DEVELOPING A COMBINATION OF LEAN SIX SIGMA IMPACTING ON FIRM'S COMPETATIVE ADVANTAGE ENTERPRISE PATTERN FOR THE CASE STUDY OF AUTOMOTIVE INDUSTRIAL IN THIALAIND.

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ABSTRACT

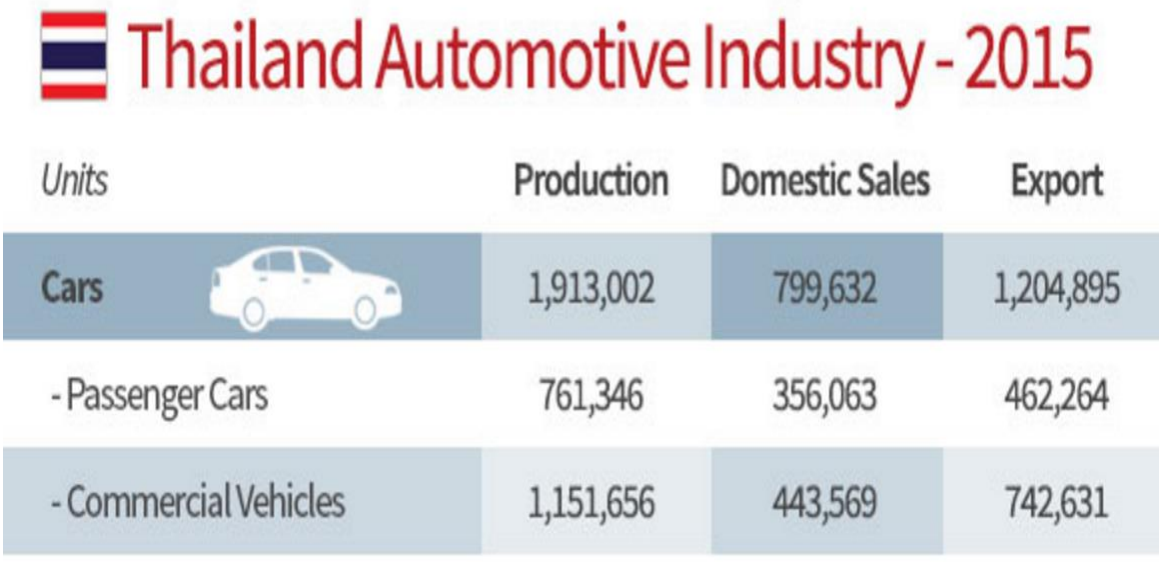
Lean production focuses on agility to meet changes such as customer needs. New products, methods, employees, new locations, use of resources, create value for customers Thinking from the customer perspective, adding value, reducing waste. And continuous development the basic idea is Trying to maintain the flow of products continuously At the same time, Six Sigma is a corporate management philosophy aimed at customers. Use facts and information to manage the organization. Six Sigma is a process that brings together various improvement principles. Lean and Six Sigma are intended to improve processes better. Lean's tools are focused on eliminating waste in work or processes. In order to facilitate the flow of work and information Integration of both Lean and Six Sigma with a focus on business processes. Or supply chain process The ultimate goal of the business is to have a business process that is capable of responding to both the demand and the variety of needs that change over time Application of Lean Six Sigma concept by supply chain process Will make the process of creating value to customers better by reducing waste And improve the performance of the process in the customer's perspective The purpose of the research is to: 1) study the factors that affect Lean Six Sigma for industrial production operators and 2) study the influence of factors affecting Lean Six Sigma for the manufacturing enterprises of the electronics industry. This research consists of quantitative research. Which collects data on creating competitive advantage, efficiency and production processes that affect Lean Six Sigma and qualitative research is divided into 2 parts: Part 1 is the collection of factors that will affect Lean Six Sigma for wholesale and retail electronics products Which is a case study in this research, Part 2 is an interview with experts, experts and academics in the manufacturing system of the electronics industry. Including those engaged in production from the results of the analysis, it was found that 1) The creation of a tangible competitive advantage has a positive direct influence on the production process factor. 2) Creating a tangible competitive advantage with direct influence 3) the production process has a positive direct influence on Lean Six Sigma and 4) the efficiency has a positive direct influence on Lean Six Sigma.

