

Quality Management in Automotive Manufacturing & Service Sector

Nilmani Sahu, K Sridhar, Dinesh Dubey

Abstract: The paper presents the systematic literature review of range of extensive research paper which is based on quality management and thus it will help the research scholars, managers of organization & the decision makers of various SME's to better understand the concept of quality. The research on Quality management has emerged from the practical requirement This study uses a comprehensive literature review of previous published literature from reputed journals. The review includes the paper related to case study, implementation of quality, concept and application of quality tools. The review is done on the basis of previous available research papers from the reputed journals and by the data base from search engines; hence it has not included the suggestion and guideline of experts. Thus empirical study is required to be conducted in order to get better clarification of QMS. This article has made contribution in the manner that it has included the research paper in all the aspect of quality management. The review includes the research paper from the background of implementation, review, application and case studies of QM in various sectors. Also paper related to critical success factor for QM implementation has been included for better understanding and improving the production process. Many investigations regarding study of quality culture around the manufacturing organization were included to understand how it affects the organizational performance. From the study many gap has been identified from previous literature that requires to be studied in future for successful implementation of quality management.

Index Terms: Quality management, Critical Success Factors, Statistical Tools.

I. INTRODUCTION

During the industrial revolution, production was generally done by the craftsman and labors who were responsible for production. The motivation was to complete their job and earn the livelihood. During that time quality was considered as an activity of inspecting the product before delivering to the customers. After this, during 1960's to 1970 the quality of product was controlled and inspected by testing and using statistical tool, thus assuring the product quality. There after quality management enjoyed widespread focus during 1980s to produce good quality product at competitive cost. At this period of time span, QMS was mainly aligned with the organizational objective and focuses on continuously meeting customer desires. In 21st century maximum organizations are striving to assess the systematic approach of QMS and to implement in very cost effective way, thus delighting the customers. In todays competitive world quality management for any manufacturing or service sector plays very important role for the survival and

success of an organization. From the previous study it is found that, there is no systematic theoretical framework which may distinguish the past efforts and clarify the future research guidelines. To understand and fill the void, a comprehensive and systematic literature review of published QMS research is undertaken. A total no. of 133 previous literature have been studied to give better view for understanding the status of QM, its need for implementation in various sectors and tools and techniques adopted by the various organization to uplift the organization & survive in the competitive market. Quality management system may depend upon level and type of the firm. The concept of quality management is associated to the revolutionary approach to success in the competitive market and maximum research available is based on conceptual and practitioner oriented. The adoption of QMS by an organization depends upon the voluntary basis. After the industrial revolution, the need of quality management was realized by many companies. But due to lack of resources and knowledge it was not too easy to implement by the companies. In the last few years the concept of management of quality is become wider; it means that in order to meet the customers desire and make them delighted both objective as well as subjective quality is required to be considered in an optimal way. The paper integrates different ways of innovational study performed in the area of quality management and to develop knowledge regarding quality for academician and industrialist in the field of manufacturing and service organization.

TABLE 1: REGARDING THE SOURCES OF LITERATURE PAPER COLLECTED

Publisher Detail	Publisher Detail	Publisher Detail	Publisher Detail
Type of Study			
Case Study	16	08	13
Survey based	19	14	16
Implementation based	13	7	10
Application based	06	4	7

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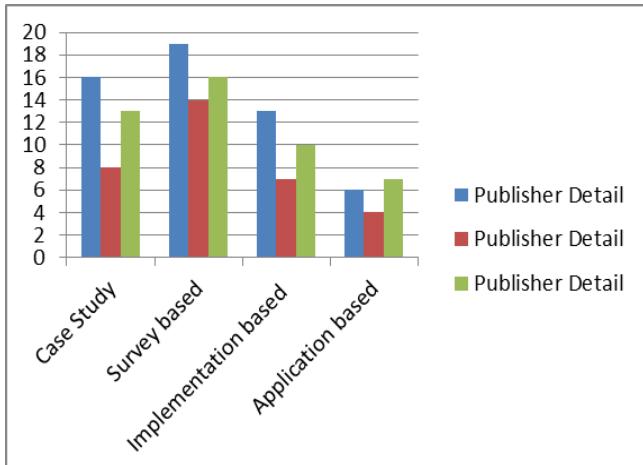


FIGURE 1: GRAPH REPRESENTING THE SOURCES OF LITERATURE PAPER CONSIDERED FOR REVIEW

II. METHODOLOGY

Quality management in manufacturing and service sector is the need of time for their survival and stability in the competitive world. In this study a methodology used is based on a comprehensive literature review of previous published literature selected from the esteemed journals. The study includes research articles which are based on case study, implementation of quality, concept and application of quality tools. A total no. of 133 literatures was selected from reputed journal which includes paper mainly from Science direct, Springer journal, Taylor & Francis and others. A total no. of 54 research paper are selected from science direct journal, 33 papers from Springer journal whereas 46 research article were selected from other journals.

