

Method of Implementation and Application of Six Sigma Concept in Food Industry

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Summary

Six sigma is a quality control tools that are used to improve the process and minimize the defects which help in achieving targets and help in boosts the profits. It is a statistical tool that allow only 3.4 defects per million of opportunity. Generally, two methodologies are used for implementation of six sigma. All the six sigma process are executed into 4 groups such as six sigma white belt, six sigma yellow belt, six sigma green belt and sig sigma black belt and overseen by six sigma master black belt asper the term created by Motorola.

Introduction:

Six sigma is a method or technique that provide organizational tools to improve the strategic process, new product development, service and It leads to reduce the defects, improve the profits, and quality of product. The implementation of full six sigma concept is equal to 99.9997% accuracy that means it reduce the defect up to 99.9997% and offers a very low level of 3.4% defects per million opportunities (DMPO). Motorola is a smartphone company which launched the Six Sigma program 1st time in the 1980 and awarded with Malcolm Baldrige National Quality Award for its innovative approach to developed the quality approach. it is represented by the Greek symbol “ σ ”. it is a statistical term that measures process deviation from process mean and target. In the business contrast, Six Sigma is a stronger methodology that increases business process efficiency and able to reduce defects. This is useful to achieve customer satisfaction. While another side, in the statistical contrast, it aims to decrease the variability in business processes. Six sigma’s imperial goal is to improve each and every process so that overall quality is improved. It is widely used by the companies, industries, small and medium-size enterprises to improve their strategy and meet their goal towards best quality of product output.

Objective of Six Sigma implementation:

The main objective of six sigma strategy is such as

- Improve customer satisfaction (Internal and External)
- Improve the quality of product and service
- Reduce the process cycle time
- Overall cost
- Development of staff skill

Methodologies:

Generally, two well-known project methodologies are widely followed during Six Sigma projects. These widely used project methodologies are inspired by W. Edwards Deming's Plan–Do–Study–Act Cycle where each are comprises with five phases

- DMAIC project methodologies are used for the projects which aimed at improvement of existing business process.
- DMADV project methodologies are used for the projects which aimed at development of product or process designs.

DMAIC

DMAIC is a data driven quality strategy used to improve the process and it is comprising with five phases.

1. Define: - The leaders of the project create a Project Charter, create a high-level view of the process, and begin to understand the needs of the customers of the process
2. Measure: - The purpose of this step is to evaluate and understand the current state of the process and involve in collecting data for measures the quality, cost, and throughput/cycle time
3. Analyze: - In this step, the data is used from the Measure step to determine the cause-and-effect relationships in the process and to understand the different sources of variability.
4. Improve: - The improvement or optimization of current process based on data analysis using techniques like design of experiments, mistake proofing, and standard work to create a new as well as future state process. Once the project teams satisfied with their data then they move on to solution development and the team is most likely collecting



improvement ideas throughout the project. Pilot runs are done to establish process capability.

5. Control: - The team has been building a form of infrastructure throughout the project and control the system of the process management for sustainable improvements. Future state process is controlled with a motive to ensure to any deviations from the correction of the target before the defect of result arises. Implementation of control systems like statistical process control, production boards, visual workplaces and continuously process monitoring. Repeatedly this process is done until desired quality is obtained.

DMADV:

It is recognized as Design for Six Sigma (DFSS). DMADV methodology is implemented for inventing and innovating a completely new product, service, or processes, new features of existing products, services, or processes. DMADV project methodology comprises with five phases.

1. Define: Design goals are used to define which are consistent with customer demands and the enterprise strategy. It is also used to develop a business case and understood the risk and the benefits of the project
2. Measure: The measurement and identification of characteristics that are Critical to Quality (CTQs), measurement in product capabilities, production process capability, and measurement of risks. This phase consists of three different steps
 - Dividing the market into different segments
 - Conducting a survey
 - Using the survey results as inputs to find critical-to quality (CTQ) characteristics
3. Analyze: A design is generated or the current design is analyzed for defects by using the cause and effect diagrams and evaluate design capability to select the best design.
4. Design: In this phase, three steps are present:
 - A detailed design is created of the best design from the analyze phase
 - Estimate the capabilities of the process elements
 - Develop the verification plan
5. Verify: Set up pilot runs, implement the production process for the verification of design and hand it over to the process owners.



Application of Six Sigma methodologies in food industry:

At the present scenario, global food industry faced several challenges which directly forces to the company to improve their productivity as well as quality strategies to sustain the market competition. Companies which deals with perishable products are required more effort to reduced error for maintaining product quality. So, Six Sigma plays an important role into it. Customers have more and more demands and are getting more selective, while sales are decreasing and costs are growing up. There are some important issues associated with determining the customer expectations, providing services to satisfy customer needs and evaluating the service performance by customer. Company managers should consider the way to keep profitability during a competitive market, while meeting increasingly complicated customer requirements with high-quality products and effective service. Companies can put into action two strategic plans to get this seemingly impossible goal. They will target ways to reinforce the operational performance of the system and take actions to boost its operational quality. The concept of implementing simplified Six Sigma methodology in an exceedingly food service “small- to medium-sized enterprise” (SME) in terms of initial training, laser focusing in projects and easy tools was proposed by the lecturers pursued a quantitative investigation of structured continuous improvement programs applying Six Sigma approaches, lean manufacturing and then on within the Canadian food sector. In another study, Six Sigma methodology was conducted using the statistical methods in terms of customer’s requirements to search out the defect and its causes, in addition on provide optimum delivery process in a very food service SME. The bulk of the investigations within the food industry category are concentrating on quality assurance like the world organisation for Standardization. The essential goals of those research studies are food safety that's only one a part of the wide quality management system. There's an absence of study that combined quality improvement like Six Sigma methodology and lean tools in their quality management system introduced the applying of Six Sigma methodology as an efficient quality enhancement drive to at least one of the big-scale food processing industries in India. Researchers implemented DMAIC approach on one in all the most problems, variation within the milk pouch weight. They concluded that by using the Six Sigma methodology, a substantial improvement was achieved.

Conclusion

Fully implementation of six sigma process help in reduction of 50% of process cost by reducing the defects, improve the process and technical skills of employee. It is a data-driven approach and methodology, that is used to eliminates or reduce the defects during the manufacturing and processing. Most of food industries are implemented the concept of six sigma to improve the process, to produce the quality product and to improve the image of the company.

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