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OpportunitiesforLean- Six Sigma (LSS) in Bangladeshi Industries

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Abstract

Companies around the globe are now suffering serious strategic plights by facing financial recession and huge competitive pressures. Countries in developing countries like, Bangladesh are also facing this issue and their manufacturing industries are not capable to compete others especially on waste reduction and quality problems. LSS is one of the most effective tools to overcome these problems and also improve the business process continuously. This approach is dynamic and synergistic force. Although this is a combined approach of reducing wastes and performance variations, the methodology is quite understandable. LSS is based on clear methodological principles and can be implemented on any process within any industry – in manufacturing and service, and in companies small to large. Lean and Six Sigma are collaborative and complementary in nature and when performed efficiently, represent a long term business practice that produces unparallel results. Lean accelerates Six Sigma and delivers greater results in terms of increased revenue, reduced costs and improved collaboration than what would typically be achieved by Lean or Six Sigma individually. Lean focuses on elimination of non value added steps in a process while Six Sigma focuses down its approach on reduction of variation over the remaining value added steps. This paper includes a methodology of LSS approach and presents how LSS improve the customer satisfaction, cost, quality and process speed. The paper also contains the basic principle of LSS and discusses why the use of LSS in manufacturing industry and service industry (hospital, HR administration) is so important. Main goal is to identify the opportunity of this mixed approach in various organizations. Finally, the overall execution process and value stream map show how LSS improve the process by bring a product (or transaction) though the main flows essential for every product/ service by discussing the opportunities of LSS for Bangladeshi industries.

Keywords: *Lean- Six Sigma, DMAIC, Value stream mapping.*

1. Introduction

Lean and Six Sigma are recent developments in continuous improvement methodology that have been popularized by several high-profile companies. The success and complementary nature of these methodologies has led to their combination into a single methodology, commonly called Lean Six Sigma or Lean Sigma. Lean Six Sigma has grown into a vital business discipline that was born of two individual methodologies--Lean and Six Sigma. Lean focuses on the elimination of waste from any and all business processes and centers around process flow and the separation of value-added and non-value-added. Six Sigma is a data driven approach for eliminating defective products. Lean and Six Sigma complement each other. Lean accelerates Six Sigma, delivering greater results than what would typically be achieved by Lean or Six Sigma individually. Combining these two methods gives your improvement team a comprehensive tool set to increase the speed and effectiveness of any process within your organization – resulting in increased revenue, reduced costs and improved collaboration. There are many ways that Lean Six Sigma can be applied to any type of company or organization. Lean Six Sigma more effective and different from its solitary isolated components is the fact that it optimizes the balance between "just quality" and " just speed". It is a balanced process that helps an organization with improving service quality, within a set time limit (DUSA, 2009) .You can readily start to apply it to your company. The LSS methodology integrates the human/customer elements like (culture change, customer focus, etc.) and process elements (process management, statistical analysis of data, measurement and system analysis, etc.) for improvement. Lean Six Sigma's growing popularity in the services industry masks a downside. Many organizations have trained and deployed legions of Lean Six Sigma experts—known as black belts—only to see little value result from their work. In a recent Bain & Company management survey of 184 companies, 80 percent say their Lean Six Sigma efforts are failing to drive the anticipated value, and 74 percent say they are

not gaining the expected competitive edge because they haven't achieved their savings targets. Not only service industry but also manufacturing industry has a vital role of LSS.It can be applied in garments manufacturing industry to minimize bottleneck, scrap product. The implementation of Lean and Six Sigma requires a systemic laid out plan that cannot be completed in a company board meeting in one day. This systemic plan of action is as crucial as the operating of the programs themselves. According to George (2003), failures occur most often in the execution of implementing of Lean and Six Sigma. The components of successful implementation and the creating of a Lean/Six Sigma culture will be introduced and discussed in great detail.

