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"A Study on Quality Enhancement and Trends in Selected Engineering Industries in Coimbatore District during Post Liberalization Era With Reference To Technology Upgradation"

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ABSTRACT: The engineering industry is one of the most important basic industries. Very often it is referred to as "Engine of Growth" and occupies an important place in the Indian economy. It has become the barometer of industrial growth and advance in every country. Coimbatore is one of the leading industrial cities in India. Coimbatore is well known for its high growth in industrial development. The primary capital income of Tamil Nadu mainly depends on the industrial output of Coimbatore, which is partly attributed to the entrepreneurial skills of this city. Coimbatore is the house for textile mills and more than fifty thousand large, medium, and small scale engineering units. The liberalization policy, declared in 1991 by the Government of India, exposed the Indian Industries to global competitive pressures and opportunities. It brought in a new era of technology, quality consciousness, and competition, which compelled Indian business to wake up from its somnambulism and reassess its assumptions for dealing with the 'compete-or-perish' situation. However, the industry quickly responded to these challenges and upgraded itself. Quality improvement is a strategic variable employed in the highly competitive international business world. Quality Improvement is a formal approach to the analysis of performance and systematic efforts to improve it. Industries need quality improvement of manufacturing process as it helps to decrease the operation cost, to improve product quality, etc. This paper attempts to analyze the quality enhancement and trends in selected engineering industries in Coimbatore District during post liberalization era with reference to technology upgradation.

Keywords: liberalization policy, quality enhancement, engineering industries

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I. INTRODUCTION

Industrialization is the transition of an economy from primarily agrarian to one based mainly on manufacturing and industry. Industrial development has influence on economic growth, improves the standard of living, generates new employment opportunities, improves the production of agriculture, promotes capital formation, improves balance of payments, provides economic stability, and promotes revenue to the government. In industrialization, engineering industries occupy a greater part which leads the development of other industries and is a barometer of industrial growth. Liberalization was the trend to dilute the strict licensing system and provides more liberty to entrepreneurs, which was propagated from 1980s. After liberalization, the fact that free trade is growing throughout the world creates a more competitive environment [Seth and Goyal 2004]. Quality is a vital component of the business strategy, and quality improvement is a strategic variable employed in the highly competitive international business world. Frequently changing business environment bring a substantial challenge to the industries to remain competitive in the global market place [Powell 1995]**.** It is thus essential for an industry to pursue continuous improvement to keep up with changing market conditions**.**

II. STATEMENT OF THE PROBLEM

The engineering industry had insignificant share in GDP at the time of independence, but later on it gained its importance with an arduous planning regime since 1951. By taking the Soviet experience in 1930s as a base, the Indian policy makers started to believe that the native technological capacity and self-sustaining economy would go in parallel. In India it is impossible to increase the per-capita income through income redistribution, therefore the only option which was widely open for increasing per-capita income, employment and through the consumption, was to substantially increase in the level of output. According to the planners view, the reasons for the low levels of output were low level of investment and poor quality of capital goods. As the main objective of the planners was to achieve long term growth, more weightage was given to the category, i.e., "machines producing machines". In order to meet the growth, ability to compete in international market is determined by the quality of the products and also by the cost, both of which are dependent on the technology used. After the liberalization, it is expected that due to the competitive pressure of the industry, it would try to access and adopt new technology. In order to assess the impact, engineering industries were selected, since it is the growing sector in terms of production and export. Hence the present study entitled, "**A Study on Quality Enhancement and Trends in Selected Engineering Industries in Coimbatore District during Post Liberalization Era with reference to Technology Upgradation"**

OBJECTIVES OF THE STUDY

1) To study the after liberalization trends in selected engineering units with reference to technology up gradation.
2) To examine the factors that influence the quality of products and measures taken for improving the same.

III. SURVEY RESEARCH DESIGN

As large numbers of engineering units were spread over in Coimbatore district in Tamil Nadu, this district was selected to conduct the present study. From the list of industries, by adopting quota sampling (10 % from the three categories: small, medium and large), 169 engineering industrial units were selected. However, correct and reliable information and data were received from 150 units only. By adopting personal interview method and canvassing a structural interview schedule the data were collected from these units. These industries when classified brought under four categories i) General Engineering ii) Textile Engineering iii) Automobile Engineering iv) Pump Industry. To analyze the collected data One Way ANOVA, Multiple Regression Analysis and Discriminant function analysis were used.

