

Designing A Leaf-Based Performance Metric Model for Organisational Effectiveness (PMMOE) with Special Reference to Small and Medium Enterprises (SMEs)

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Abstract

Organizations are always on the move to improve their performance to stay in business for a longer period. Measuring performance has been one of the prominent activities in all types of business. Hence, organizations predominantly engage in tracking the performance against goals and also in identifying areas where improvement is needed. It is seen in the literature that systematic performance measurement models (Hudson, Lean, Smart, 2001) were implemented only in large companies. And later those measurements were tried in small and medium enterprises also. During the early '90s, SMEs mainly implemented financial performance measures used in large companies such as ROI, ROE, ROCE, and their derivatives. However, the operations carried out in large industries and SMEs are not the same. So this forms a major problem for those SMEs, as there is no specific performance measurement model available for them. Therefore, an effort has been made in this study to design a performance metric model specifically for SMEs. The model which, if designed is specific to their nature of operations will help them to monitor the performance of various factors leading to achieving organizational effectiveness and meeting the competition in the global market.

SMEs form the largest employment generator sector in India, which is next to the agriculture sector. It earns a significant share in export revenue of 40% of the total exports of the country. Extensive workforce i.e. about 106 million (40%) of India's total workforce is involved in these SMEs for production and operational activities. An effective performance measurement model if available would be very useful for this segment to keep track of their activities and move towards organizational effectiveness.

The Pump Industry was selected for the study because of its high importance and benefits to the growth of the country. Indian Pump industry is mounting at a compound annual growth rate of about 10 percent and shares more than 20 percent of the largest net assets of the mechanical industry. In addition, the Indian Pumps domestic market is rising at a healthy annual rate of 16 to 18 percent.

The present study is descriptive and conceptual in nature. The study was conducted during 2015-2019 in Coimbatore, Tamil Nadu. Coimbatore is the hub of various small and medium manufacturing

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units. Data was collected from stakeholders (owners, managers, supervisors, employees) of the pump manufacturing SMEs. The study adopts various stages which are interconnected with each other. As per the requirement of the particular stages, appropriate sample size, sampling technique, and methodology for data collection were used. The study adopts both qualitative and quantitative data analysis techniques.

Initially, the researchers concentrated on developing a conceptual process model for designing a performance metric model. Then in the next stages, the research concentrated on testing each stage of the conceptual process model like identifying the critical success factors and key performance indicators with specific to small and medium pump manufacturing units in Coimbatore city. Finally, a performance metric model was designed and presented.

The study identified twenty-five critical success factors for the pump industry out of which, the top ten critical success factors were considered for further stages of the process model. In the next stages, there were forty-three strategic objectives formulated, and corresponding KPIs and performance metrics were also identified. Thus a leaf-based performance metric model (PMMOE) was designed with these forty-three KPIs and metrics. This metric model helps the owners and managers to make relevant decisions as quickly as possible to sustain in this competitive environment. The model also supports sharing updates on organizational performance with stakeholders like employees, customers, bankers, and suppliers. There is quite a lot of scope for trying this model in other small and medium manufacturing clusters and making it more generalized. Also validating the model by testing it with actual data will make the model more applicable.

Keywords : SME, pump industry, metrics, organizational effectiveness, performance, analytics

Introduction

SMEs are the backbone of the Indian engineering sector. They form the largest employment-generating sector in India and earn a significant share of the export revenue of the country. Promoting and developing small and medium-scale enterprises (SMEs) are the priority focus of Indian industrial policy (MSME Department Policy, 2017-2018). Also, it can be seen that the Pump manufacturing industrial segment forms a major part of small and medium-scale enterprise clusters in India (Ken Research, 2015). This segment contributes 10 to 12 percent of the country's product exports and has a net value addition of over 20 percent in the manufacturing sector. The following figure 1.1 shows the major pump industry cluster in India.