2. Literature Review

Overview of LSS

Lean Six Sigma (LSS) is a powerful, flexible and proven cost and waste elimination method that has been used successfully in both private and public organizations. It is applicable equally to both industrial/manufacturing processes and transactional/customer service processes. In other words Lean Six Sigma is a synergized managerial concept of Lean and Six Sigma that results in the elimination of the seven kinds of wastes (classified as Transportation, Inventory, Motion, Waiting, Overproduction, Over-Processing, and Defects,) and provision of goods and service at a rate of 3.4 defects per million opportunities. In order to understand the power of LSS methodology it is important to know about lean and six sigma.

Lean is an approach to organizational improvement that focuses on process speed and efficiency. It does this by a relentless search for all kinds of waste in the functions the organization performs. This waste is generally identified as non-value-add tasks, process steps, review cycles, reporting requirements and personnel practices that distract and take away from the absolutely essential functions the organization must perform. By identifying and eliminating these non-value-add activities, the organization decreases costs and shortens the time required to deliver goods and services to its customers (either customers in the traditional commercial sense of the word or citizens under the authority of a government entity.

Six Sigma is a set of tools and strategies for process improvement originally developed by Motorola in 1986. In other words, Six Sigma is a disciplined, data-driven approach and methodology for eliminating defects (driving toward six standard deviations between the mean and the nearest specification limit) in any process – from manufacturing to transactional and from product to service. Six Sigma also created a generalized problem solving methodology called DMAIC (Define, Measure, Analyze, Improve, and Control). In the first step, **Define,** you must talk to the user of your output to understand what they would like to see improved. In the **Measure** phase, you collect data to verify the users' issues. The **Analyze** and **improve** phases use the Statistical Process Control tool to reduce variation. Finally, the **Control** phase requires the owners of the process to sustain the benefits achieved.

Common LSS Terms

I. Common cause variation: Variation where the root cause is known or easily understood without advanced statistical analysis. For example, if different workers perform the same task in significantly different amounts of time, one obvious root cause would be lack of standard work, training, and best practices.

II. Non-common cause variation: Variation where the root cause is not readily evident and in which statistical analysis (e.g., DOE or ANOVA) must be performed to determine the root cause of the responsible independent variables. For example, a manufacturing defect may require quantitative analysis to determine which combination of variables is significant.

III. Tact time: Available time divided by customer demand. This produces a value in units of time per good or service. If tact time is five minutes, a value stream or cell should produce a good or service every five minutes.

IV. Value stream: All the actions, value-added and non-value-added, required to bring a product or service from raw material through to the customer.

Lean and Six Sigma make such a powerful combination because Lean maximizes value stream velocity and Six Sigma minimizes value stream variation. Without the combination, companies might fall into the trap of increasing value stream velocity alone; in that case, the quality of the end product may degrade because the firm produces more flawed product per unit of time.

LSS Principles

In lean Six Sigma, there are five principles that are used:

I. The first of these is the **law of the market**. This signifies that the customer is always to be put first. The company must implement this immediately and make sure that all employees adhere to it. The company wants the employees to understand that without the customers, there would be no business.

II. The second of these principles is the **law of flexibility**. If a process is easily maneuverable, it is easier to work with. A method of business that cannot be changed for any reason can cause problems.

III. The third principle is the **law of focus**. This is meant to keep the focus on the problems within the company and not the entire company itself. Executives and employees should concentrate on just the portions of the company that are causing problems and fixing those problems, dismissing distractions by other areas of the business that are not having problems.

IV. The fourth principle is the **law of velocity**. This means that if a process has many, many details that have to be performed, it may be slowing down the process. The work put into the process should be proportional to the results the company sees.

V. The fifth principle in lean Six Sigma is the **law of complexity**. Simply put, keep it simple. When a process is complex and difficult, it may have elements that are not necessary. More complexity does not necessarily mean more valuable or more important. In fact, it could mean just the opposite.

