



Comparative study for Lean and Six Sigma for organizational improvement

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ABSTRACT

In this study a comparative research has been done on Lean and Six-Sigma. For organizational improvement and process improvement both the management philosophies are effective but depends upon their applicability. Sometimes Lean is more preferable and sometimes other Six Sigma can take the place. Lean is basically emphasized on minimized the waste of a system and depends on process flow. Six Sigma on the other hand takes care for reduce the variation of the system and emphasized on the problem of the system. In this paper, a discussion has been done to conceptualize the effectiveness of Lean as well as Six Sigma methods for improvement.

KEYWORDS:

Six Sigma concepts:

Six Sigma seeks to improve the quality of process outputs by identifying and removing the causes of defects (errors) and minimizing variability in manufacturing and business processes.[4] It uses a set of quality management methods, including statistical methods, and creates a special infrastructure of people within the organization ("Black Belts", "Green Belts", etc.) who are experts in these methods.[4] Each Six Sigma project carried out within an organization follows a defined sequence of steps and has quantified financial targets (cost reduction and/or profit increase).[4]

Six Sigma process steps:

Six Sigma includes five steps: define, measure, analyze, improve and control (commonly known as DMAIC)[2],[11]:

- Define. Practitioners begin by defining the process. They ask who the customers are and what their problems are. They identify the key characteristics important to the customer along with the processes that support those key characteristics. They then identify existing output conditions along with the process elements.
- Measure. Next the focus is on measuring the process. Key characteristics are categorized, measurement systems are verified and data are collected.
- Analyze. Once data are collected, it is analyzed. The intent is to convert the raw data into information that provides insights into the process. These insights include identifying the fundamental and most important causes of the defects or problems.
- Improve. The fourth step is to improve the process. Solutions to the problem are developed, and changes are made to the process. Results of process changes are seen in the measurements. In this step, the company can judge whether the changes are beneficial, or if another set of changes is necessary.
- Control. If the process is performing at a desired and predictable level, it is put under control. This last step is the sustaining portion of the Six Sigma methodology. The process is monitored to assure no unexpected changes occur.

Lean concept:

Lean thinking is sometimes called lean manufacturing, the Toyota production system or other names. Lean focuses on the removal of waste, which is defined as anything not necessary to produce the product or service. Frequently, lean's focus is manifested in an emphasis on flow.

Lean process steps [9]:

There are five essential steps in lean:

1. Identify, which features, create value.
2. Identify the sequence of activities called the value stream.
3. Make the activities flow.
4. Let the customer pull product or service through the process.
5. Perfect the process.

Identify value. The determination of which features create value in the product is made from the internal and external customer standpoints. Value is expressed in terms of how the specific product meets the customer's needs, at a specific price, at a specific time. Specific products or services are evaluated on which features add value. The value de-

termination can be from the perspective of the ultimate customer or a subsequent process.

Identify the value stream. Once value is identified, activities that contribute value are identified. The entire sequence of activities is called the value stream. Then a determination is made as to whether activities that do not contribute value to the product or service are necessary. Necessary operations are defined as being a prerequisite to other value added activities or being an essential part of the business.

Improve flow. Once value added activities and necessary non-value activities are identified, improvement efforts are directed toward making the activities flow. Flow is the uninterrupted movement of product or service through the system to the customer. Major inhibitors of flow are work in queue, batch processing and transportation.

Allow customer pull. After waste is removed and flow established, efforts turn to letting the customer pull product or service through the process. The company must make the process responsive to providing the product or service only when the customer needs it—not before, not after.

Work toward perfection. This effort is the repeated and constant attempt to remove non-value activity, improve flow and satisfy customer delivery needs. While lean focuses on removing waste and improving flow, it too has some secondary effects. Quality is improved. The product spends less time in process, reducing the chances of damage or obsolescence. Simplification of processes results in reduction of variation. As the company looks at all the activities in the value stream, the system constraint is removed, and performance is improved.

The lean methodology also makes some assumptions[10]:

- People value the visual effect of flow.
- Waste is the main restriction to profitability.
- Many small improvements in rapid succession are more beneficial than analytical study.
- Process interaction effects will be resolved through value stream refinement.

Table 1: Different program for quality journey[3]

Program	Six Sigma	Lean Thinking
Theory	Reduce variation	Remove waste
Application guidelines	1. Define 2. Measure 3. Analyze 4. Improve 5. Control	1. Identify value 2. Identify value stream 3. Flow 4. Pull 5. Perfection
Focus	Problem focused	Flow focused
Assumptions ⁽⁶⁾	A problem exist, Figure and numbers are valued. System output improves if variation in all processes is reduced	Waste removal will improve business performance. Many small improvements are better than systems analysis

Primary effect ^[7]	Uniform process output Reduced flow time Secondary effects Less waste. Fast throughput. Less inventory. Fluctuation-performance measures for managers. Improved quality	Less variation. Uniform output. Less inventory. New accounting system. Flow-performance measure for managers. Improved quality.
Criticisms ^[8]	System interaction not considered. Process improved independently.	Statistical of system analysis not valued

Comparison of Lean and Six Sigma:

Lean Six Sigma was actually derived from two systems[1]. One of those systems, of course, was Six Sigma, and the other system was Lean Manufacturing. These two systems were combined to make Lean Six Sigma because the systems can be used to complement one another so well. When there are complex problems, methodologies from both systems can be used to completely analyze and solve a problem within a busi-

ness. As the Lean and Six Sigma tools are implemented in problem solving, the type of problem and the complexity of the problem will be shown, and those working the problem will know whether to use the DMAIC approach or a Lean tool to solve the specific problem[5]. Lean Methods and Six Sigma Methods are both used for continuous improvement, but the Lean Methods tend to be smaller increments of gain over time to become great gains. Six Sigma Methods are there to make significant changes to the business process to result in major impacts on the overall quality of a business.

Conclusion:

It is to be concluded that both the management philosophies are effective in product and service sectors. As India in concern, this country is famous in all over the world for its providing the service. Hence, service sectors of India has greater employment opportunities. Six Sigma will take care for process improvement taking care of all the staffs of an organization by minimizing defects. On the other hand Lean will take care from the top of organization to flow in the bottom level by minimizing the waste which will not add any value for the organization.

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