

Lean Six Sigma in a Service Environment: Applying a Unique Project Management Framework

Hena Rana & Francis Tse
Beca Applied Technologies Ltd

Introduction

Lean Six Sigma is an established management approach to achieving operational excellence and it can do more than simply improve processes. It can help leaders discover opportunities far beyond operations, enhance financial performance, identify the root cause of obstacles to successful operations, and create organisations that have an inherent inclination toward innovation. This paper provides an overview of Lean Six Sigma and some of the tools that have been applied for problem solving in a service orientated environment and draws on examples from a major international airport to demonstrate how this unique form of project management can be used to build transformational change into a service culture.

Overview of Lean Six Sigma

Lean Six Sigma is a combination of Lean approaches and Six Sigma methodologies. The former was borne from the Japanese manufacturing industry in the 1950's and the latter from Motorola Corporation in the 1980's. Lean is a systematic approach to eliminating waste from processes, so that every part of the process is value adding from the eyes of the customer. Six Sigma focuses on improving product and service quality through eliminating the causes of defects and minimising process variations. Over the years, Lean and Six Sigma have evolved into a business management strategy and commonly referred to as "Lean Six Sigma". At its core, Lean Six Sigma focuses on the Voice of the Customer – understanding and satisfying the customer needs and expectations to achieve competitive advantages over competitors.

Case Study: Airport X

The global financial crisis in 2008 has dried up the availability of capital across a number of industries. The aviation industry was no exception. This economic downturn halted planned terminal expansion at a major international airport due to reduced demand in airline travel and capital liquidity. Although an essential requirement for long term growth, this airport (referred hereon as Airport X), in the short term, has to shift its focus from building infrastructure and capacity to improving operational efficiency and enhancing the overall passenger experience to remain competitive. The management team decided to adopt Lean Six Sigma as the preferred framework to achieve this goal. The rest of the paper examines how this framework has been applied at Airport X to build transformational change without significant capital investment and highlights some of the tools that have been used in solving the airport's challenges.

Governance Structure

Most project managers will be familiar with the importance of executive leadership support to the successful delivery of projects. Communicating the project vision and committing the required resources must be driven from top. In the case of Airport X's Lean Six Sigma programme, the criticality of such sponsorship cannot be understated. In an airport environment, there are a number

of stakeholders, including airlines, ground handlers, border agencies, retailers and airport operations. Executive sponsorship from the airport alone is insufficient and must be extended to all the different stakeholders. The programme established a three tier governance structure with a CEO Steering Group made up of chief executives from key stakeholder organisations to provide direction and strategic alignment; a Governance Group made up of senior operation managers to commit resources and to remove roadblocks; and a series of working groups made up of frontline staff to identify opportunities and to execute improvement initiatives. This governance structure provides transparency at all levels and demonstrates the commitment of each organisation to this multi-stakeholder continuous improvement programme.

Shared Vision

Each stakeholder has its own obligations and performance metrics, as well as service improvement initiatives. Initially, it was a real challenge for the different stakeholders to find alignment on how their different roles and responsibilities could serve a common interest and not compromise their own organisational interests. For example, retailers are interested in maximising dwell time in shops while operations are interested in on time performance of departing flights; and border agencies are interested in border control and law enforcement while airlines are interested in efficient operation and customer satisfaction. The Lean Six Sigma approach has helped everyone to focus on what matters most – the passenger experience. This enabled the different stakeholders to establish a shared vision of enhancing the passenger experience, leading to systematic reviews of such processes as queue times, baggage claim waiting times and the provision of flight information.

DMAIC Framework

Having established a shared vision, it was time to develop a set of Specific, Measurable, Achievable, Relevant and Time-based (SMART) goals; to carry out systematic reviews to identify opportunities for improvement; and to execute the improvement initiatives. Lean Six Sigma uses the Define, Measure, Analyse, Improve, Control (DMAIC) problem solving framework.

- **Define** – to define the problem in the eyes of the customer.
- **Measure** – to understand and baseline the current performance.
- **Analyse** – to find the root causes of the problem and together with statistical analysis, understand and quantify their effects on the current performance.
- **Improve** – to implement the changes required to improve performance.
- **Control** – to ensure the benefits obtained from improvement initiatives are sustained.