Keywords: Six Sigma, Lean, Competitive Advantage, Performance

INRODUCTION

The automotive sector is a major driver of the Thai economy with strong infrastructures and a vast network of small and large, local and foreign companies all along the car-production supply chain. A large hub in ASEAN and Asia, the Thai automotive industry is gearing towards a green automotive production base. In 2015, the production of cars in Thailand was 1.9 million cars with 800,000 cars sold domestically and 1.2 cars exported. Most of the vehicles built in Thailand are developed and licensed by foreign producers, mainly Japanese and American but with several other brands as well for car production, notably BMW and Mercedes. The Thai car industry takes advantage of the ASEAN Free Trade Area (AFTA) to find a market for many of its products. Thailand is one of the world's biggest markets for pickup vehicle car with over 50 percent market share. Presenting the Thai automotive industry from a governmental perspective to attract potential investors, the Thailand Board of Investment (BOI) produced a report to highlight structures, outputs and new developments planned for the upcoming years. The Thai government is eager to assist the private sectors and drive the entire automotive supply chain towards more value creation. Their goal is to make Thailand a global production base for green automotive, enhancing value creation and environment preservation both for the export and domestic markets. In this first report from 2015, the BOI presents the automotive industry and developments of recent years before diving in details: automotive numbers and sub-industries of auto-parts and automotive electronics. The report highlights particularly interesting opportunities in Thailand and the advantages of the country for investors of the sector.

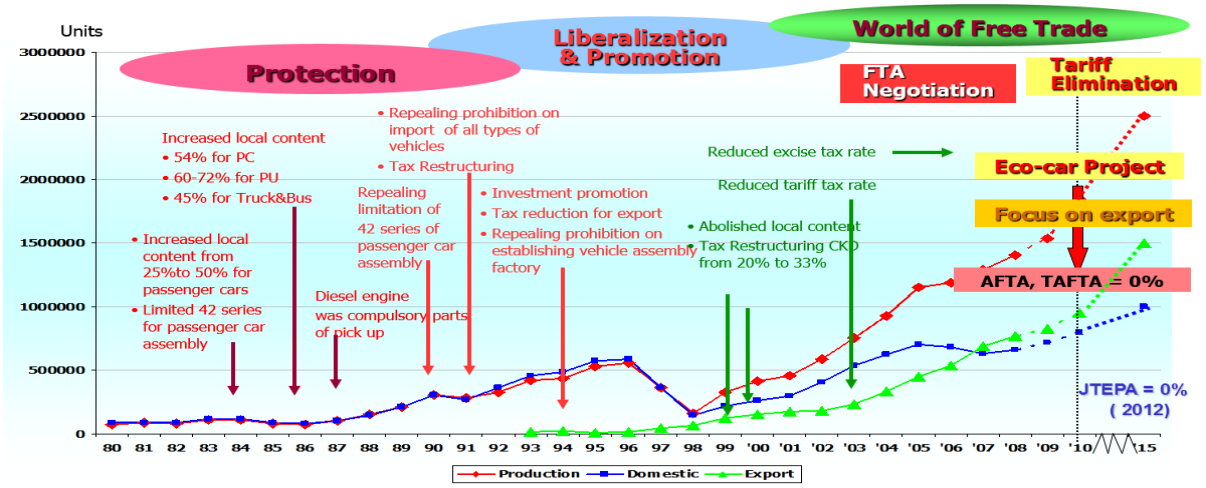
Figure 1
Shown the currently number of production car in Thailand
(Thai Automotive Industry Association, 2015)