IV. REVIEW OF LITERATURE

Majumdar (1996) examined the impact of liberalization on productivity growth in Indian Industry and found that relative to past industrial performance, the liberalization process seems to have had a positive impact on current Indian Industrial Performance. Rumki Majumdar (2010) analyzed the contribution of total factor productivity growth (TFPG) to output growth (OG) with respect to four sub sectors of Indian hardware electronics industry during liberalization. The Industry has failed to maintain a sustained growth in TFPG during this period. The sub sectors were seen to have emphasized more on Technological Progress (TP) than Technical Efficiency Change (TEC) during liberalization.

Table:1-Certifications -Multiple Responses

Certifications	**Type of Unit**						**Total**	
	Large scale		**Medium**		**Small scale**			
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
ISO certification	24	96.0	47	94.0	21	28.0	92	61.3
ISI certification	9	36.0	2	4.0	2	2.7	13	8.7
CE certification	20	80.0	7	14.0	2	2.7	29	19.3
No certification	1	4.0	2	4.0	50	66.7	53	35.3

Source: Primary Data

The ability to compete in the international market is determined by the quality as well as cost, both of which are technology based. Fortunately, Indian industries are devoting greater attention for quality improvement and manage to obtain certifications like ISO, ISI and CE. As given in Table 1, Irrespective of industries among large and medium scale units, many companies had ISO and also certification like ISI and CE. Among small scale units, many companies did not possess any certification. In Coimbatore, LMW, ROOTS and ELGI were the maximum certificate holders.

Table :2 - Changes in the Scenario after Liberalization

Item	Type of Industry (Response)						Total	
	Large scale		Medium scale		Small scale			
	No.	%	No.	%	No.	%	No.	%
Quality of products are improved	25	100.0	50	100.0	75	100.0	150	100.0
Production has increased	25	100.0	50	100.0	75	100.0	150	100.0
Profit margin	24	96.0	45	90.0	64	85.3	133	88.7
Compete with liberalization	25	100.0	50	100.0	72	96.0	147	98.0
Competitors increased	25	100.0	50	100.0	75	100.0	150	100.0
Delivery commitment	25	100.0	44	88.0	48	64.0	117	78.0
Technology upgraded	25	100.0	50	100.0	59	78.7	134	89.3
Work pressure	23	92.0	35	70.0	19	25.3	77	51.3

Source: Primary data

Liberalization and globalization introduced a new standard of quality to meet the global competition. Indian companies need to speed up new product development and reach the scale to compete efficiently. The machining technology plays an imperative role in the output, quality, productivity and competitiveness of the engineering industry. In Coimbatore, large scale units like LMW, TEXMO, ROOTS and ELGI were the best in the following factors after liberalization. Table 2 explains the changes in the scenario after liberalization in large and medium and small scale engineering units. Majority of the units from large, medium and small scale units were of the strong opinion that certain positive changes took place in the industrial scenario after liberalization. They were as follows: a) Improvement in the quality of the product, b) Increase in production and competition, c) Upgradation of technology, d) Satisfied with profit margin, e) Ability to compete with liberalization, f) Delivery commitment has become tough, and f) Work pressure (accepted by large and medium scale units alone).

Table: 3 - Measures to Improve Productivity

Productivity Enhancement Measures		Type of Industry industy							
		Large Scale (n=25)		Medium Scale (n=50)			Small Scale (n=75)		
Effective use of computers	No.	25	-	48	2	-	74	1	-
	%	100	-	96	4	-	98.7	1.3	-
Automation of routine task	No.	23	2	48	2	-	74	1	-
	%	92	8	96	4	-	99	1	-
Better supervision	No.	24	1	47	2	1	51	23	1
	%	96	4	94	4	2	68	31	1
Enhanced training & development	No.	21	4	38	12		17	55	3
	%	84	16	76	24	-	23	73	4
Buying expertise and experience	No.	25	-	31	19	-	9	63	3
	%	100	-	62	38	-	12	84	4