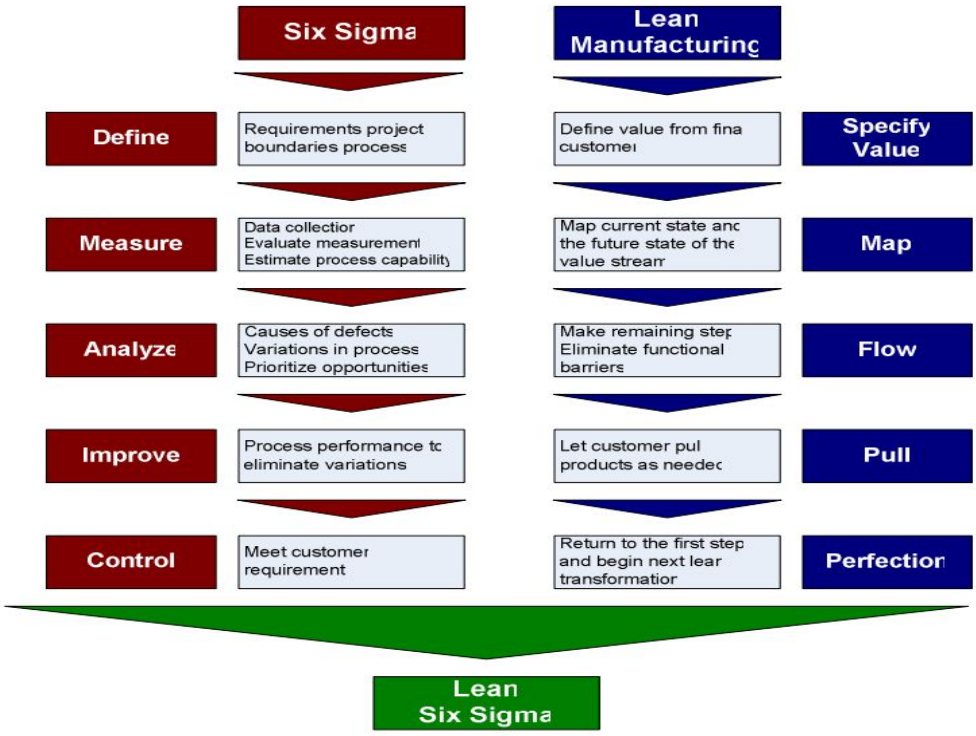

Fig.1. Combined Lean Six Sigma principles

General Applications

I. Lean Six Sigma can be applied to finance and accounting by reducing the time it takes to close the monthly accounting, controlling spending, improving the process to pay vendors, reducing the time it takes to complete payroll processing, improving payment receipts from accounts receivable and improving the forecasting process.

II. Use Lean Six Sigma in sales and marketing for improving time required to enter sales orders, reducing errors on sales orders, increasing the repeat orders process, reducing the time it takes to approve a new customer's credit line, reducing the time spent on bad deals or no sales, improving the cycle time from invoicing to receiving payment and improving client management processes.

III. Apply Lean Six Sigma to shipping and receiving by improving delivery time to customers, improving the documentation processes, improving inventory control and rotation and improving the inspection process.

IV. Implement Lean Six Sigma in information technology by finding ways to reduce network and server downtime, improve help desk processes, improve system reliability, improve technical support calls and responses and improve software and hardware upgrading processes.
V. Apply the process to call center departments by increasing or decreasing talk time on calls, improving employee knowledge and communication skills and reducing customer on-hold time.
VI. Apply Lean Six Sigma to product or service design by reducing the time it takes to complete designs, reducing the number and severity of design errors and reducing design testing time.
VII. Healthcare facilities can apply Lean Six Sigma in several ways including improving patient satisfaction and care, improving physician satisfaction, reducing costs and increasing savings, reducing time patients spend in the emergency room and eliminating system redundancies, bottlenecks and waste.
VIII. Education facilities can apply Lean Six Sigma by improving student satisfaction, teacher satisfaction, the registration process, the grade reporting process, the communications process from student to teacher to administrator, the teacher evaluation process, reducing waste and costs, improving all processes from handling student and teacher records to purchasing, information technology, bus routing and upkeep and building maintenance.