LITERATURE & THEORY

During the last decade in the automotive assembly is a concept of management of quality control in the production of different treatments. Including the management of quality within organizations using Six Sigma (Six Sigma) and industrial systems Lean (Lean manufacturing) has been taken up in the enterprise different to the industry. Automotive although the work is very important in the management of the relevant documents, the similarity between management and Six Sigma management, lean manufacturing industries. But many questions remained regarding enforcement. Concept and context of these organizations (Roy Aderson et al. 2006). Competition in the automotive sector higher. The need to reduce costs in the organization. Car assembly plant in the United States. The Ford Motor Company assembly plant, it has taken a variety of program management and Lean Manufacturing. The production Just in time to help to increase competitiveness (The Machine That Change the World, Jame P.Womack, 1990). And to eliminate misunderstandings about Six Sigma and lean management manufacturing systems, industrial production has affected the organization's competitive advantage. By describing each system and the concepts and techniques that support the use of Six Sigma and lean manufacturing industries that affect the competitive advantage of the organization (Edward D.Amheiter and John Maleyeff, 2005). The system Six Sigma originated from the company Motorola have thought the quality of the production process that allows waste in just 3.4 pc to produce one million pieces. And also as a tool to help businesses. Can solve the problems of the manufacturing process of the operating system, too. Six Sigma is a methodology that seeks to identify and eliminate defects, errors or failures in business processes or systems by focusing on those processes (Dr.Mikel Harry, Galvin Manufacturing Corporation, 1980). The Thailand government has to play a role in transmission. Industry automobiles countries by the promotion of investment. On the industrial assembly of cars and auto parts industry in the country in year 2504 the amount of industrial vehicles were registered with the department of industrial plants in the country with a total of 2,242 representing 100% of the factory. The automotive industry, large (LSEs) All 82 plants representing 4% and manufacturing automotive components size enterprises (SMEs) through 2,160 plants representing 96% by the expansion of the industry, automotive parts as well (Thailand Auto Parts Manufacturing Associations, 2014). Competitive supply chain management conditions in the businesses of the auto industry and the automotive industry. Group makes automotive industry must adapt to meet the business. Build quality and value of the production line (Jens J.Dahlgaard, 2006). Although the foregoing, making research ideas to research, development, integration of lean manufacturing and Six Sigma to affect the supply chain management of an arms race in the Lord. Arm of the automobile industry and automotive parts manufacturing industry within Thailand country via developing a combination of lean manufacturing and Six Sigma impacting on firm’s supply chain management (FSCM).

Figure 2
Shown that the marketing trending of automotive industry in Thailand
(The Auto – Parts Manufacturing Associations, 2014)



The framework for this research. The research aims to study the scene. And the effect of improving the integration of lean manufacturing and Six Sigma to affect the firm supply chain management of enterprises manufacturing automobile parts and vehicles assembly industries. Thailand that researchers conducted a literature review of international research and in order to develop a conceptual framework. By creating a framework for research. The researchers used the very concept of research.

RELATED WORKS

Origin and theory, even though lean and Six Sigma have the same or similarities origin, the concept of lean manufacturing and six sigma to eliminate non-value added based on customer requirement and customer satisfaction. Six Sigma is often associated within the field of quality management, for example, Deming (1994) they have to general Deming cycle (PDCA) in term of quality. In particular, Deming (1994) had stated that. Regarding the concepts, theory, process review, methodologies, approach, effects and criticism are shown in Table 1.

Table 1

Shown the similarities and different between lean manufacturing and six sigma methodologies.

Concepts	Lean Manufacturing	Six Sigma
Origin	The quality evolution in Ford manufacturing	The quality evolution in Motorola
Theory	Zero defect	Eliminate wastes
Process	Reduce reduction and improvement process	Improvement processes
Approach	Project's management	Project's management
Methodologies	Define Measurement Analyze	Value Map Eliminate

Concepts	Lean Manufacturing	Six Sigma
	Improve Control	Flow Literate
Tools	Statistical and analytical tool	Analytical tools
Effects	Performance	Performance and customer satisfaction
Criticism	Improvement customer satisfaction	Improvement customer satisfaction
Other	N/A	N/A

