



THE IMPLEMENTATION OF LEAN SIX SIGMA: A
CASE STUDY OF MULTINATIONAL CORPORATION
IN MALAYSIA

BY

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ABSTRACT

Lean Six Sigma (LSS) is a method focused on continuous improvement of quality, elimination of waste and minimization of defects in an organization. LSS has been tremendously applied in Multinational Corporation (MNC) for cost savings and benefits. Many LSS studies have been done in the western countries and a few studies has been found in developing countries particularly in plantation industries. This study aims to explore the process of implementation of LSS in one of the Malaysia MNC namely Palma, Somerset Bhd. In this study, the Palma division, one of the biggest plantation industries and the highest revenue contribution for Somerset Bhd, was examined as a single case study using a qualitative method. The data was collected by interviewing thirteen (13) executives and non-executives, documents reviews, and direct observations. Drawing on Actor-Network Theory (ANT), it was used to understand how a group of actors aimed to encourage other participants in implementing LSS by developing few strategies such as promotions and increments of work place. By strengthening the interest of the alliance and the relations between actors and other relevant actors within the network participation, hence, there is strong allies and network which support the implementation of LSS. Overall, this study contributes the process, benefits and the issues arise when implementing LSS particularly in plantation MNC in developing countries.

خلاصة البحث

يعد نظام (لين سكس سيجمما) طريقة تركز على التحسين المستمر للجودة، والقضاء على النفايات وتقليل العيوب في أي منظمة. وتم تطبيق هذا النظام بشكل كبير في الشركات متعددة الجنسيات من أجل توفير التكاليف والفوائد. تم إجراء العديد من الدراسات في البلدان الغربية، وتم العثور على عدد قليل من الدراسات في البلدان النامية خاصة في الصناعات الزراعية. تهدف هذه الدراسة إلى استكشاف عملية تنفيذ (لين سكس سيجمما)، في إحدى الشركات متعددة الجنسيات في ماليزيا، وتحديدًا بالما، وسومرست بي اتش دي، وفي هذه الدراسة، تم فحص قسم بالما، وهو أحد أكبر مصانع المزارع وأعلى إسهام في إيرادات سومرست بي اتش دي عبر دراسة حالة واحدة باستخدام الطريقة النوعية، وتم جمع البيانات من خلال إجراء مقابلات مع (13) مديرا تنفيذيا وغير تنفيذي، ومراجعات المستندات، والملاحظات المباشرة. بالاعتماد على نظرية الشبكة الفاعلة، تم استخدامها لفهم كيفية قيام مجموعة من الممثلين بتشجيع المشاركين الآخرين في تنفيذ (لين سكس سيجمما)، من خلال تطوير استراتيجيات قليلة مثل الترقيات وزيادات أماكن العمل. من خلال تعزيز اهتمام الحلف والعلاقات بين الأطراف الفاعلة والجهات الفاعلة الأخرى في إطار مشاركة الشبكة، فإن هناك حلفاء وشبكة أقوى يدعمون تنفيذ نظام (لين سكس سيجمما). تسهم هذه الدراسة بشكل عام في الفوائد والقضايا العملية التي تنشأ عند تنفيذ (لين سكس سيجمما)، ولا سيما في مزارع الشركات المتعددة في البلدان النامية.

APPROVAL PAGE

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

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*I dedicate this research to Almighty Allah, the Ever-Magnificent, for His help and
bless. I will also like to dedicate this research to my entire family member.*

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LIST OF ABBREVIATIONS

ANT	Actor-Network Theory
BB	Black Belt
CI	Continuous Improvement
DMAIC	Define, Measure, Analyze, Improve, Control
GB	Green Belt
LSS	Lean Six Sigma
MBB	Master Black Belt
MNC	Multinational Corporation
PSC	Plantation Sustainability Committee
PSQM	Plantation Sustainability Quality Management
RSPO	Roundtable Sustainable Palm Oil
SS	Six Sigma
WB	White Belt
YB	Yellow Belt

CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

This study commences with a concise background of the study in Section 1.2. Section 1.3 covers the problem statement. The motivation for conducting this study is discussed in Section 1.4, followed by Section 1.5 which articulates the research objectives and research questions in Section 1.6. Moreover, the significance of the study will be described in Section 1.7, while Section 1.8 offers a concise overview of the research framework. The chapter concludes with a summary in Section 1.9.

