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Frugal Approach by Productivity Improvement in Manufacturing Industry

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ABSTRACT

The aim of the study is to find a frugal approach for productivity improvement in a resource constrained environment for the manufacturing industry. Productivity improvement in the manufacturing industry is a key parameter for industry survival and for scaling up business performance. Competition in manufacturing industries for minimum manufacturing cost, best quality, and timely delivery is increasing exponentially. Industrial professionals are achieving only incremental results with the available lean tools for productivity improvement. Day by day, resources like raw materials, space, manpower, materials, water, electricity, fuel, etc. are getting tougher and shrinking. To stay in business, the manufacturing industry must find a way to operate in a resource constrained environment.

Keywords: Frugal Approach, Productivity, Manufacturing Industry, etc

1. Introduction

Manufacturing industries have witnessed an outburst in productivity. For productivity improvement, manufacturing industries are taking various initiatives by using lean tools and techniques. However, in different manufacturing industries, a frugal approach is applied to product design and services as a tool for improvement. The frugal approach contributed to proving less is more and seems to indirectly contribute to improving productivity. Hence, there is a need to understand the status of frugal approach application in manufacturing industries. All manufacturing industries are trying hard and putting forth continuous efforts for competitive existence. For productivity improvements, manufacturing industries are coming up with different effective and efficient solutions in manufacturing processes and operations. To overcome current challenges, manufacturing industries have started to use frugal approaches in product design and services. Productivity improvement plays a very important role in the survival of manufacturing industries. There are different tools available and being used by the manufacturing industry to improve productivity. To expand business for an exclusive customer base and allow a product range to be affordable. This is also a purpose driven business strategy to mitigate poverty, and this has new potential for business development. It means that a frugal approach and increased productivity go hand in hand in supporting manufacturing industries. Therefore, there is a need to understand the application of the Frugal Approach in manufacturing industries and its essence in productivity improvement initiatives. At present, manufacturing industries are facing challenges like low market demand and unpredictable business forecasts. Volatile market scenario and products. have a very small life cycle. It indicates that the manufacturing industry has only one way forward and must go with the adaption of frequent changes in production plans, on-time delivery, cost competitiveness, zero defects, and the manufacturing of customer asked variants. In this journey of manufacturing industries, the proportion of output to input resources is becoming very competitive, and this has now become one of the key performance indicators for success. Resource availability and its meaningful conversion is the key factor associated with manufacturing industries. Tools that are popular as enablers for productivity improvement are lean tools. All manufacturing industries are aggressively utilising these tools. Its importance is also acknowledged among the industries. The ultimate purpose of adopting lean tools is to make manufacturing processes and operations more effective and efficient. Productivity improvement lean tools which are popularly used by manufacturing industries are 5S , Live Display/Andon, Bottleneck operation analysis, uninterrupted or continuous flow, actual location of the shop floor, Heijunka (Production Level Scheduling), Hoshin Kanri (Policy Deployment), Jidoka (Autonomy), Just-In-Time (JIT), Kaizen (Continuous Improvement), Kanban, Key Performance Indicator (KPI), Muda (Waste), Overall Equipment Effectiveness (OEE), PDCA (Plan, Do, Check, Act), Poka-Yoke (No fault forward), Single Minute Exchange of Die (SMED), Prominent Losses, Goal with SMART Approach, Standardization, Takt Time, Total Productive Maintenance (TPM), Value Stream Mapping, Visual Management etc. Productivity improvement in the manufacturing industry is a very important aspect. As the days pass, the need for productivity improvement increases for producing the right product with the right process. This makes it an integral part of continuous business systems and strategies. Prominently, it has become very important to have efficient and effective productivity improvement methods to ensure the organization's growth in productivity. Therefore, this research aims to find an approach for productivity improvement to counter the challenging situation of the manufacturing industry. This research will enlighten the approach to performing in a constrained-based environment.