Source: Primary data

Table 3 depicts measures to enhance the productivity of large, medium and small scale units. In case of effective use of computers, all the large scale units have improved, whereas, among medium scale units, 96.6% of the units have improved, and in small scale units, 98.7% of the units have improved in the utilization of computers. In the analysis of automation of routine task, 92% of large scale units have improved, in medium scale units 96% of the units have improved, while among small scale units, 99% of the units have improved the automation of routine task. In case of better supervision among large scale units, 96% of the units have improved, in medium scale units 94% of the units have improved and in small scale units 68% of the units have improved. While analyzing through the enhanced training and development 84% of the large scale units have improved, in medium scale units 76% of the units have improved, and in small scale units 73% of the units have marginally improved in training and development. Speaking about recruit expertise and experience, 100% of the large scale units have improved, in medium scale units 62% of the units have improved, while among small scale units 84% of the units have marginally improved in recruiting expertise and experience personnel. Overall, majority of the companies in large, medium and small scale units have improved in utilization of computers and automation of routine task. In all the three industrial units, maximum number of companies adopted better supervision.

Table : 4 - Factors to enhance the quality of product

Items	Type of industry									Total		
	Large scale			Medium scale			Small scale			Mean	S.D	No.
	Mean	S.D	No.	Mean	S.D	No.	Mean	S.D	No			
Cost	2.84	.55	25	3.00	.64	50	3.05	.63	75	3.00	.62	150
Machinery	2.96	.20	25	2.98	.55	50	3.25	.55	75	3.11	.53	150
Tools and instruments	3.00	.29	25	2.98	.55	50	3.23	.51	75	3.11	.51	150
Team effort	3.00	.29	25	3.02	.59	50	3.04	.58	75	3.03	.54	150
Material Purchase	2.92	.28	25	2.98	.32	50	2.91	.29	75	2.93	.30	150
Marketing techniques	2.88	.44	25	2.76	.69	50	2.47	.89	75	2.63	.78	150

Source: Primary data

The ratings assigned in Table 4 were: 1.Not Helpful, 2. Helpful, 3. Mostly Helpful, and 4. Fully Helpful. Mean table shows that among large scale units, Tools and instruments with mean rating 3.00 and Team effort with mean rating 3.00 were the mostly helpful factors for improving the quality of product and Cost was given the lowest rating with the mean of 2.84. Among medium scale units mean rating was higher for Team effort with mean rating 3.02 and mean rating was lower for Marketing techniques which is 2.76 compared to other factors. In small scale units, highest rating was given to Machinery with mean rating 3.25 and Marketing techniques was with the lowest mean rating of 2.47. Upon concluding, irrespective of industries, for majority of the items, the ratings fall between 'Helpful' and 'Mostly helpful' since the rating ranges between 2 and 3.

Table: 5 - Measures to enhance the quality of the product

Items	Type of industry									Total		
	Large scale			Medium scale			Small scale			Mean	S.D	No.
	Mean	S.D	No.	Mean	S.D	No.	Mean	S.D	No.			
Workers suggestion	2.28	1.02	25	2.24	.66	50	2.73	.68	75	2.49	.78	150
Suppliers of components/parts	2.60	.50	25	2.76	.48	50	2.72	.56	75	2.71	.52	150
Study on foreign buyers market	3.08	.49	25	3.00	.64	50	3.21	.96	75	3.12	.80	150
Domestic buyers	3.00	.29	25	2.88	.48	50	2.53	.68	75	2.73	.60	150
Strategic plan to work out foreign collaboration	2.96	.73	25	3.12	.56	50	3.27	.96	75	3.17	.81	150
Improvement in In-house R&D	2.88	.44	25	2.84	.71	50	2.40	.64	75	2.63	.67	150
Empanelment of Consultants	2.12	.53	25	2.28	.57	50	2.71	.63	75	2.47	.64	150
Publicity in Professional & Trade journal	1.96	.98	25	1.80	.64	50	2.33	.53	75	2.09	.70	150
Overseas travel by staff- to study newer markets	1.96	.89	25	2.10	.97	50	2.67	.74	75	2.36	.90	150
Product of competing firms-domestic	2.76	.44	25	2.54	.71	50	2.51	.98	75	2.56	.82	150
Product of competing firms-foreign	2.84	.55	25	2.66	.75	50	2.57	.68	75	2.65	.69	150
Government R&D institution	2.92	.40	25	2.62	.60	50	2.44	.74	75	2.58	.67	150