Name	LEAN				SIX SIGMA								
Reference	**Process**	**Quality level**	**Supplier**	**Data Management**	**Organization and Management**	**Customer Focus**	**Motivation**	**Knowledge and Knowhow**	**Agreements**	**Brand**	**Leaderships**	**knowledge and Skills**	**Team Approached**
Krafick (1988)	X	X			X								
Pannirselvam (1994)	X			X									
Mathew et al. (1997)	X	X			X		X						
Linker (1997)	X	X			X		X						
Hines and Rich (1997)		X			X								
Permsiriphan (1997)	X	X					X						
Spann et al. (1999)	X	X										X	X
Adams et al. (1999)		X			X					X			X
Swain and Martin (1999)	X	X			X	X							
Harris et al. (2000)	X	X	X						X				
Yinging et al. (2000)	X	X											
Djumin et al. (2001)	X	X		X							X		
Fawaz (2003)	X	X			X			X					X

Table 2
Shown the table of lecture review of lean manufacturing, six sigma and competitive advantage.

Pyzdek (2003) and Magnusson et al. (2003), the first methodology used to improve an existing process can be divided into five phases. (1) Define. Define which process or product that needs improvement. Define the most suitable team members to work with the improvement. Define the customers of the process, their needs and requirements, and create a map of the process that should be improved. (2) Measure. Identify the key factors that have the most influence on the process, and decide upon how to measure them. (3) Analyse. Analyse the factors that need improvements. (4) Improve. Design and implement the most effective solution. Cost-benefit analyses should be used to identify the best solution. (5) Control. Verify if the implementation was successful and ensure that the improvement sustains over time. Jiju Antony (2005), six sigma in small and medium size UK manufacturing enterprises. The results was six sigma in SMEs, Quality program and Critical success factors. Melissa J (2007), Exploring future competitive advantage through sustainable supply chains. The results was potential competitive advantage firms can create through the creation of a sustainable supply chain. S.C. Lenny Koh (2007), Could enterprise resource planning create a competitive advantage for small businesses. The results was small to medium sized enterprises, Resource management and Competitive advantage. Andreas R (2008), a framework for purchasing transport services in small and medium size enterprises, Improve relationships with logistics service providers (LSPs). Assadej Vanichchinchai (2009), the relationship between quality management and supply chain management (An Analysis of The Automotive Industry in Thailand). Supply Chain Management Practice (SCMP), Quality Management Practice (QMP) and Firms Supplier Performance (FSP). Guangshu Chang (2009), Total Quality Management in Supply Chain by construct Implementation of total quality management in supply chain system but not only in enterprise has become an exquisite premise of the survival of enterprise.

METHODS

The framework for this research. The research aims to study the scene. And the effect of improving the integration of lean manufacturing and Six Sigma to affect the competitive advantage of enterprises manufacturing automobile parts and assembly industries. Thailand that researchers conducted a literature review of international research and in order to develop a conceptual framework. By creating a framework for research. The researchers used the very concept of research.