2. Productivity Improvements in Manufacturing Industry

Productivity improvement in the manufacturing industry is a key parameter. Productivity in manufacturing processes helps in scaling up business performance. At present, in manufacturing processes, lots of productivity improvement tools are available. These tools are predominantly popular and known as lean tools. Over a period, these tools are being practiced by industrial professionals. With this systematic approach of applying lean tools, incremental productivity improvement is nailed by industrial professionals. Day by day, resources like raw materials, space, manpower, materials, water, electricity, fuel, etc. are getting tougher and shrinking. The kind of competition in the manufacturing industry in terms of minimum manufacturing cost, best quality, and timely delivery has increased exponentially. Do more with less and deliver the best you need in an hour. To remain in business and ensure its existence, the manufacturing industry has no way to find a solution to perform in a constrained based environment. Manufacturing industry process productivity improvement is a prominent core strategy for achieving manufacturing process excellence. This approach helps in achieving the desired business financial and operational performance. It improves the customer satisfaction index and cuts down on investment to develop, manufacture, and produce products and services. Productivity has a direct and very specific relationship with manufacturing process performance measurement in terms of the process output, process utilization, goods costs, plant inventory levels, and the right time of delivery of goods. Productivity can be increased by reducing, eliminating, restoring (repairing) old processing, realigning the process, optimizing resources, reducing process variation, maximizing throughput, cutting costs, quality improvement, set-up time reduction, downtime reduction, and maintaining a zero approach such as zero breakdown, zero production loss, zero change in plan, and so on.

The objective of this study is to improve productivity in a resource constrained environment for the manufacturing industry. Further, this study has four objectives that will directly or indirectly help several industrial stakeholders. The first objective of this study is to give direction for understanding the present state of frugal approach in the manufacturing industry. This objective will enable us to know the current scenario of frugal approach in the manufacturing industry. The second objective is to explore the identification of themes for the frugal approach. These themes will help for the applicability of a frugal approach to an industrial problem. Furthermore, Themes are validated by the appropriate methodology. The third objective is the development of a framework for the frugal approach application for productivity improvement. A structured framework is developed, and this can be used to solve an industrial problem with a frugal approach. Subsequently, the fourth objective will give confidence about the performance evaluation of the frugal framework. This study is mainly focused on the improvement of productivity in the manufacturing industry

using a frugal approach. In the journey of industrial process productivity improvement, this study will help industrial engineers to add new lean tools as a frugal approach. This research will provide an outlook on how to approach to improve the industrial process in a resource constrained environment. This study will help in finding a frugal approach for productivity improvement in manufacturing industries to overcome the current challenges of highly competitive times.

3. Themes Identification For Frugal Approach

The previous chapter conducted a literature review with various available case studies and industrial visits to study the current scenario of frugal approach in manufacturing industry. The frugal approach is found to be non-structured and is random in different areas for its utility. Hence, this chapter presents the identification of the themes for the applicability of the frugal approach. It will help in evolving a successful direction to improve productivity. This chapter highlights the need for themes as a guiding path to assist the manufacturing industry with productivity improvement with a frugal approach. Theme identification is done based on the collection of data from an industry problem bank, data analysis with statistical tools, and validated using the Delphi technique.

4. Need For Themes For Frugal Approach

Lean tools used for productivity improvement are structured and systematic. However, the frugal approach is non-structured and random. In order to apply the frugal approach, there is no guiding path available for its systematic application. To have effective implementation of the frugal approach, industrial problems are supposed to be segregated into different regimes. Based on these facts, themes for a frugal approach are needed for the future. This will help to tune the industrial problems into different buckets and will enable the professionals to apply a frugal approach in a very focused way. Multinational corporations have created products and services for customers at the top of the pyramid who can afford them. Whereas multinational corporations have ignored the bottom of the pyramid customers as non-targeted business areas. On the other hand, a frugal approach targets the undeserved customer and process. The frugal approach has the power to attract poor customers and opens the door to establishing processes and products that they can afford. Theme identification will help to address different sectors of business with a frugal approach.

