

Critical Success Factors for Small Scale Manufacturing Industries in Chhattisgarh, India

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Abstract

India is experiencing rapid industrialisation phase. The most important concern of any industry is to do business profitably. The profit making requires identification of factors to be controlled and monitored. An explorative research is done to make instruments i.e. questionnaire for data collection. The purpose of questionnaire is to obtain information to improve its content, format and sequence. The study identifies critical factors responsible for the growth of small scale industries. Various elements related to Quality, productivity, safety, risk, return on investment are identified for enhanced organisational performance.

Key-words: *Manufacturing industries, Critical Success Factors, CSFs, Quality, Productivity & Safety, organisational performance*

1. Introduction

Manufacturing industries in a developing country like Indian contribute a lot in growth of country .Industries aims towards increased production rate, optimization , high efficiency& sustainable development This research aims in identifying possible input factors (CSF) for optimal output in small scale industries in Chhattisgarh state of India. It is essential for every organization to identify CSFs for ensuring overall performance development hence an approach is made to find the factors which have positive impact on organizational performance. Every organisation today is striving for excellence & requires value addition through profit, growth & survival in long run. The value is always linked to measures like consistent performance, price, flexibility, responsiveness etc. The complete evaluation of economic viability of a system is done on the basis of multiple measurement variables and not on only productivity or profit. A structured questionnaire is prepared using literature survey and in-depth interview with concerned people. It helps in enriching the information and makes the qualitative analysis more focused.

2. Literature Review

The overall information obtained from the review provides an insight to the linking elements Researches in India and as well as abroad are studied for this study. The methodology adopted by researchers and their findings have been carefully analysed. Golhar & Deshpande (1999) suggested that overall customer satisfaction, customer complaints, customer retention and order processing time, defects produced, reliability & cost of quality are critical elements of manufacturing firms. TQM also improves quality & targets towards continuous improvement in all organizations.

The global growth of industries has raised concern on safety & health issues at workplace. Salminen et al. (1995), in their research, suggested that improving machines & equipments , providing more spacious work sites & initiating better housekeeping will increase both productivity & safety. Preventing accidents are necessary for improving plant capacity. Improvement in industrial safety performance results in improvement in plant operations & maintenance. Safety improvements improve financial position because most of the safety improvements also lead to quality & reliability improvements

Berg & Dutmer (1998) studied the relationship between Quality , Safety & Productivity in construction companies. They concluded that if the installation quality is increased & jobsites are safer then construction productivity can be improved & projects made more profitable.

3. Critical success factors

Critical Success Factors are also known as input factors. It defines essential areas for organization to accomplish its mission.

Untawale et al. (2004) carried out his work on Indian manufacturing industries. He has listed 7 Critical Success Factors for performance improvement.. Shrivastava et al. (2014) carried out his research on Indian cement industries .He Identified 9 Critical Success Factors with 43 attributes. Lande et al. (2015) identified 17 Critical Success Factors in her work for lean six sigma in Small and Medium Indian industries

Minhaj et al. (2015) identified 12 critical success factors with 42 variables for Green Supply Chain Management in automobile industries in Maharashtra, India. Gorantiwar et al. (2014) identified 50 attributes of prime consideration in sponge iron industries. Lokhande (2014) identified 10 Critical Success Factors including 74 variables for establishment of Remanufacturing Industry in India.

Singh et al. (2006) collected data from 71 industries to access the impact of KM practices in Indian manufacturing Industries for Total Preventive Maintenance initiatives. In their proposed model they stated that the organizational, cultural, behavioral, technological, operational, financial, departmental barriers are the main obstacles for implementation. Waali et al. (2000) conducted their research on Indian Software and suggested elements like Quality attributes such as timeliness & reliability of delivery. Desai et al. (2012) highlighted Critical Success Factors of six sigma implementation in Indian manufacturing industries. Khanna et al. (2011) have reviewed critical success factors of Total Quality Management & ranked them for Indian Manufacturing Industries. They concluded that process management, top management leadership, customer focus are the top factors for implementation of TQM in Indian manufacturing industries.

Demirbag et al. (2006) carried out their study in Turkish textile industry & have determined the critical success factors of TQM & their effect on organisational performance of Small, Medium enterprise. Joyce et al. (1999) communicated that critical factors responsible for productivity improvement are employees' participative involvement, continuous improvement & customer satisfaction.

Velocci (2002) did a case study in new casting plants & documented that customer focus & quality culture has resulted in decrease in rework, scrap, customer lead time, and increase in productivity. Further factors affecting both Quality & Productivity identified were focus on

Quality, process reduction variation, technology upgrades, investments in new equipment & human resources. Kontoghiorghe (2003) carried his work in a service organisation. He found

the following linking variables between Quality & Productivity: Quality of peer work output, doing things correctly first time, measurement of product quality at all levels, focus on process improvement & decision making involvement.

