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QFD METHODOLOGY APPLICATION TO SMALL SCALE INDUSTRIES WITH SPECIAL REFERENCE TO FASTENERS INDUSTRY-'A CASE STUDY'

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ABSTRACT

The purpose of the present study was to apply Quality Function Deployment (QFD) to develop awareness of the concerned customer's needs for small scale industry with special reference to a fastener industry. In a developing Nation like India, Small and Medium scale industries (SMEs) play a vital role in providing employment and boosting the economy of the country. The objective of the present study was to identify the critical success factors that contribute to the performance of quality management practices in fasteners manufacturing units in India .A number of studies have been carried out in various parts of world showing factors affecting QFD Application practices and their impact on the firms performance, but very few such studies have been in Indian SMEs in general and fastener manufacturing industry in particular. The quality dimensions in manufacturing products show the fundamental requirement. In the present work, the needs of the stakeholders were determine through QFD for improving the quality of fastener industry. It was found that QFD played a vital role in identifying true customer requirements, prioritizing requirements and meeting the needs of all customers in order to achieve excellence in various fields and functions of businesses. In order to collect convenient information, the study used the questionnaire as instrument to achieve the objectives of the research.

KEYWORDS: Quality Function Deployment, SPSS, Production Management.

INTRODUCTION

In the present scenario of liberalization, privatization & globalization, small and medium scale technological industries are facing intense competition and hence survival and growth of these industries has become a tough challenge. Some industries are consistently achieving the growth under competitive conditions while others are not. As a result of this, new opportunities and threats have emerged.

So far as the Indian capital Delhi & NCR region is concerned much small and medium scale technological industries are operating in Delhi and suburban region .Though there are lots of challenges and opportunities in front of these industries, most of the people neglect the importance of the existing technology in these industries and its handling. At present many small and medium scale industries are either sick or underperforming. There is a tremendous scope for the production management, product development, process planning, tool design, plant layout improvement, productivity improvement etc. for performance improvement in these industries with ultimate aim of cost reduction and to provide the innovative product or technology to catering to the needs of the customer.

A number of studies have been carried out in various parts of world showing application affecting TQM like QFD technique and their impact on the firms performance, but it appears that a very few such type of studies are done in Indian Small & medium enterprises Industrialization has been a striking feature of Indian economic development since 1951. Industrial production has gone up by about five times, making India the tenth most industrialized country in the world. Small-scale industries play a vital role in the development of the national economy. India is facing the problems of unemployment and paucity of capital resources. The built in characteristics of small scale industries, such as relatively small size of initial capital requirement, entrepreneurship and employment generation potential, etc., render them the ideal for balanced and decentralized development. The small-scale industries assume great importance in

mitigating the problem of unemployment, in facilitating the growth of the industrial sector and in ensuring all round development of the economy.

Quality function deployment (QFD) is a management tool that provides a visual connective process to help teams focus on the needs of the customers throughout the total development cycle of a product or process. It provides the means for translating customer needs into appropriate technical requirements for each stage of a product/process-development life-cycle. It helps to develop more customer-oriented, higher-quality products. While the structure provided by QFD can be significantly beneficial, it is not a simple tool to use. (Bouchereau 2000).

LITERATURE REVIEW

In a study by Fung et al.(1998) ,the authors proposed a novel approach for analyzing customers attributes and projecting them into the relevant design, engineering and product attributes in order to facilitate decision-making and to guide downstream manufacturing planning and control activities. The proposed hybrid system incorporates the principles of QFD, AHP and fuzzy set theory to tackle the complex and often imprecise problem domain encountered in customer requirement management. It offers an analytical and intelligent tool for decoding prioritizing and inferring the qualitative, sometimes vague and imprecise voice of customer. As a result, the appropriate product attributes can be mapped out and their relevant design targets can be determined quantitatively and consistently.

Franceschini and Rupil (1999) worked on the use of rating scales in QFD, focusing the critical aspects and consequences resulting from an incorrect use of rating scales. The paper illustrated how the priority rank of design characteristics can change depending on the type of scale used. Practical effects of these issues were finally shown on a real case concerning the design of a climatic control system for commercial vehicles.

Another significant application of QFD is in ergonomics. Guedez et al. (2001), who improved the ergonomics, design of containers, which are used in flexible manufacturing systems (FMS) & championed this. QFD was used to analyze the customer desires and to generate high quality and competitive ergonomic products and processes. Prasad (1995) introduced a set of JIT house of matrices and a matrix-based procedure to analyze the results of strategic planning and implementation. The rating system is derived from the same principles on which QFD was based. This enables the planning team to sustain a series of successful planning activities throughout the strategic implementation process and the manufacturing and strategic teams from unknowingly making any possible implementation mistakes.

Olhager and West (2002) used the methodology from QFD for linking manufacturing flexibility to market requirements. This approach creates a framework for modeling the deployment of the need for flexibility from the customers' viewpoints into manufacturing flexibility at various hierarchical levels. The paper presented an application of the methodology in a firm where a manufacturing system was being redesigned for the manufacture of a new and wider range of products than previously, based on a new product platform. The studies on hybrid QFD, rating scale QFD, ergonomic-based QFD, hybrid JIT-QFD and the manufacturing flexibility-based QFD omitted cost elements. They also omitted feedback from customers as well as did not include neural networks in their model building.