1.2 BACKGROUND OF THE STUDY

In today's business environment, it is essential to have quality products. Quality management is one of the general indications of a quality product. The activities that assure quality management in companies comprise of three processes such as quality planning, quality control and quality improvement (Juran, 1989). The study notes that, quality planning encompasses the determination of customer needs and the development of products and processes. Meanwhile, the focus on the reaction to irregularities or regularities in the production process based on quality control. On the other hand, quality improvement consists of the systematic and proactive activity, which improve the opportunities in production processes to increase quality levels. The third process, quality improvement is best reached by working on projects (Juran, 1989).

The quality improvement of the Six Sigma (SS) approach that emerged in the 1980s is regarded as an operationalisation of this vision. Walter Shewhart played a

crucial role in the development of the SS when he demonstrated how three Sigma deviations from the mean needed a correction process. He developed the Process Control Chart that was largely viewed as the basis for quality management. Further, he helped in the improvement of the quality of the manufacturing process of the Western Electric Company in the year 1924 (Theodore, James, & Jason, 2011).

Japanese connection has also played a crucial role in the history and evolution of SS. The Japanese influence began when the issue was applied to enhance quality in the television manufacturing unit of Motorola in 1970. By using the Japanese style significance measurement placed on all the activities involved in the production process (Theodore et al., 2011). The study notes that, as a result of the adoption of SS, the total number of defects resulting from the production of the television sets was reduced to just five (5) percent, which formerly from every one hundred (100) televisions needs an average of one hundred and forty (140) adjustment to meet the quality standard. Then, Motorola played a crucial part in the evolution of SS through the research report that was implied by Bill Smith and Mikel Harry on a new quality management system (Theodore et al., 2011).

The new system focused on adjusting the manufacturing process with the performance of the product in the market. The research stipulated that the lesser the non-conformities at each stage of the production process, the better the performance of the product in the market. The four-stage logical filters that are known as the basis for the modern SS were developed with the Motorola CEO at the time leading the adoption of the process, and the process consists of measure, analyse, improve and control (Gardner, 2013). Subsequently, these stages play a crucial role in solving problems associated with quality assurance and improvisation of the process. Therefore, it led to achieving extensively better results (Gardner, 2013).

SS began with Motorola, followed by many large industries in the United States of America (USA) and later in Europe. The SS approach executed by projects with a strategic project selection process, performed in structured techniques and supported by improvements specialist and engaged leaders using a massive set of tools including advanced statistical tools in improving quality (Schroeder, Linderman, & Liedtke, 2008). Studies confirm that the SS approach improved employee productivity and financial performance (Shafer & Moeller, 2012; Swink & Jacobs, 2012).

A few decades later, a new approach emerged in Japan focusing on the improvement of process performance named The Toyota Production System, Ohno (1988), which evolved as Lean manufacturing. Lean seeks to eliminate waste and reduce variability, are also known as the continuous improvement approach, Shah and Ward (2007) optimising the so-called ‘value-added time’ as part of the total lead time.

Determining whether a process is a form of value added to the product can be done by evaluating whether the customer may be willing to pay for these processes (Gardner, 2013). The study notes that, Lean approach is mainly focused on improving the speed of the business process. The approach is based on the belief that reducing waste in the business process and also eliminating the bottlenecks can help reduce the time taken between different activities, events and cycle. Further, reducing wastes help increase the number of cycles completed in a specified period. Different types of wastes can be found in the business process. These types of wastes include unnecessary waiting time, overproduction, defects, inefficient transportation, unutilised talent, over processing of information and lack of utilisation of talents and knowledge (Gardner, 2013). Since the year 2001, there have been suggestions to merge Lean and SS into Lean Six Sigma (LSS) (George, 2002).

Based on Snee and Hoerl (2007), the main focus of SS is on improving the process. Meanwhile, Lean is improving the flow between processes. An integrated LSS approach should encompass both projects and Lean Kaizen projects on the one hand and SS projects taking a number of months on the other. The LSS is defined by Basu (2009) as a method of solving problems efficiently. The process applies to the manufacturing industry as it helps in detecting and reducing defective products thus helping increase revenue and subsequently customer satisfaction. Gardner (2013) indicated that LSS is adopted by organisations that are experiencing rising costs in the production process and those facing increased competition. The study notes that, the application of LSS has enabled the streamlining of the production process resulting in a fast production process at a reduced cost while also ensuring quality products. Another advantage of LSS is, it helps in decreasing the operational costs. By reducing the amount of waste emitted from the production process, the costs incurred to produce products are reduced (Gardner, 2013). Thus, LSS is an important tool that an organisation can use to improve the performance of the organisation.