4. Research Methodology

A Questionnaire is developed as the instruments for data collection based on Likert scale. A questionnaire consists of set of questions for obtaining information from respondents. It enables quantitative data to be collected in a standardized way for analysis.

Primary data are collected from Practitioners and Academicians of various manufacturing Industries in Chhattisgarh region. For the study small scale industries of Chhattisgarh region were targeted. The secondary data is collected from published material like Journals, Working Papers, Magazines, Websites, etc.

5. Questionnaire Study

The questionnaire was filled by 254 experts viz. academicians and industry professionals from manufacturing industries. Responses to each statement in the questionnaire were taken using a 5 points likert scale.

Five point likert scale used in the questionnaire is shown in given below:

1	2	3	4	5
Disagree to large extent	Disagree to some extent	Agree	Agree to some extent	Agree to large extent

In this research Quantitative method is used for data collection . Here the main objective of the research is to identify the critical success factors for improving the overall performance of the manufacturing industry. For achieving these objectives all above analysis are carried out through Statistical Package for Social Sciences (SPSS) Software Version 20.0

This study utilized a survey approach with a closed questionnaire which was distributed in the industry professionals at Chhattisgarh region. To ensure proper representation of manufacturing industries, industries are chosen of different sizes, different types of production, different annual turnover and different year of establishments at various zones of Chhattisgarh state. Survey was conducted with a closed questionnaire in local industries in Chhattisgarh State of India. 254 questionnaire was collected for further analysis.

6. Research Findings

An exhaustive study was carried out to determine various critical success factors and their variables .They are listed as below:

1	Involvement of top management
2	Knowing the overall mission of organization
3	The structure of organization
4	Proper machines and equipments
5	Better machine protectors
6	Use of personal protectors
7	Better education & experience
8	Initiating better housekeeping
9	Spacious worksites
10	Better personal relations between workmates
11	Supervisors discourage dangerous workhabits
12	Intensified safety inspections
13	Intensified accident investigations
14	Recognition of technological changes
15	Regular review of work produced
16	Tighter adherence to worktables
17	Morale of workers
18	Longer time allowed for work performance
19	Better flow of information between production & maintenance workers
20	Monitoring complaints about product/ services
21	Organizations finance monitoring
22	Comparison of performance data with goals
23	Planning in advance
24	Quality productivity policy
25	Effective communication channels between departments in organization
26	Necessity of awareness
27	Teamwork in the organization
28	Monitoring quality improvement concerns at regular intervals
29	Conducting customer surveys about product on regular basis
30	Proper planning before purchase
31	Paying fairly for work done
32	Keeping a tracking system in organization for relevant quality information
33	Evaluating the change in business strategy from time to time
34	Proper worker training for equipment use
35	Use of statistical process control charts/ graphs to collect information
36	Survey within the organization for improvements needed
37	Accountability of people for success / failure
38	Acquiring recent technological improvements
39	Planning ahead for technological changes
40	Keeping priority to continuous improvement of work
41	Usage of right tools & equipments
42	Taking feedback from customers
43	Analysis of data concerning goals in order to determine if improvements needed
44	Reward to creative thinking in organization
45	Improving an already acceptable quality record
46	Safety behaviours(safety awareness, training etc.)
47	Employee satisfaction related to safety efforts
48	Implementation of osha regulations

49	Improvement of safety knowledge of workers
50	Employee safety suggestions implemented
51	Better coordination among workunits
52	Proper employee utilization
53	Quality assurance
54	Supervisors promotion to safe work habits
55	Intensified safety inspection
56	Tighter adherence to timetables
57	ISO Awards
58	More safety measures for workers
59	Compensation cost
60	Discipline
61	Better organisation climate
62	Company policy
63	Management's commitment for providing good work environment.
64	Fulfillment of legal, ethical & social responsibilities by organization
65	Proper HAZOP & Hazard Analysis system
66	Adoption of Quality control tools
67	Training programs for Quality techniques
68	Proper implementation of QMS

7. Normality

The normality test is carried out for all input items. It is necessary that data follows normal distribution At a confidence level of 95%, a clearance of 2.5% on either side is taken.

Skewness and Kurtosis refer to the shape of the distribution. For a normal distribution, values of skewness and kurtosis are zero. The Kolmogorov – Smirnov statistic and the Shapiro – Wilks Statistics with a significance level for testing normality is produced. If the significance level is greater than 0.05, then normality is assumed.