III. LITERATURE REVIEW

Saja Ahmed Alblawi et. al (2017) made a survey for effective implementation of lean six sigma which was based on descriptive survey questionnaire. The questionnaire had been derived from literature reviews. They conducted a survey by distributed questionnaire to 400 organizations in Saudi Arabia using Qualtrics online software. Total of 146 responses were received out of which 102 responses were found complete which were further analyzed. Their research objective was to make better clarity regarding the status of LSS in Saudi Arabian organizations. Barbara Aquilani et. al (2017) have done systematic review for critical factors of TQM and identified new research avenues for implementing TQM. In their study it was found that customer focus play important role in implementing the concept of quality.

Lai Wan Hooi et. al (2017) made a study related to TPM and manufacturing performance. From the study it was found that the role of top level management and commitment were very important during the early stages of planning for production system, but thereafter TPM philosophy can prove to be more better for improving the performance of the manufacturing. A TPM implementation initiative gradually enables engagement, proper planning, right execution and continuous improvement which ultimately improves the manufacturing performance indicators significantly. Ateeq Khan et. al (2016) made an attempt and surveyed the current challenges in manufacturing unit. For this qualitative technique is utilized to understand the various problem faced by manufacturing firms. They have sent the Questionnaire to

experts, managers and supervisors of various manufacturing companies. Also formal and informal interview were conducted for better understanding the challenges in production field.

Saja Ahmed Alblawi et. Al (2016) have done empirical research for assessing the status of lean six sigma in Saudi Arabia by utilizing data from multiple case study. They have collected qualitative data by means of face-to-face and semi-structured interviews with 29 participants from five Saudi companies deploying Lean or Six Sigma. They found that implementation of lean six sigma is still in early stages. Alessandro Laureani et al (2016) made a study to understand critical successful factors for deploying six sigma in manufacturing sector. For this structured questionnaires were send to various company. Their study focused on the impact of leadership on lean six sigma deployment, but clear guideline regarding types of leadership needed is not presented. From their study it is found that lean six sigma is an evolving quality management practice that has influenced many organization.

Sachin Modgil et. al (2016) performed an empirical study on TPM, TQM and operational performance of pharmaceutical industry. They have surveyed 410 Indian pharmaceutical plants and send questionnaire for study purpose, 254 responses have been used in the study for analysis. They utilized the tool of factor analysis, path model and structural equation modeling for the proposed framework. From the study it was found that the impact of TPM practices is more significant for R&D, whereas quality data and reporting contributes very less to toward TQM. Dimitrios P. Kafetzopoulos et. al (2015) made a study to better understand the impact of QMS on the performance of manufacturing company. For this tool of an initial exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and structural equation modeling (SEM) were utilized to understand the relations between the various element of the proposed model. For this a sample of 287 ISO 9001 certified Greek manufacturing hub was collected. The objective of study was to bridge and understand the effectiveness of ISO 9001 in the performance of manufacturing organization.

Sarina Abdul Halim Lim et. al (2016) have focused on the application of QM tool of Statistical Process Control in Food Processing Industry. Their research is focused with the importance of SPC readiness towards its implementation in the food industry. SPC readiness factors were identified on the basis of previous literature review and by using Delphi technique involving SPC experts from academics, industry and consultants. From the study SPC readiness factors identified were top management support, sense of urgency, measurement system, employees involvement and organizational culture readiness. Hazem Kaylani et. al (2016) introduced a novel approach that combines discrete event simulation, Design of Experiments (DOE), and Failure Modes and Effects Analysis (FMEA) to enhance the VSM processes. They have utilized simulation modeling to evaluate the performance of production system and the severity of potential failure modes under several operational conditions. In the study FMEA and DOE were considered best systems enhancement tool to generate future map. They have identified critical factors affecting production, assess severity of different failures and select the best levels of

factors that will maximize performance and reduce risk of failures.

Daniel Jurburg et. al (2016) have focused on improving the performance of organization by employee involvement thus motivating for continuous improvement in the production process. Their study was based upon the existing literature and proved usefulness to detect the main weaknesses and improvement opportunities for improving employee participation for customers satisfaction. Rajesh Kumar Jain et. al (2015) have made an study to better understand about the quality practices adopted by manufacturing industry in Gujarat. For this they have used exploratory & descriptive study in which primary data were used by the response from questionnaire in the Manufacturing Organizations of Gujarat. From the study it was found that there is awareness regarding QM in few of the organization but yet lot of efforts is required to understand the quality principles by the organization.

Alireza Shokri et. al (2016) investigated the readiness of people in manufacturing SMEs to embark on Lean Six Sigma projects. From the study it was found that there is a strong positive association between the core competence of people and organizational culture with readiness for commencing LSS in the manufacturing SMEs. They have found the core values of people, education level and the vision of making continuous quality improvement are key variables in promoting LSS readiness in these manufacturing. Ang Wei Shan et. al (2016) have published their article which is based on finding relationship between TQM and business performance to identify the relationship between TQM and business performance with a mediators effect of innovation. In their paper a SEM-PLS (Structural Equation Modeling Partial Least Squares Structural) is utilized for better understanding the quality and to explore co-relationship among total quality management, innovation and business performance. Helgi Thor Ingason (2015) had made an attempt to understand the extend of implementation of ISO 19001 in organization of Iceland. For this he had interviewed top level management person and managers of 21 renounced organization. The objective of the study was to know the types of tools and techniques of QM that is applied for project management. From the study it was found that implementation of ISO 9001 can be easily realized for short term project, but effort is required to implement in more effective way in long term project.