The DMAIC framework is closely aligned with PMI's Initiating, Planning, Executing, Monitoring and Controlling, and Closing process groups. **Define** essentially falls under the **Initiating** and **Planning** process groups, where a clear project charter is developed based on a real problem that is relevant to the customer and will provide significant benefit to the business. The team will need to define the scope, agree on the delivery schedule and project budget, and plan for resources, communication protocols and risk management strategies. **Measure, Analyse** and **Improve** are activities that occur in the **Executing** and **Monitoring and Controlling** project phases. **Control** addresses the transition from project to operations and represents the **Closing** processes.

Lean Six Sigma Tools

Defects such as queuing for security, delays in collecting baggage and lengthy immigration checks are damaging to the passenger experience, and contribute to overall operational costs. Using Lean Six Sigma tools and techniques, new measures were implemented at immigration control, security screening and baggage handling, resulting in greater efficiency and an improved passenger experience. Some of the key tools and techniques that have been used include:

- **Process Mapping** – produces an end-to-end illustration of each part of the process and shows how a process really works, not how it should work. It helps bring clarity to what is actually happening and reveals the non-value adding activities. At Airport X, a process map of baggage delivery highlighted that baggage handlers would inform airport operations of carousel allocations and airport operations would then update the public display monitors to inform the passengers where they can collect their bags. There is no reason why the baggage handlers cannot be provided with the tools to directly update the public display monitors to eliminate the phone call to airport operations, which adds no value to the passengers.
- **Cause and Effect Diagrams** – are diagrams that resemble the shape of a fishbone, where the head represents an effect and the bones represent the possible causes. At Airport X, Fishbone Diagrams are used to facilitate brainstorming sessions to identify and document root causes of issues, such as system malfunctions.
- **Statistical Analysis** – there are a number of statistical analysis tools and techniques that can be used, from creating performance baselines to quantifying the benefits of change initiatives. One of the statistical tools used in the Airport X programme is Pareto Analysis, where the on time performance of airlines are measured and ranked, to help identify the airlines that have the greatest on time performance issues. It allows the team to focus its resources on resolving the few critical issues that would result in the greatest benefits.
- **Standing in a Circle** – is a simple yet powerful technique where the team literally stands in one spot and observes a particular part of the process with the aim of identifying waste or better ways of doing things. At Airport X, “standing in a circle” exercises are regularly carried out at different touch-points of the passenger journey. For example, internal departures and arrivals, transits and transfers, inter-terminal connection and the likes. It encourages participants of the Lean Six Sigma programme to view the airport in the eyes of the passenger and to continuously look for improvement opportunities.

Innovation

Lean Six Sigma focuses on the Voice of the Customer and the elimination of non-value adding activities. This continuous improvement mindset encourages everyone to look for better ways of doing things and naturally creates an inclination toward innovation. Some of the innovative technologies created or adopted by Airport X include:

- **Advanced Passenger Display** – The various border agencies and airport operations needed improved visibility on international inbound and transiting passenger numbers. This led to the development and installation of the Advanced Passenger Display at arrivals, which provides a common view of advanced passenger numbers and leads to better resource management.

- **Passenger Measurement System** – Airport operations needed a reliable and non-intrusive method to monitor passenger processing performance in real-time. The Passenger Measurement System was installed in the departures hall and arrivals hall and enables airport operations and its stakeholders to review processing times within different functional areas and to quantify the benefits of improvement initiatives.

The Results

The Lean Six Sigma programme at Airport X began with a review of the international arrivals process and had since extended to international departures, baggage handling and aircraft operations. It created a multi-stakeholder forum that can make informed decisions and implement improve initiatives within very short timeframes. This has the added benefit of enhancing the working relationships between the various participants.

The various improvement initiatives have contributed to significant deferral of capital expenditure by improving operational efficiency, thus “squeezing” more out of existing assets. There has also been a significant reduction in the passenger processing time; contributing to an improved passenger experience.

Conclusions

Lean Six Sigma is an established management approach to achieving operational excellence and it can do more than simply improve processes. Using the DMAIC framework, root cause analysis is combined with statistical analysis to identify which factors are contributing to the big efficiency “leaks” which come from delays, defects and variations in any given process. This value-added approach has been demonstrated in Airport X’s Lean Six Sigma programme, where the team has successfully applied this framework to help improve operational efficiency, enhance the overall passenger experience, reduce costs and implement a continuous improvement programme in day-to-day operations.