This research is carried out in pump manufacturing small and Medium Enterprises in Coimbatore. It aims to design a performance metric model that is more specific to SMEs for measuring their performance against their organizational goals and objectives to keep track of organizational effectiveness. The proposed model is designed in such a manner that the stakeholders namely owners and managers of the organization can rely upon its quantitative output for effective decisions.

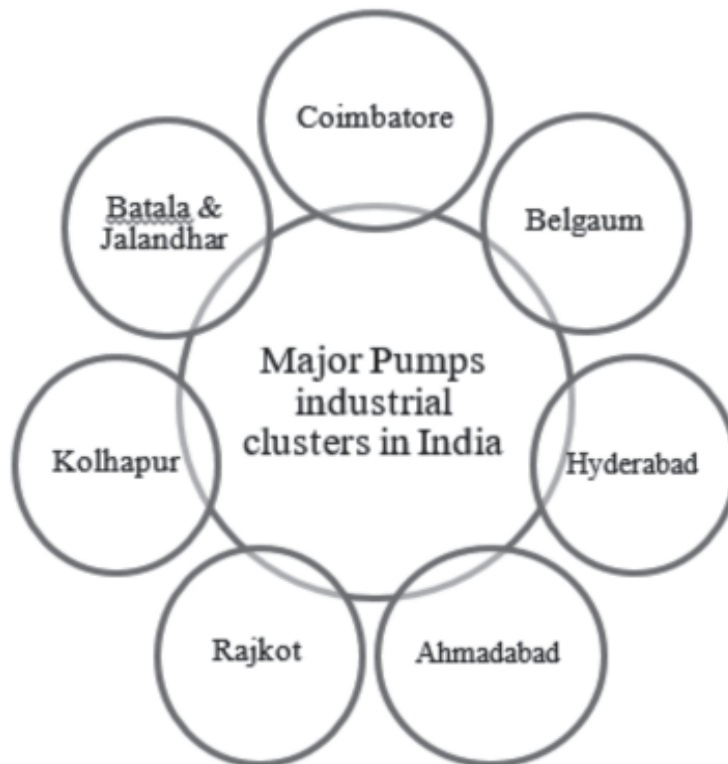


Figure 1.1: Major Pump Industrial Clusters in India

Literature Review

Workers, managers, departments, and organizations are always required to be effective to produce good results (George Pettinico, George R. Milne, 2017). Initially, researchers and practitioners concentrated on measurement systems and business performance (Neely et al, 2000), but later many studies have been done to develop comprehensive frameworks and models for measurement (Kaplan, R. S., 1986).

The first Performance Measurement Management (PMM) models were developed for large companies in the 1980s, while the first research on SME-PMM appeared in the mid-1990s. The concept of measuring performance is to enhance organizational effectiveness and organizational health with the ability to remain effective. During this period, SMEs mainly implemented financial performance measures used in large companies such as ROI, ROE, ROCE, and their derivatives (Weber & Thomas, 2005).

In the early 2000s, research on measuring the performance of SMEs took two directions. The first direction is the application or adaptation of models developed for large companies and the second is the development of specific models for SMEs. There were cases identified in research that showed

the implementation of the famous BSC, the application of quality models such as ABC application (Johnson & Kaplan, 1987). In addition, only a few frameworks offering an integrated approach to performance measurement were found in the literature.

It is also interesting to note that, like the PMM literature on large enterprises, the development of integrated frameworks seems to have stopped in 2002 in favor of research on more specific issues. Thus the major research gap is the non-availability of performance measurement models which do not have a clear picture of managing and monitoring the performance level of SMEs.

Researchers (Hauser, J. R., & Katz, G. M., 1998) measuring the performance of the organization, suggest that appropriate performance indicators must be chosen. Performance indicators are often linked to business strategy and are often derived to measure performance against a critical success factor (Martin, 2004). Generally, Performance indicators for manufacturing organizations consist of the measurement of seven criteria security, hour, cost, resource, quality, and actions. Weber & Thomas, (2005) specifies that there are two ways for identifying Performance Indicator. One is through identifying the CSF from the vision of the organization and another is through identifying the criteria of success from the earlier achievement of the organization (Roland Yeo, 2003).