Lillian Do Nascimento et. al (2015) have investigated how the firms organizational culture affects the output quality of the product. For this research data have been collected from 251 organization from Brazil & Denmark. For this structural modeling equation is used to understand and correlate organizational culture with operational performance. Julian Paul Sidin et. al (2014) published a paper to study the correlation of level of implementation of QM & production quality in Malaysian manufacturing hubs. The study was conducted by sending sample questionnaire to various manufacturing organization of Malaysia. Since the samples were heterogeneous due to which stratified sampling method was adopted for selecting the samples. A total of 600 questionnaires were send out of which 233 responses were received. From the study it was found that there is strong positive correlation between and quality management implementation & product quality.

Talib et. al. (2013) made a research to find the critical factors which are very important for QM practices for various food industry and SME's in Malaysia. The objective of their research was to develop a conceptual frame work for QM practices to improve the organizational performance. A survey method is utilized for research and it was identified that the Malaysian Food industry are approaching towards benchmark by implementing concept of QM and producing good quality product for their customers. Dr. Masood Ul Hassan et. al (2012) had performed an empirical study to examine the linkage between TQM practices and organizational performance. A survey was conducted in Pakistan manufacturing industry and the quantitative data from 171 quality managers were analyzed. From the study it was found that QM implementation in manufacturing hubs of Pakistan has great impact on the performance capacity of organization leading to better customer support, employee satisfaction, product quality and business performance.

IV. GAPS IDENTIFIED

- A wider study is required to understand and correlate the CSF with TQM and to identify new avenue of research.
- The ISO certification of present level of TQM practices and implementation of TPM level is not considered in studies, which may impact operational performance.
- No systematic QA program is being established for Production process.
- The JIT system along with TPM and TQM can be studied.
- No specific Business Excellence model is presented for quality management.
- Exact identification of areas are yet to be studied where TQM can be implemented.
- The study does not examine other operating performance measures such as inventory levels, defective product rates, lead times, delivery performance and wastage rates of the organizations that could more directly affect ISO 9001 certification.
- No specific strategy is presented for TQM implementation.
- The interrelations of TPM with other approaches such as total quality management, employee involvement and just in time practices are yet to be studied to measure its success in maximizing production effectiveness
- No any generic model is presented for implementing the quality concept.
- Empirical research is required to determine the current status of quality practice in developing countries.
- No specific strategy is presented for TQM implementation.
- The study focuses on the impact of leadership but it does not go into the specifics of separating the types of leadership needed.
- The hybrid model can become more useful tools for decision making &



- improving the implementation process which is not yet studied.
- Importance of correlation chart to describe the factor affecting TQM implementation is not yet presented.
 - Strategies for formulation of TQM are not available.
 - There is no specific method for implementation is given.
 - Broader aspect of quality management is yet required to be studied.
 - The concept of Six Sigma and Lean Six Sigma implementation requires more descriptive study.
 - More number of case studies are yet required to be performed for making strategies for six sigma implementation.

V. CONCLUSION AND SCOPE FOR FURTHER WORK

QM is one of the essential requirements for all the organization for their survival and get stability in this competitive market. This Research is valuable to both research scholars and managers for better understanding the extend of QM implementation in manufacturing as well as in service unit. This article has made contribution in the manner that it has included the research paper in all the aspect of quality management. These review have included research paper from the various aspects regarding implementation, review, application and case studies of QM in various sectors. Also the study in broader aspect of quality has been included. Much research paper from case studies is included in the review. Also paper related to critical factors for QM implementation has been included for better understanding and improving the production process.

Implementation issues from various manufacturing hub around the world were investigated and identified to make clear vision of QM. Also the tools and approaches used by the previous author were discussed in this paper. Many investigations regarding study of quality culture around the manufacturing organization were included to understand how it affects the organizational performance. Moreover the gap has been identified from previous literature that requires to be studied in future for successful implementation of quality management. Quality management and its implementation required to be consider in more wider approach. Various new approaches for applying quality concept in manufacturing as well in service sector is yet to be studied which can become a scope for further research.

The limitations of this study are that the databases and search engine used do not cover all the accessible sources of previous literature. Experts suggestion from various service as well as from manufacturing organization are not include, thus empirical study is required to be conducted in broader aspect in order to get better clarification of QMS. Also in this paper primary data base is used for study, Secondary data base also can be include to get more clarity about implementation status of QM.

ACKNOWLEDGMENT

The authors would like to gratefully acknowledge Dr. Anurag Verma, Director, C.S.I.T. Durg and Dr. Subhash Chandra Shit, Head L.T.C. C.I.P.E.T. Raipur for their motivation towards the research and help to improve the presentation by his invaluable comments.

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