

Evaluating Performance Metrics for Effective Internal Supply Chain Optimization

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Abstract—Each and every manufacturing industry has a goal that describes its purpose and destination. The goal of any industry may be achieved by team work and managerial skills of all departments. However, achieving goals and objectives is not enough to improve the internal supply chain management performance of manufacturing industries therefore proper identification of performance indicators for benchmarking of internal supply chain management is essential for the growth of manufacturing industry. The identification of benchmarking performance indicators and their impact on internal supply chain management performance is vital for productivity and performance improvement. This study identifies the benchmarking performance indicators to improve internal supply chain performance of Indian manufacturing industries through literature review.

I. INTRODUCTION

It appears that much of the literature has focused on performance indicators with very limited perspective. For a scheme execution team, a more clearly perceptible of performance indicators of different groups would make it likely to consider the project scheduling phases and establish the concerns of these significant groups possible. This will enhance the probability of achieving higher success levels and resulting in saving time and cost along with the improvement in the internal supply chain management system. Emerging technologies have much impact on the internal supply chain of manufacturing industry around the world [1]. The rapid changes in the business environment and finally in the industry could lead to changes in business benchmarking and performance measures. So, this research focuses only on critical reviews of the available literature on benchmarking performance indicators identification process. The performance indicators should be fruitful in improving the internal

supply chain performance of Indian manufacturing industries. The critical performance indicators have been used significantly. The result of this concept should present that the manufacturing industries should continuously focus on successful competitive performance [2], [3]. It is further suggested that in order to achieve efficient implementations, focus should be made on those vendors who do not perceive the implementation towards being successful [4]. The manufacturing groups view the new technology as a decision

support tool or a method by which they can increase their competitiveness. Some of the performance indicators are critical to the successful performance of any type of manufacturing industry. These performance indicators exist at different stages within an industry [5]. In sense, if objectives associated with the performance indicators are not achieved, industry will fail.

II. INDIAN MANUFACTURING INDUSTRIES

Globally, Indian manufacturing industry has been changed over the world due to day to day competition and customer demand. As per the concept of “Make in India”, “Made in India” and “Make for India” started by Indian Prime Minister honorable Sh. Narendra Modi, manufacturing industry is more helpful in the improvement of business in Indian economy. Every country supports a string of manufacturing products of all kinds and sizes. Factors like changing lifestyle, economy growth, migration to urban areas have contributed much towards the demand for products which in turn lead to the growth of the manufacturing industry as a whole. The Indian manufacturing industries are producing and selling a wide range of products related to automobile, power plants, agriculture, office, medical sectors, house, garden, construction work, school, college etc. Manufacturing groups have been found to be important in economy of any country all over the world. In India they contribute up to 60% of India’s manufactured exports. They also have a significant workforce and have a high share in the employment generation. But many middle and small scale industries are lagging behind in this scenario of growth. The internal supply chain networking into competitive groups would lead to:

- Faster decision making among industry members.
- A cost effective team.
- Higher responsiveness to industry demands.
- Faster information diffusion.
- Overcoming weak capital base and low scale potential. □ A more flexible structure.

A. Major Problems Faced by Indian Manufacturing Industries

1. Human Resource Issues

- Lack of skills development center/Institute facilities.
- Lack of educated, certified and professionally trained/skilled work force.

2. Technology issue

- Lack of modern and efficient processing and hand carving tools/ equipment.

3. Financial issues

- Inaccessibility to financial institutions for financial support results in loan credits from informal sectors at high cost of capital.

4. Marketing issues

- Stake holders are unaware of quality control and standards.
- Unawareness of international trade trend, markets due to poor marketing skills and lack of access
- Unawareness of international certifications and non-tariff barriers [95].

B. Characteristics of Indian Manufacturing Industries

- The manufacturing industries are in both, an organized and a non-organized sector.
- Utilization of tools, techniques, equipment, machines and CAD/CAM for manufacturing and designing.
- Source of employment for rural workers. Identification of critical indicators for internal supply chain performance.
- Employment spread across many sectors showing the diverse nature of the industry and a broad product range.
- Utilization of skilled and unskilled workers.

C. Hypothesis of the Work

In the proposed research following hypothesis shall be tested:

- Groups shall facilitate adoption of innovative technology in the manufacturing industry.
- Manufacturing group will bring about positive changes in the work culture.
- Group quality shall determine internal supply chain performance of the manufacturing industry.
- Groups shall promote competitive cooperation among manufacturing industries.
- Groups will improve specialized local suppliers of inputs and services.
- Identified performance indicators have effect on benchmarking of internal supply chain performance of manufacturing industry.