Normality for input variables

Case Processing Summary						
	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
INPUT VARIABLES	68	100.0%	0	0.0%	68	100.0%

Descriptive

			Statistic	Std. Error
INPUT VARIABLES	Mean		4.2613	.03108
	95% Confidence Interval for Mean	Lower Bound	4.1985	
		Upper Bound	4.3240	
	5% Trimmed Mean		4.2664	
	Median		4.2759	
	Variance		.042	
	Std. Deviation		.20382	
	Minimum		3.77	
	Maximum		4.61	
	Range		.84	
	Interquartile Range		.28	
	Skewness		-.352	.361
	Kurtosis		-.249	.709

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
INPUT VARIABLES	.082	68	.200*	.978	68	.563

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

8. Factor Analysis

Factor analysis attempts to represent a set of observed variables in terms of a number of 'common' factors plus a factor which is unique to each variable. Confirmatory Factor Analysis (CFA) technique is used in this research. *Confirmatory Factor Analysis* (CFA) is used to study how well a hypothesized factor model fits a new sample. Here Varimax rotation is used to improve interpretability. Confirmatory factor Analysis and Varimax rotation yielded 06 critical input factors of overall performance improvements in context with Indian manufacturing industries.

9. Interpretation and naming of Input Factors

The Confirmatory factor analysis confirmed six critical input factors. The factors are named on the basis of items which they contain. The six factors are considered as critical factors for improving the overall performance of the Indian manufacturing industries.

Interpretation and Naming of Input Factors

Factor no.	CSFs Identified	Attributes
Factor 1	Effective higher management	Focus of management on vision, mission, Actions for continuous improvement, Adequate budget allocation , Employees recognition , better work environment, Proper organizational structure , well governance system, Adopting new business strategy
Factor 2	Human Resource Management	Increasing Involvement of Employees, Growth & Development , Work-Life Balance, Proper Planning, Implementation and Procurement Policy, Performance Incentives to Employees, Staff Training , new technologies Awareness Programs, Motivation to the employees
Factor 3	Work culture management	Increasing employee skills, Effective communication channels, Teamwork, Friendly environment, Customer's feedback on regular basis, better housekeeping, structured work-sites , safe working rules implementation
Factor 4	Regulatory Management	Clear rules & regulations, Fulfillment of legal responsibilities by organization, Following Govt. Safety Policies, osha regulations, Quality systems (ISO 9000) , Environment System (ISO 14000) , Occupational Health & Safety System (ISO 18000), Proper Hazard Analysis system, Fair Compensation for accidents
Factor 5	Operation Management	Adopting technological changes, review of the work & suggesting improvements needed, Analysing performance data, Adherence to work tables, statistical process control charts & graphs usage , Safety inspections, Accident Investigations & Reporting, , utilising machines tools and equipments, Implementation new suggestions
Factor 6	Quality Management	Proper Quality auditing , Timely activity assessment , Quality Assurance, Promoting Certification Programs, Analysing Quality cost, Quality Training, Promoting Quality programs , QMS practices

10. Bartlett's test of sphericity

Bartlett's test of sphericity assesses the overall significance of the correlation matrix. If the value of test statistic for sphericity is larger and the associated significance is small, it can be concluded that the attributes are correlated. For the collected data, the Bartlett's test of sphericity value is high which indicates that the factor analysis can be applied on the collected data.

Results of KMO and Bartlett's test of Input Factors

Sr. No.	Input Factors	KMO	Bartlett's test of sphericity		
			Approx. Chi-square	df	Sig.
1.	Effective Higher Management	0.768	277.750	6	0.000
2.	Human Resource Management	0.710	146.383	10	0.000
3.	Work Culture Management	0.620	210.228	6	0.000
4.	Regulatory Management	0.742	334.583	10	0.000
5.	Operations Management	0.606	199.395	10	0.000
6.	Quality Management	0.731	392.167	10	0.000

Hence based on above mentioned statistical analysis, it can be concluded that all the CSFs are suitable for factor analysis.

11. Conclusion

In this case study, an extensive research has been performed regarding attributes in the manufacturing industry. This research involves a systematic process that focuses on objectives and gathering information for analysis. The study tried to explore various performance improvement factors (critical success factors). The most important practices explored were employee's training, employee relations, and quality data and reporting. The various attributes suggested helped the organization to improve its overall organization's performance. This study successfully describes CSFs for improving the performance of the manufacturing industries. Confirmatory factor analysis revealed six CSFs namely 1. Effective Higher Management 2. Human Resource Management, 3. Work culture Management 4. Regulatory Management 5. Operations Management, 6. Quality Management. The results of the Questionnaire show that, the instrument can be used as a standard for collecting data related with manufacturing industries.

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