5. Steps For Identification of Themes For Frugal Approach

For the identification of themes for frugal approach below steps are followed:

1. Collection of data from identified manufacturing industries.
2. Tabulation of data with stratification like Problem Description, Financial Year and

Name of the industry.

3. Analysis of data by using statistical tools.
4. Inference from statistical analysis.
5. Identification of themes for the applicability of the frugal approach.
6. Validation of identified themes by Delphi technique.

6. Conclusion

This paper presented a brief background on productivity improvement and productivity improvement techniques. In this chapter, background discussed the challenges being faced by the manufacturing industry with a constrained base environment. The need for the frugal approach and its application in productivity improvement are discussed. In this chapter, the aim and scope of the study are defined. Then a brief outline of the methodology is presented, followed by a short description of the organization of the thesis. The next chapter will present the literature review and then find out the issues in this research area

The themes identified for the applicability of the frugal approach evolving successful direction for productivity improvement in manufacturing industry. The themes are developed based on the industrial problem bank data from the manufacturing industries and statistical analysis. Further, the themes are validated using Delphi technique. The proposed themes are covering all the possible fields striving for productivity improvement in manufacturing industry. These themes can be applied at various levels and based on need of the situation. In addition to it, the proposed themes are facilitating strategic decision in manufacturing activities in dynamic situation. The theme provides an opportunity for industrial professionals to view industrial resource constrain problem in much focused way. This in turn, it is expected to evolve successful themes for the applicability of the frugal approach for productivity improvement in manufacturing industry.

REFERENCES

1. Zeschky, M. B., Winterhalter, S., & Gassmann, O. (2014). From cost to frugal and reverse innovation: Mapping the field and implications for global competitiveness. Research-Technology Management, 57(4), 20-27.
2. Alam Md Tawqueer and Gangil Manish cc Employees Skills Inventory using Deep Learning for Human Resource Management" Research Journal of Engineering Technology and Management (ISSN: 2582-0028) Volume 2, Issue 4, December 2019.
3. Shantilal Sonar Prashant and Gangil Manish "Warehouse Sales Forecasting using Ensemble Techniques" Research Journal of Engineering Technology and Management (ISSN: 2582-0028) Volume 2, Issue 4, December 2019.
4. Shantilal Sonar Prashant and Gangil Manish "A Review of Optimization-associated examine of Electrical Discharge Machining Aluminum Metal Matrix Composites" Research Journal of Engineering Technology and Management (ISSN: 2582-0028) Volume 2, Issue 3, September 2019.
5. Kumar Hemant Dave Kush and Gangil Manish "An Approach to Design of Conveyor Belt using Natural Fibres Composite" Research Journal of Engineering Technology and Management (ISSN:2582-0028) Volume 2, Issue 3, September 2019.
6. Kumar Hemant Dave Kush and Gangil Manish "An Assessment of Duplex stainless Steel pipe for Oil and Gas Application" Research Journal of Engineering Technology and Management (ISSN:2582-0028) Volume 2, Issue 3, September 2019.
7. Sah Ram Balak and Gangil Manish "Optimization Design of EDM Machining Parameter for Carbon Fibre Nano Composite" Research Journal of Engineering Technology and Management (ISSN: 2582-0028) Volume 2, Issue 3, September 2019.
8. Kantilal Patel Bhaumik and Gangil Manish "Scope for Structural Strength Improvement of Compressor Base Frame Skid" Research Journal of Encoineerinc Technology and Management (ISSN: 2582-0028) Volume 2, Issue 2, June 2019.
9. Kantilal Patel Bhaurnik and Gangil Manish "Recent Innovations for Structural Performance Improvement of Cotter Joint" Research Journal of Engineering Technology and Management (ISSN: 2582-0028) Volume 2, Issue 2, June 2019.
10. Tanel Hirenkumar Vishnubhai and Gangil Manish "Recent Innovations for Structural Performance Improvement of Plummer Block" Research Journal of Engineering Technology and Management (ISSN: 2582-0028) Volume 2, Issue 2, June 2019.