III. RESEARCH METHODOLOGY

The goal of this study is to gain the understanding of various critical benchmarking performance indicators for internal supply chain performance improvement of manufacturing industries. It calls for thorough examination and review of group's quality performance indicators. The literature review is very helpful for data collection where various methods are contemplated. The critical performance indicators are defined as reference to any condition or element that was necessary in order to improve the performance. The methodology of this research proposal consists of the following steps.

A. Proposed Data Collection Procedure

Data collection is done with the help of literature survey, discussions, interviews, databases, seminars and conferences, etc. The data compilation has been carried out by thorough reviewing the research articles published in several national and international journals of repute having information relevant to the subject content.

B. Data Analysis

The authentic investigation stage implies reviewing the conception in terms of frequency as well as identification of the critical factors approach. Quality performance of manufacturing groups and the quality problems faced by them will form the focus of data collection. The data will be scrutinized and analyzed using various statistical and quantitative techniques. The analysis will help in identification of critical benchmarking performance indicators for improving internal supply chain performance of manufacturing industries. This research work integrates the critical indicators to develop quality improvement frame work for manufacturing group. The developed framework will be tested in a manufacturing group and this study will be used to validate the frame work [96]. The above collected data will be analyzed using various statistical and quantitative techniques like: Multivariate analysis, Hypothesis testing, Multiple regression analysis, etc. as necessary.

C. Proposed Software Packages

Computer software packages like – SPSS, Minitab, etc. shall be used extensively in further research work.

D. Proposed Model

The proposed model shall be executed in case studies of manufacturing industries.

IV. RESULT TABLE I

BENCHMARKING PERFORMANCE INDICATORS FOR IMPROVEMENT OF INTERNAL SUPPLY CHAIN MANAGEMENT OF INDIAN MANUFACTURING INDUSTRIES

Serial no.	Performance Indicators	References
1	Benchmarking performance indicators- Financial Performance, Plan Performance, Source performance, Make performance, Delivery performance, Sales performance, Customer service and satisfaction	[6]-[23]
2	Ideal time of inventory	[24]-[26]
3	Distance of suppliers and dealers from manufacturing industry	[27]-[29]
4	Different sections productivity	[30]-[35]
5	Performance and Comparative analysis	[36]-[38]
6	Human Resources Orientation- Education training and development, team work, organizational learning, provision of public goods, export market assistance, importance of capital and finance, inter firm relationship	[39]-[68]
7	Inbound logistics- Information flow & analysis, Inventory [69]-[95] level & control, Integration of group companies, Vendor development in nearby region, Underutilization of software facilities, Scientific methods for forecasting, Orientation & customer service, Market penetration, Flexibility to change, Ineffective transportation, Integrated planning, Vendor rating	[69]-[95]

After successful completion of critical review of literature, authors have come across some of the performance indicators like: sale performance, make performance, delivery performance, human resource orientation, financial performance, product delivery, production programming, inventory management, inbound logistics, operational logistics and outbound logistics, purchase performance etc. as shown in Table I. These performance indicators are helpful in creating benchmarking of internal supply chain management as well as improving internal supply chain performance of manufacturing industries.

V. CONCLUSION AND FUTURE RESEARCH DIRECTIONS

Research on critical benchmarking performance indicators can be a valuable step towards enhancing chances of implementation improvement of internal supply chain performance in Indian manufacturing industries. The critical performance indicators lead to an environment of positive competition in the manufacturing industry. We have come across the review of literature and found performance indicators for benchmarking of internal supply chain management. In this research, we have mentioned only those indicators which have already come out during literature review. But after completion of this paper, we found some more indicators which are: Operational logistics, Economies of scale, Logistics strategies, New product development system, Material follow up and procurement, Production operation process, Production programming, Quality system, Products delivery, Foreign trade and service management, and Transport-reception-custom decision. The work shall address specific issues of manufacturing industries in the counseling as under:-

Support the creation of providers, specialized technical, administrative and financial services.

- Give rise to collective benefits, for example with the continuous inflow of raw materials supply, apparatus and equipment or the accessibility of workforce with segment precise skills.
- Build a healthy environment for the growth of inter-firm collaboration as well as of support among private and public institutions to support local manufacturing and combined learning.
- Focus on critical factors and their control may cut down the efforts and resources spending on non-critical factors. Also provide the scope of research for researchers in the field of benchmarking in internal supply chain management.

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