Quite a lot of research is available which brings out how the performance indicators can be quantified. Most of the researchers use performance metrics to quantify indicators. Performance metric measures the behavior, activities, and performance of an organization. And it should be compatible with a wide range of stakeholder needs (David, S. & Richard, Finn, 2005). Parida & Kumar, (2007), suggest Performance metrics capture internal performance which includes measures of productivity and quality of service provided and can be the focus of measurement in addition to the traditional metrics based on finance.

Thus on scanning the literature, it can be concluded that there is a gap pertaining to the current availability of performance measurement models which might bring out a clear picture on managing and monitoring the performance levels of the SMEs.

Research Objectives And Hypothesis

The following are the objectives of the research.

1. To design a Performance metric model for Small and medium pump manufacturing industries.
 - a. To identify the common critical success factors.
 - b. To assign the key performance indicators that gauge the CSFs.
 - c. To choose the appropriate metrics that help to quantify the identified KPIs.
2. To identify a suitable time interval for monitoring the organizational effectiveness using the identified metrics of the model.

3. To categorize the identified metrics of the model to be monitored based on the stakeholder's requirement in the Small and medium pump manufacturing industry.
4. To examine the current status of the sufficiency of data availability and data quality prevalent among the small and medium pump manufacturing industry.

Based on the above objectives the following Hypothesis was framed. Thus the research proposes:

H1: Organizational effectiveness is measured through the five P's of Production namely 'Product', 'Process', 'People', 'Policy', and 'Place'.

H2: The five P's of organizational Effectiveness are achieved through Critical Success Factors.

H3: Critical Success Factors are achieved through Strategic Objectives.

H4: Strategic Objectives based on 'Cost', 'Quality', 'Quantity', and 'Time' helps to identify Key Performance Indicators precisely.

H5: Key Performance Indicators are measured through Performance metrics.

Research Methods

The research was divided into six stages and each stage had a separate type of research design, sampling techniques, data collection, and data analysis.

The first stage comprises of collection of the mission, vision, and quality policy of small and medium pump manufacturing Industries in Coimbatore. SIEMA List was used as a sampling frame to determine the sample respondents. The 2018 SIEMA list had 214 member organizations. Of these 97 members belong to pump industries. The websites of all 97 companies were scrutinized for the collection of mission, vision, and quality policy statements. Thematic analysis was used to identify the critical success factors which served as the base data for further analysis.

In the second and third stages, key performance indicators and corresponding performance metrics were identified. Strategic objectives were identified for each of the CSFs. For this 5 company owners and 25 department managers were interviewed. A Stratified random sampling technique was used to collect data. The top repeated objectives were identified using frequency analysis. Finally from the secondary data suitable KPIs and performance metrics were identified for each of the strategic objectives.

The fourth stage comprises designing the leaf-based performance metric model based on the literature support.

The fifth and sixth stages consist of categorizing the list of identified metrics needed by appropriate stakeholders at differing time intervals. This stage also understands the current state of availability of

data and its quality in these small and medium pump manufacturing Industries to implement performance metrics in their organizations. A structured questionnaire was distributed and data was collected by approaching 245 (50 percent) respondents from a total sample consisting of 485 approximately. Frequency distribution analysis, mean, and standard deviation were used to arrive at the results.

Research Results

The major research findings are discussed here.