Somerset Berhad (Bhd) is the largest Multinational Corporation (MNC) in Malaysia and one of the largest in the Southeast Asia region (Ahmad & Kitchen, 2008). The study notes that, it has operations in 23 countries with more than 270 companies operating under its business. An estimated 38 percent of the revenue generated by the company is generated domestically. The company has a diversified range of activities with the core being oil palm and rubber plantation, tyre manufacturing, distribution of heavy equipment and motor vehicle, property development, power generation and also the provision of engineering services, travel and tourism and healthcare services. Therefore, Somerset Bhd is a dominant business organisation (Ahmad & Kitchen, 2008). With the range of diversified business,

Somerset Bhd seeks continuous improvement (CI) to minimise costs and reduce waste.

The Palma division is one of the largest revenue contributions to Somerset Bhd and focuses on the production of a wide range of plantation such as oil and fat products as well as rubber production (Ahmad & Kitchen, 2008). The Palma produces vegetable oil-based ingredients that are applied to foods, non-food and other consumer products. It is a pioneer and leader of many sustainable practices for the palm oil industry and is currently the world's largest producer of Roundtable on Sustainable Palm Oil (RSPO) with a market share of 20 percent of the global production by capacity (Jacques & Kepos, 2012).

The RSPO framework provides a number of set principles and criteria for sustainable practice. If the organisation meets the standard of criteria and principles based on planting, milling and waste management, the organisation will be certified as RSPO oil palm (Padfield et al., 2014). The Palma division was the first division in Somerset Bhd that implemented the LSS system. The development of the LSS system started in the financial year 2010/2011 mainly in one of the Palma division, downstream. By the 2012/2013 financial year, Somerset Bhd including all divisions had implemented the LSS system based on the removal of wastage, defect and errors by a combination of different tools in LSS under various sustainability department guidance.

Therefore, this case study explores the process of LSS implementation in detail at the Palma division. Additionally, this study explores the challenges in the process of LSS implementation. The exploration of implementing LSS in this particular MNC is based on the actor-network theory (ANT), which proposes that LSS implementation helps decrease costs and increase revenue. This study also reveals the benefits and

challenges of implementing LSS in the organisation. Hence, this study offers insights to improve our understanding of the LSS implementation process in Palma.

1.3 PROBLEM STATEMENT

MNC are key drivers of globalisation and promote economic activity interdependence among national markets (Rugman & Verbeke, 2004). MNC is a single industry with many firms that have been acquired either through takeovers or mergers and supply various services or goods (Franzoni & Giannetti, 2017). Being an MNC involves diversification into an industry that has no relationship with the current firm. The aim of MNC is to maximise the shareholder value. When a company becomes an MNC, risks are spread across more industries, and hence the company reduces fluctuations regarding profits and sales that may arise due to cyclical or seasonal risks (Franzoni & Giannetti, 2017). Kazmi (2008), in the current corporate world, leaders face very complicated tasks and need to identify what steps to follow, what is the sequence of those steps, why it is needed in the corporate world and the critical factors for success. Therefore, the leaders need a new framework strategy as a roadmap to better understand the process and achieve the objectives of the organisation.

Particularly in developing countries where the industrialisation procedure has its foundation in MNC, energetic globalisation implies a great change in the method of operation management (Fleury, 1999). In other words, investing in new markets will also involve rethinking management practices, using better ways of transferring knowledge and implementing CI methodologies such as LSS across units. This study examines LSS because it has proven successful with leading benefits gained upon implementing it particularly in MNC in developed countries. Antony (2008), Lean and Six Sigma are examples of successful concepts in quality management. Increased

customer satisfaction (Snee, 2010; Albliwi & Antony, 2013), reduced cost, reduced waste and cycle time and increased quality by defect reduction (Salah, Rahim, & Carretero, 2010; Albliwi & Antony, 2013), increased profits and financial savings are the benefits gained by the MNC throughout the successful implementation of LSS in developed countries (Albliwi & Antony, 2013). The benefits achieved in implementing LSS should be a focus of other organisations towards implementing LSS. This study examines LSS in MNC of developing countries to contribute to the success of implementing LSS in other organisations by implementing LSS in MNC in developing countries.

Meanwhile, Snee (2010) explained that most large companies have made tremendous progress in deploying continuous improvement programmes based on LSS. For instance, the level of implementation of LSS are growing in large companies particularly in the USA, United Kingdom (UK) and the Netherlands and some Small-Medium Enterprises (SMEs) in developing countries particularly in India (Albliwi & Antony, 2013). However, there is a relative lack of studies on the implementation of LSS in MNC, particularly in developing countries such as Malaysia.