QFD BASED COLLECTION & ANALYSIS OF DATA

An attempt was made to(a) QFD based collection & analysis of the data &(b)SPSS analysis of data (SPSS based)determine the prioritize the needs of the stakeholder through data collection on VOC (Voice of the customer)of the QFD technology. We start with the analysis of data on the basis of respondent's demographic characteristics. Demographic characteristics of respondents are presented in the Table 4.1

Table 4.1 -Percentage distribution of respondents

Stakeholder	No. of Questionnaire	No. of Respondents	% of Respondents
Employees	10	10	100
Retailers	15	12	80
Builders	14	10	71.4
Management	4	4	100
Society	30	22	73.3
Total	**73**	**58**	**79.4**

While the education status & respondent are shown in Table 4.2

Table 4.2 Qualification distribution of respondents

Qualification	**No. of Respondents**	**% of Respondents**
Ph D	Nil	Nil
Post Graduate	12	20.68
Graduate	29	50.00
Below Graduate	9	15.51
Others	8	13.81
Total	**58**	**100**

Age group	**No. of Respondents**	**% of Respondents**
20-25 yrs	4	06.90
25-30 yrs	15	25.90
30-35 yrs	13	22.41
35-40 yrs	18	31.03
Above 40 yrs	8	13.76
Total	**58**	**100**
Age group	**No. of Respondents**	**% of Respondents**
20-25 yrs	4	06.90
25-30 yrs	15	25.90
30-35 yrs	13	22.41
35-40 yrs	18	31.03
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Total	**58**	**100**

Table-4.3 Age group distribution of respondents

In terms of age (Table 4.3) maximum number of respondents were from the age group 35-40 yrs while appx.80% of the respondent were male (Table 4.4)

Table-4.4. Gender distribution of respondents

Gender	No. of Respondents	% of Respondents
Male	46	79.3
Female	11	20.7
Total	**58**	**100**

DISCUSSION

In the present study the needs related to the fasteners as expressed by different stakeholder were found be Quality of supplied fasteners ,Defect free products, Faulty products replacement policy, Quick responds of complaint, Cost of supplied fasteners ,Product performance ,After sales services, Delivery time, Maintenance cost, The profit, Reliable in supplying the product, Good salary to employees, The product durability ,Credit policy. From the literature review it appears that perhaps no such studies related to fastener industry where conducted and therefore observed needs established in the present study are not discussed in light of previous researches.

The aim of the study was to find out various needs of the stakeholder of fastener industry which represented a typical unit in small scale sector. For this data were collected from various stakeholders like retailer, employee, builders, and management and society members. The analysis of respondents revealed that a total of 79.4 % responses were received. The percentages of received responses were shared by retailer (80 %), employee, (100 %) builders (71.4%), management (100 %) & society members (73.3%). For fastener industry the retailers, management & builder (end user) emerged as important and more responsible among the stakeholders.

CONCLUSION

The main objective of the present study was the application of Quality Function Deployment (QFD) to develop awareness of the concerned customer's needs for small scale industry with special reference to the fastener industry. In the present study the needs and expectations of the specific customers for small scale fastener manufacturing industry were identified using the voice of customers (VOC) through the application of Quality Function Deployment (QFD). Initially the specific customers or stakeholders for small scale fastener industry were identified. After that, the needs and expectations of the specific customers for small scale fastener industry were assessed and finally the customer's needs were prioritized and analyzed. QFD forces the entire organization to constantly be aware of the customer requirements.. Marketing benefits because specific sales points that have been identified by the customer can be stressed. Most importantly, implementing QFD results in a satisfied customer

Quality emerged very important aspect for all stakeholder, Thus it bears a direct impact on the improvement of the product.TQM relies more on processes than on products and is based on strong assumption that a product which comes out of a good process is always good. In the present study, concepts of quality in fastener industry and other type of manufacturing quality products industry are studied in detail. The quality dimensions in manufacturing product were identified. The utmost advantage of implementing the QFD approach in small scale fastener industry was to establish the factors through we minimize the wastages and increase the productivity. Ultimately this would results in high quality of the product, more profit to customer, end users & manufacturers. Present study provide strong indications about the main needs of the stakeholder focuses Gathering voice of customer is a very important task in played a vital role in identifying true customer requirements, prioritizing requirements and meeting the needs of all stakeholder in order to achieve excellence in various fields and functions of businesses.

SCOPE OF FUTURE WORK

The present study was conducted only among different stakeholders of one small scale fastener industry. Future studies might be conducted with detailed comparisons between stakeholders. The future research may be focused on other fastener industry in India and abroad and try to find out if the findings are similar. There is a large scope for further research on other dimensions of product quality in fastener industry and other product manufacturing in small scale industry.

The present study contributes to the QFD literature with the aim of understanding the profile of the literature in terms of the mixture of subjects, varieties of methodologies, approaches, and models. Hence, the present study helps to advance and sharpen our understanding of QFD research. From the findings of the present study it is recommended that future studies should be more focused toward integration of some existing tools in the QFD literature, particularly for small scale units. This would open new area of improvement in small scale manufacturing units in India. Particularly keeping in view the global competitive world where the recently evolved logan of MAKE IN INDIA to be operational, perhaps, in the tomorrows India.

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