Source: Primary data

The measures on quality enhancement are presented in Table 5. It was done based on the ratings, namely, 1.Not taken, 2. Little measures, 3. Measures to a certain extend, and 4. More measures. Mean table shows that, among large scale units, highest rating was given to study on Foreign buyers market (3.08) followed by Domestic buyers (3.00). Publication in professional and trade journals (1.96) and Overseas travel by staff to study newer markets (1.96) measured a little. In medium scale units, highest rating was given to Strategic plan to work out foreign collaboration (3.12) and mean rating was lower for Publication in professional and trade journals (1.80). Within small scale units, highest rating was given to Strategic plan to work out foreign collaboration (3.27) followed by Study on foreign buyers market (3.21). Publication in professional and trade journals was given the lowest rating with the mean of 2.33. In general, irrespective of industries, for majority of the items, the ratings fall between 'Little measures' and 'Measures to a certain extent' since the rating ranges between 2 and 3. In Coimbatore, as a machine builder, LMW was implementing all the mentioned measures to make their product the best to compete with international standards.

Findings of the Study:

- Among large and medium scale units, many companies possessed ISO and other standard certification like ISI and CE, and among small scale units, many companies did not have any certification.

- Majority of the units from large, medium and small scale units were of the strong opinion that certain positive changes took place in the industrial scenario after liberalization. They were as follows: a) Improvement in the quality of the product, b) Increase in production and competition, c) Upgradation of technology, d) Satisfied with profit margin, e) Ability to compete with liberalization, f) Delivery commitment has become tough, and f) Work pressure (accepted by large and medium scale units alone).
- There was adoption of various productivity enhancement measures in order to increase the productivity in large, medium and small scale units. Majority of the companies in large, medium and small scale units had improved in utilization of computers and automation of routine task. In all the three industrial units, maximum number of companies adopted better supervision.
- The mostly helpful factors to enhance the quality of product in large scale units were tools and instrument, and team effort. Among medium scale units, mostly helpful factors to improving the quality of product were team effort. In small scale units, machinery was the mostly helpful factor to improve the quality of the product.
- Among large scale units, measures to a certain extent to enhance the quality of the product were taken up. The chief measure was to study on foreign buyer's market. Among medium and small scale units, it was foreign collaboration. Little measures were, publication in professional and trade journal in large, medium and small scale units.

Suggestions:

Government has to restrict foreign companies to use India only as a selling point. For this purpose, export and import policies may be updated regularly.

- Price fluctuations in providing raw materials of industrial goods are common in India, and hence, quality raw materials at a reasonable rate can be made available.
- Government has to encourage upcoming clusters and organizations like Confederation of Indian Industry (CII), Coimbatore Industrial Infrastructure Association (CoIndia) and Coimbatore District Small Industries association (Codissia) to discuss problems of engineering units and try to find solutions for it and implement the same quickly.

V. CONCLUSION

Findings of the study indicated that Quality improvement that was adopted after liberalization played a key role in engineering industry. In Coimbatore, majority of the engineering units were of small scale with job shop base. The study also found that the small scale units differ vastly from medium and large scale units in SWOC. Quality requirements were emphasized more in large scale units than in medium and small scale units. According to the employer the domestic and foreign markets have become highly competitive due to the process of liberalization and globalization. They are of the view that day-by-day the consumers are becoming more and more quality conscious with a variety of products. The small and medium scale units must obtain relevant quality as per international standards, which would be beneficial to operate in foreign and domestic markets. The small and medium scale units also have to explore the possibilities of collaborative manufacturing and marketing with other foreign units of their size and nature. The units enhance their quality, but still there are challenges to meet international standards. After liberalization, majority of the large and medium scale units understood the importance of the quality standards and upgraded themselves in administration, marketing and production processes. The small scale units too were aware of technology upgradation and prepared themselves to meet the challenges.

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