3. Methodology

The theoretical implementation of lean six sigma strategy is based on the following steps-

First step

Need to look at the "3 Real Things" in every operation.

I. Material Flow or Business Steps (i.e. transactional processes)
II. Information Flow (data)
III. Work-in-process

Second step

Need to answer the following questions.

I. Ask what?i.e., what is the operation doing?
II. Ask why?i.e., why is the operation necessary?

Anything which does not add value is waste. Once the function of the process is known, waste can then be identified.

An improvement plan can be achieved by asking how. For example: how the production process run?

Third step

Finally, major contributors need to be checked out.

I. Overburden/ overdoing (or called, MURI)
- Waste caused by how work and tasks are designed

II. Unevenness (or called, MURA)
- Waste caused by poor quality (process unpredictability)

III. Process methods (MUDA)

For overall implementation of lean with six sigma perfection, the process then need to be examined through DMAIC' (Define, Measure, Analyze, Improve and Control). The details of DMAIC process are as follows:

Define	Define the requirements and expectations of the customers Define the project boundaries Define the process by mapping the business flow
Measure	Measure the process to satisfy customers Develop a data collection plan Collect and compare data to determine issues and shortfalls
Analyze	Analyze the causes of defects and sources of variations Determine variations in the process Prioritize opportunities for future improvements
Improve	Improve the process to eliminate variations Create alternatives and implement enhanced plan
Control	Control process variations to meet customer requirements Develop a strategy to monitor and control the improved process Implement the improvement of the systems and structures

4. Theoretical Implementation of LSS

The execution of a Lean Six Sigma initiative includes three streams of activities:

I. Initiation
II. Resource allocation and project selection, and
III. Implementation&sustainability.

The Initiation stream includes the steps that are necessary to successfully execute Lean Six Sigma. These activities are conducted by the leader of an organization or company. The activitiesneed to be done by the CEO and those who directly report to CEO to implement and support the LSS initiative. These activities lay the foundation for a successful implementation. For this research effort the Initiation stream will be considered "deployment." CEO involvement is widely believed by most professional implementers to be a vital factor to LSS implementation. Lean Six Sigma expert Michael George states, "Over the past dozen years in working with both successful and failed continuous improvement initiatives, my colleagues and I have learned one hard-and-fast lesson: the Lean Six Sigma effort will succeed or fail based on the engagement and buy-in of the CEO and executives with P&L (Profit and Loss statement) responsibility" (George, 2002). This anecdotal evidence suggests that without the support and engagement of the top-level management of an organization it is impossible to organize and utilize the energy of the entire organization. This lack of support appears to doom a Lean Six Sigma or any quality improvement initiative to failure. The leadership support of Lean Six Sigma includes three specific activities performed by the CEO in coordination with the executive leadership.First is "CEO/executive engagement, as demonstrated initially by his or her active involvement in the upfront decisions about "where," "how," and "who" of Lean Six Sigma" which is followed by the second leadership activity "setting long-term (two- to five-year) fiscal and performance goals for the organization. The third and final leadership activity is, "commissioning a design/deployment team to champion the design of the Lean Six Sigma policies and architecture for the company" (George, 2002). The George Group's implementation model describes the design and deployment team's initial responsibilities are to "determine the gaps between current and desired performance, determine how Lean Six Sigma can close the gap, and develop a preliminary design for the implementation of Lean Six Sigma".

The implementation team's mission is to use the gap analysis to design the Lean Six Sigma plan to address the changes required to meet the desired performance levels. Once the theoretical issues have been addressed, the team then moves on to developing the infrastructure that will support the Lean Six Sigma implementation. With the CEO approval of the goals and the general deployment plan, the design team then sets about to develop a detailed deployment plan. According to George, "Meticulous planning for the first 100 days of implementation is a prime determinant of the ultimate success of a Lean Six Sigma launch and of your organization's ability to achieve major cost and lead time reductions and quality improvements in one year". According to George (2002) the detailed deployment plan should include the following components:

I. Process: Designing the critical Lean Six Sigma sustaining processes to be part of the normal business mode of operations.
II. Organization: Fleshing out the organizational structure by determiningthe roles, responsibilities, and reporting structures. Developing the criteria and selecting the champions and black belts. Identifying what training will be given to which groups of people.
III. Measures: Determining the measures of success.
IV. Rewards: Establishing mechanisms for collection of information and methods for providing rewards and recognition.
V. Tools: Determining requirements for supporting software tools.