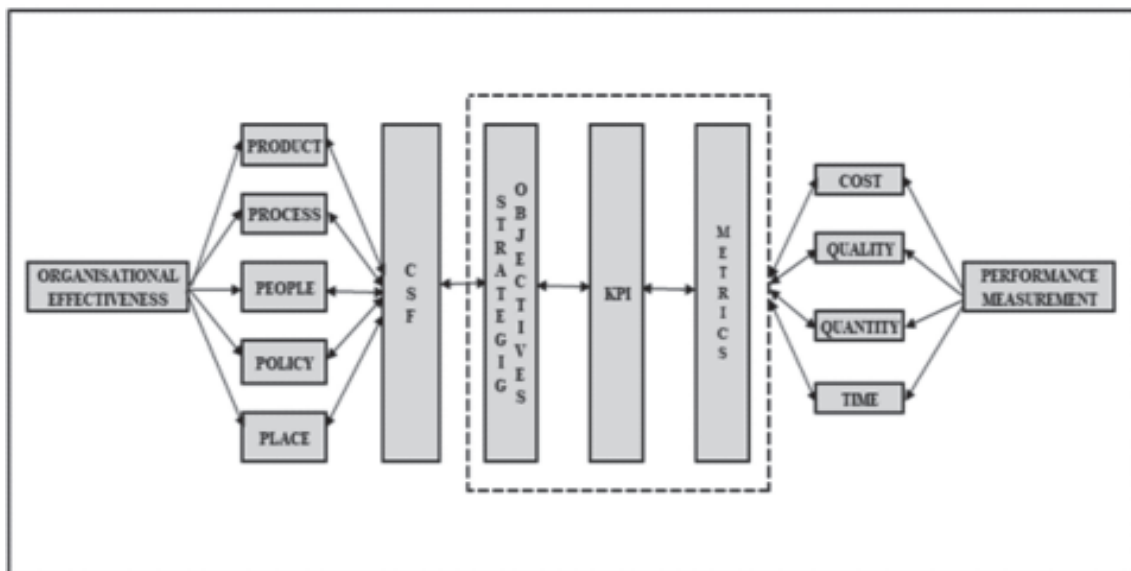
There were 25 critical success factors identified as common to all the pump industries in Coimbatore, analyzed using the thematic analysis word cloud given in Figure 5.1. Of the 25 CSFs that arrived top ten were included for further research. They are 'Product quality', 'Quality Management System', 'Employees effectiveness', 'Customer satisfaction', 'Product innovation', 'Providing timely service', 'Manufacturing process', 'Become market leaders', 'Training and development program effectiveness' and 'Stakeholders commitment'. Figure 5.1 shows the word cloud of 25 CSFs obtained out of thematic analysis.



Figure 5.1 : Word Cloud of the Common Critical Success Factors
(Thematic Analysis using NVivo software)

Next, for the identified CSFs, appropriate objectives were formulated from the opinion of the owners and the manager through the survey. It resulted in 43 strategic objectives spread across four dimensions namely cost, quality, quantity, and time. Finally, for the above-identified 43 objectives, the relevant KPIs and appropriated metrics were derived through literature support.

Finally, a performance metric model was designed. It is called a Leaf-based Performance metric model as it looks like a leaf and allows the user to navigate from both ends. It moves from the factors of organizational effectiveness to the dimensions of performance measurements as well as from performance measurement dimensions to factors of organizational effectiveness bringing out the specific areas for improvement through specific metrics. Thus it results in a two-way analysis. Below figure 5.2 shows the Leaf-based Performance metric model (PMMOE) in a diagrammatic format.



Conclusion

Performance analysis is crucial for any firm in any sector, not only for determining its own efficiency and achievement but also for further improvement and development. Firms should measure their success and failure because without measuring and evaluating it, taking improvement action is impossible. It helps to identify the extent of their usage of resources to produce and meet their goals or objectives. The use of the Leaf-based performance metric model helps the pump industries to monitor their performance periodically which aligns with their organizational goals. It also results in taking the necessary decisions immediately without any delay which is based on factual evidence. Thus the study proposes that if the pump manufacturing SMEs use the PMMOE model having 43 metrics to be monitored at suggested time periods by appropriate stakeholders; it will help in enhancing the organizational effectiveness.

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