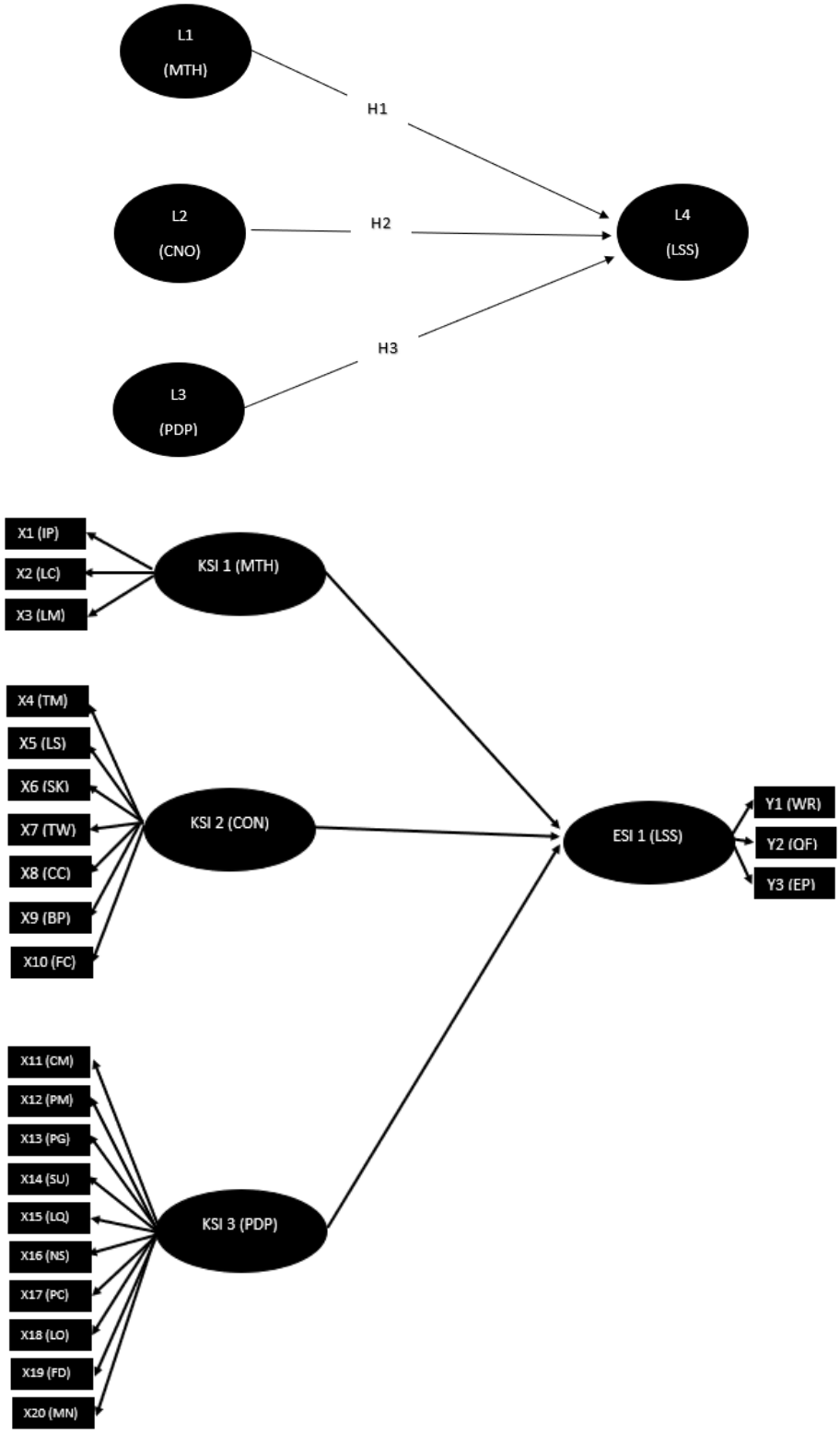
Statements and significance of the problem was impact of lean on six sigma and firms competitive advantage. Thailand automotive industry development under government policy and increase Thai economy. Hypotheses of this research as below.

H1 = Tangible competitive advantage (MTH) was positive relationship to Lean Six Sigma (LSS)

H2 = Intangible competitive advantage (PDP) was positive relationship to Lean Six Sigma (LSS).

H3 = Performance (PDP) was positive relationship to Lean Six Sigma (LSS).

Figure 3
Shown Conceptual framework of the research



(1) Lean Manufacturing principle

Roy Andersson, Henrik Eriksson and Håkan Torstensson, 2006; Andrew Thomas, 2009; Brun. A, 2011; Alessandro Laureani and Jiju Antony, 2012; Alessandro Laureani and Jiju Antony, 2012; Nurul Fadly Habidin, 2013;

(2) Six Sigma principle

Caulcutt. R, 2001; Edward D. Arnheiter and John Maleyeff, 2005; Jiju Antony and Maneesh Kumar, 2005; Jens J. Dahlgaard, 2006; Paul M. Gibbons, 2010; Sunil Sharma, 2010; Souraj Salah, 2010; Lawrence M. Corbett, 2011; Ian D. Blackman, 2013; Shri Ashok Sarkar and Arup Ranjan Mukhopadhyay, 2013;

