activities outside their domestic markets and today to cope up with increased global economic competition they are functioning as an economic growth engine with increased employment opportunities.

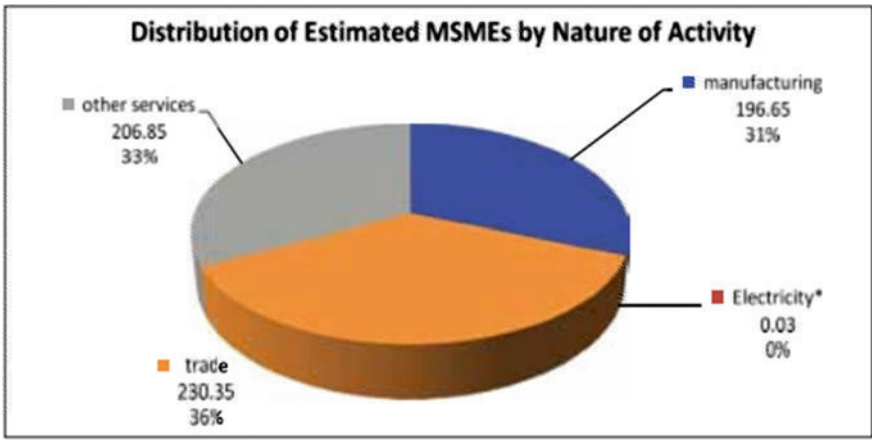
Various nations in developing countries have recognized the worth of MSME enterprises, which are seen as the engine of the economic growth, but still they face numerous challenges such dearth of finance, unavailability of specialized talent, requirement of modern technologies, etc. In present market circumstances, in which customer wants better product and service with lower price, organizational culture and quality play very important role for the continued existence of MSMEs. The companies with technology advantage and labor-intensive production capabilities are usually attending high overall performance. According to Khanna et al. (2011), Bhaumik et al. (2015), Indian manufacturing organizations are in urgent need of new strategies, approaches and techniques for meeting their competitive talent. However, in spite of good projections, the Indian MSMEs are facing notable barriers such as deficiency of timely credits, sourcing of raw materials at viable price, insufficient infrastructure amenities as well as power, water and road, and lack of experienced manpower for carrying out activities related to manufacturing and services, etc. (Mukherjee 2018). Firms usually face the challenges of accomplishing performance (market capitalization), and globalization (international intensity) to fight efficiently against global business giants. Several firms are trying hard not only to satisfy their customer's needs but also where feasible go beyond to meet them. This is possible through cost cutback, enhancement in product performance, improved customer satisfaction and steady efforts toward world class businesses. In order for businesses to stay alive and grow up in the future, it is crucial that they deliver high-quality goods and services. Those who inculcate quality are the ones who will flourish in the coming century.

As per the National Sample Survey (NSS) 73rd round, conducted by National Sample Survey Office, Ministry of Statistics and Programme Implementation during the period 2015–16, there were 633.88 lakhs unincorporated nonagriculture MSMEs in the country engaged in different economic activities (196.65 lakh in Manufacturing, 0.03 lakh in Non-captive Electricity Generation and Transmission, 230.35 lakh in Trade and 206.85 lakh in Other Services) excluding those MSMEs registered under (a) Sections 2 m (i) and 2 m (ii) of the Factories Act, 1948, (b) Companies Act, 1956 and (c) construction activities falling under Section F of National Industrial Classification (NIC) 2008. Table 1.2 and Fig. 1.1 show the distribution of MSMEs activity' wise.

Table 1.2 Distribution of MSMEs activity wise

Activity category	Estimated number of enterprises (in lakh)			Share (%)
	Rural	Urban	Total	
(1)	(2)	(3)	(4)	(5)
Manufacturing	114.14	82.50	196.65	31
Trade	108.71	121.64	230.35	36
Other services	102.00	104.85	206.85	33
Electricity[a]	0.03	0.01	0.03	0
All	**324.88**	**309.00**	**633.88**	**100**

[a]Non-captive electricity generation and transmission
(Annual Report 2018–2019 MSME, Govt of India)



Noncaptive electric power generation, transmission and distribution by units not registered with the Central Electricity Authority (CEA)

Fig. 1.1 Distribution of Estimated MSMEs (Nature of Activity Wise)

1.3 Importance of Quality in Business Processes

Business has tried to define quality in a producer–consumer context, with the following variations. Experts in organizations are seeking to describe quality in the producers' and consumers' perspective, such as:

(a) ISO 9000: The extent to which product's features are successful in fulfilling customer's expectations. This definition is in the context of the consumer.
(b) Six Sigma: The extent to which a process is capable of producing products with minimum variations (i.e., defects per million opportunities DPMO).