Value stream mapping

A value streamis all the actions (both value added and non-value-added) required to bring a product (or transaction) though the main flows essential for every product/ service: from raw material/(customer need), through all the required steps, then – back to the arms of the customer. An example of typical value stream mapping for a manufacturing Industry is plotted here.

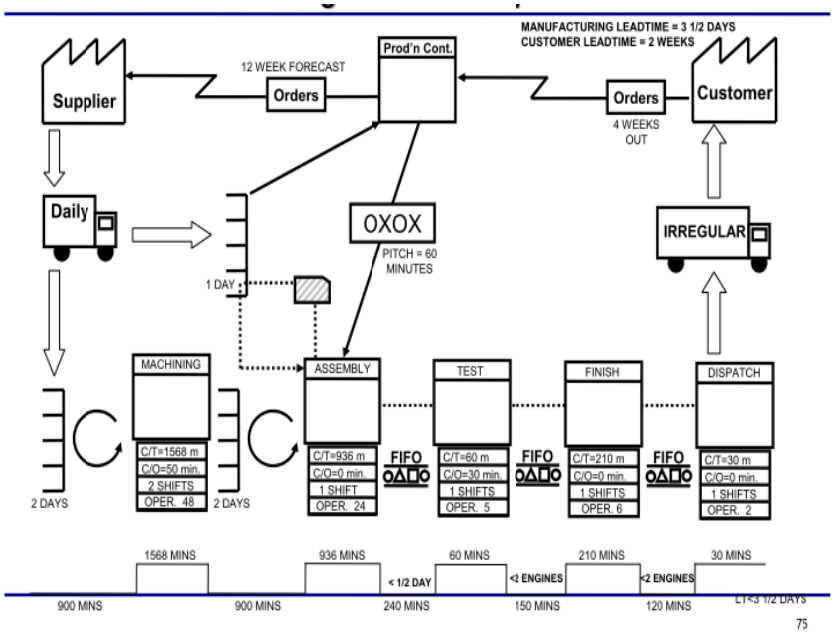

Fig.2. Value stream mapping

5. Limitations, Recommendations &Conclusion

The problems and challenges faced by an organization are gathering quality data, effective communications etc. significantly in between processes where no primary or metadata is available to begin with (Antony, 2008). The effective analysis, selection and prioritization of organization's projects can be one of the most critical factors for success of a Lean Six Sigma program. Many organizations still base the prioritization of programs, on a purely subjective basis, which often leads to program or project failure million opportunities. Lean Six Sigma implementation is most vulnerable to digress into a mere bureaucratic exercise if the project focus shifts on things such as the number of trained Black and Green Belts, etc. instead of bottom line organizational savings.This paper introduces the opportunities of Lean Six Sigma process, which combines the bests of Six Sigma and Lean. As a combined approach, it uses the strongest parts of each and reduces the limitations of each approach when they are used in isolation. The Lean Six Sigma process is extremely useful for those service companies and manufacturing industries that want to gain the benefits of Six Sigma while increasing customer satisfaction. Lean Six Sigma principles-based methods will change how you manage your business and sustain positive change into the future. The data based structure drives how management will make reality-based decisions and govern day-to-day employee performance. The suggested management strategy can provides an opportunities of reduce costs, improve quality, develop better schedules and time lines, increase speed and efficiency and reduce customer delivery time which have sealed its place as a leading methodology for improvement of our business in the present and hopefully in future for manufacturing industries in Bangladesh.

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