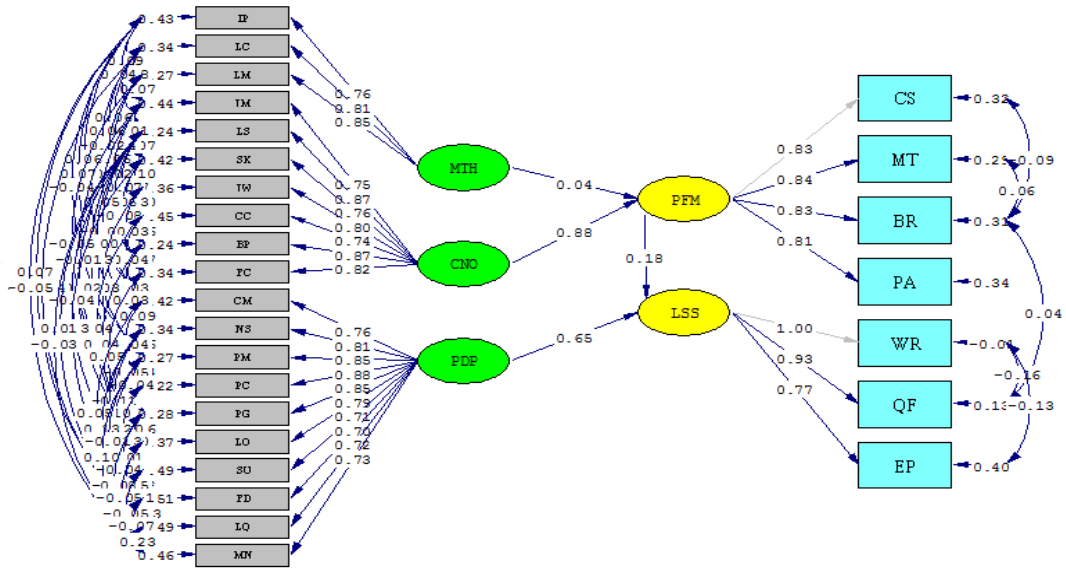
(3) Firm Supply Chain and Performance Management

Supply chain management is concerned with the management of the entire system from inbound, in process and outbound included the flow of information through the first chain to factories and warehouse up until the end of customers. (Source: Operations and supply chain management, 12th Edition. Nicholas J. Aquilano, Chase, Richard B., Jacobs Robert F)

RESULTS

The test of the first hypothesis produced a model which was significant at less than the 0.01 level, indicating that the infrastructure variables alone were sufficient to predict process flow performance. The additional of the set of unique process flow variables produced a statistically significant increase in value added of supply chain management performance. We also investigated the effects of just in time in lean manufacturing and quality practices as moderating effects via the use of interaction terms in the firm supply chain management models. However, they may have difficulty finding problems which have the potential to further improve the process, if there are eliminate waste of supplier relationship the effect. The combination with the best quality performance are given an added ability in firm supply chain management approached.

Figure 4
Shown Summarize of CFA model and framework after simulation with Lisrel program



Chi-Square=213.05, df=206, P-value=0.35332, RMSEA=0.009

CONCLUSION AND FUTURE WORK

The purpose of this paper is to describe automotive manufacturing in Thailand have been through a lean manufacturing via used just in time system from the replacement of the traditional of mass production practices by lean Six Sigma. In this paper, a study presents the results of the developing a combination of lean and Six Sigma impacting on firm's supply chain management of automotive manufacturing in Thailand. Today's automotive manufacturing are required to competitions with lean manufacturing and six sigma bases on supply chain management. In order to reach the manufacturing goals are required to compete with manufacturing paradigms such as lean manufacturing, six sigma impact to supply chain management. This's paper contribution of firm supply chain to an automotive manufacturing in Thailand to understudied as is the importance of how to develop and combination between lean six sigma assets. Further work is needed to expand this research to consider broader supply chain management typologies that link complexity with both practice difference management approaches to accommodate complexity. Performance can be expanded to include quality control, innovation and cost saving. Such research will become increasingly critical as competition from firm lean manufacturing vs firm six sigma methodology vs firm supply chain management.

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