As a framework for understanding the importance of change and understanding the organic nature of an adjustment process within organisations, ANT can play an important role. It is particularly useful to provide insights into how networks are developed, maintained and changed in order to achieve the objectives of those who join the network (O'Connell, Ciccotosto, & De Lange, 2014). This study investigates the networks and allies are developed to support the implementation of the LSS system in the organisation. In the accounting context, it is possible to see how actors translate accounting networks in order to produce new information by understanding how the transformation takes place. These concepts were used to explain a range of

accounting phenomena such as networks to develop to support new accounting systems (Lowe, 2001a; 2001b; 2001c), promote a novel approach to accounting (Jones & Dugdale, 2002), and, increase control (Ahrens & Mollona, 2007; Robson, 1992). Much of the research to date has been studies of management accounting change in financial reporting, auditing, and management information system (O'Connell et al., 2014). Few studies apply ANT when implementing LSS. Most of the literature presents Lean as a fixed object that is well-defined and designed. Implementing Lean depends on the degree of resistance from the corresponding actors (Proudlove, Moxham, & Boaden, 2008; Walley, Watt, Davies, Huang, & Ma, 2001). However, there is a relative lack of study on the implementation of LSS applying ANT Theory.

The business processes of many global organisations are integrated with SS. The SS approach improves the efficiency and effectiveness of global supply chain networks. It is beneficial for strategic, tactical and operational plans within organisations to accelerate the managerial decisions and improve customer satisfaction. The study conducted by Roberts (2004) with one of the large financial service providers in the USA identified that the organisation was able to gain business improvement with SS and become one of the pioneers of adopting SS. The study notes that, by implementing hundreds of SS projects in its business area, the organisation increased 10.4 percent in customer satisfaction and reported a 24 percent reduction in customer problems after successfully implementing SS. Besides that, GE Capital Corp., SunTrust Banks and Morgan Chase improved customer requirement and satisfaction after implementing SS (Robert, 2004).

Nevertheless, industries in developing countries have limited uptake of SS and believe its methods are not realistic and complicated. Different organisational cultures and degree of management commitment create misconceptions of implementing SS

(Kuik, Nagalingam, & Amer, 2011). However, there is a lack of studies on the benefits of implementing LSS and a combination of Lean and SS tools in developing countries, particularly in large organisations.

1.4 MOTIVATION OF THE STUDY

This study is motivated primarily by the lack of studies on the implementation of LSS in developing countries as Malaysia, particularly in MNC. It examines the actual process of implementing LSS associated with the ANT theory in developing countries. The findings are expected to provide evidence of the impact of ANT theory on LSS implementation in developing countries.

Moreover, this study is motivated by the changes executed in Somerset Bhd after the huge losses incurred in the 2009/2010 financial year. This led to changes to stabilise Somerset Bhd. This includes restructuring and introducing the New Governance Framework to expand the sustainability group which led to the CI projects. These changes included the implementation of the LSS system which might have a significant impact on this MNC. Studying this topic could reveal the benefits of implementing LSS to assist the MNC reduce cost and increase revenue. This is because Somerset Bhd is one of the biggest MNC in Malaysia and is a Government-Link company with significant impact on the Malaysian economy (Jayant Menon, 2017).

Another motivation for conducting the study is to ensure high-quality products are produced by the company to maintain and increase its market share. It is essential for the company to adopt strategies to ensure it remains competitive in the market. The results of the study will be used to improve the position and performance of the company and comprehend the issues and challenges it faced.

1.5 OBJECTIVES OF THE STUDY

The present research concentrates on investigating the process of implementing, benefits and challenges of LSS in the Palma, one of the MNC in Malaysia. Thus, the objective are:

RO1: To explore the implementation process of the LSS system in a multinational corporation in Malaysia.

RO2: To explore the benefits and challenges of the LSS system in a multinational corporation in Malaysia.

1.6 RESEARCH QUESTION

To accomplish the research objective, the research question has been constructed as follow:

RQ1: How has the implementation process of the LSS system occurred in a multinational corporation in Malaysia?

RQ2: What are the benefits and challenges of the LSS system in a multinational corporation in Malaysia?

1.7 SIGNIFICANCE OF THE STUDY

The results of the study will have a significant effect. First, this study will contribute in terms of the literature of LSS in MNC based on evidence from the Malaysia MNC in the context of implementing LSS to reduce cost and increase revenue. This is significant because few studies have explored the LSS implementation associated with ANT theory on MNC in developing countries.

Next, this study will enhance the understanding of implementing LSS in the MNC and challenges faced during the implementation phases. It shows the MNC can