The significance of quality for company's performance is widely established in business literature and company practices (Kumar et al. 2009). In order to improve business performance and achieve competitiveness, numerous approaches have been pursued in literature, most remarkably and suggested approach is the concept of quality management (Claver et al. 2003; Talib et al. 2013) which has its roots since early 1900s, i.e., preindustrial revolution. In recent times, total quality management (TQM) has been a burning topic in business literature (Sharma and Kodali 2008). It is a holistic approach that seeks managing quality; it required development of quality approach and a frame or structure for its successful implementation. It augments the conventional way of doing a business (Anupam et al. 2008) based on the principle of a continual improvement of the organizational practices. More specifically, it is the application of sound management principles, quantitative methods, and management of human resources to develop all the process within an organization and meet customer requirements. TQM has been widely acknowledged as an essential management practice, which can play key role in making companies to become more competitive in global economy. To succeed in business companies shall adopt TQM practices as quality management is regarded as a source of major organizational change that requires a change in the organizational culture, processes, and strategies or priorities.

Quality of a process depends upon how efficiently some input is transformed into some output. For this purpose, a process is subdivided into various work items each of which may have a particular intermediate output. The general ways to determine quality of a process or intermediate outputs are defined in terms of internal failures such as (i) defect: it is defined as deviation from the relevant specification, which is not as per the process plan (ii) rework: the work items that can be corrected by repeating some work to eliminate the deviations (iii) Reject or Scrap: the items that cannot be corrected and are treated as rejects. In terms of external failures, the general ways to determine the quality of a process is: (i) lost sales: when not able to meet customer demand, (ii) loss of goodwill, (iii) after sales services and (iv) increase in warranty/guarantee charges, etc. The above measurements apply both to outputs from service operations and to outputs of manufacturing processes.

1.4 Evolution of Quality Management

The primeval Egyptians established a dedication toward quality in building their pyramids. They set tall standards in arts and crafts. The cities, churches, bridge and roads built by Romans motivate us even today. The period 1800–1900 (preindustrial revolution) was called operator quality control period in which production of products and services was primarily confined to single or small group of individuals. The liability of quality was entrusted with a particular individual or small group. Skilled craftsmen/operators controlled their own quality through pride or workmanship. This leads to a sense of achievement for operators that helped to lift their morale and motivate them to attain excellence in their work. Further, the historical evolution of quality practices has taken place in four phases, as depicted in Fig. 1.2

(1) Period (1900–1920)—Quality Inspection, i.e., foreman quality control
(2) Period (1920–1940)—Quality control, i.e., inspection quality control
(3) Period (1940–1960)—Quality assurance, i.e., statistical quality control
(4) Period (1980s and beyond)—Total quality management.

Foreman quality control had its beginning from the factory system that expanded following the industrial revolutions. Due to development of industrial revolution, the notion of mass production, assembly lines, and division or span of labor came to existence. Products were generally made from nonstandardized materials and using nonstandard methods. The operator was not held accountable for the production of the entire products but only for a particular part of it. Inspection is carried out mainly to separate nonconforming quality products from the conforming ones, which were later on, send for rework or sold at discounted price. Or we can say that inspection was mainly carried out to ensure nonconforming products through visual inspection by naked eye or by using some sort of testing or inspection techniques. The foreman on shop floor had several operators working under his supervision and was responsible for maintaining quality in his area.

The second stage of quality evolution started during 1920 owing to increase in production quantity, intricacy in product design, process procedures became complex. With increase in number of workers reporting to a foreman, it became not

Fig. 1.2 Historical development of quality management

possible for the foreman to keep close control over individual workers. During the period 1920–1940, the specifications, measurement requirements and standardization with respect to products were stated in written form. This helped the inspectors to compare the quality of products against standards. The concept of statically process control came into picture by the development of control charts (Shewhart's), followed by acceptance-sampling plans by Dodge-Roming. This helped the organizations to substitute 100% inspection procedure as it becomes difficult and monotonous to carry out 100% inspection.

The third phase of quality evolution laid emphasis on detection activities, which may help to prevent loss because of poor quality. The aim of the quality assurance function is to develop a system that incessantly reviews the effectiveness of quality philosophy of the organization. In other words, quality assurance works out plans or formulates systematic actions required to assure the performance of the product. It consists of various activities that include systematic audits, failure mode and effect analysis, Taguchi design of experiments and other programs of similar nature. Most of these techniques were designed to avert sudden field failures or eliminate defects. Some other quality management activities such as use of quality costs, quality audits and process development actions were also implemented to give support to quality control.

The fourth phase, started with the word "total" or "holistic" approach to quality. The significant aspect of this phase was the involvement of people across various departments toward controlling the quality of their processes. People began to recognize that each department had important role in making quality product. Further, the concept of zero defects also pictured during this period, its main aim was to improve productivity by doing things right first time. It has become a decisive distinction in today's business where the winning strategy in the business is to achieve customer trustworthiness. Table 1.3 presents the distinct contributions of quality gurus in evolution of quality.

1.5 Statistics for Quality Management

Statistics deals with the collection, classification, analysis and interpretation of numerical facts or data or some information. It is divided into *descriptive statistics* and *inferential statistics.* A study using descriptive statistics is simpler to perform. However, to need evidence about the existence of relationship between variables in an entire population rather than only in the sample, one needs to use inferential statistics.

Descriptive statistics: It illustrates the characteristics of a product or process by making use of the information collected on it. For instance, we wish to describe the test scores out of 100 of class of 30 students. We record all of the test scores and calculated the summary statistics Mean 79.18; range (66.21–96.54) and produce the frequency histogram with horizontal axis representing a range of test score values