

IMPLEMENTATION OF LEAN PRODUCTION TO OVERCOME BARRIERS.

A STUDY ON HUMAN FACTOR.

CHENG SI PEI

Faculty of Technology Management and Technopreneurship

Universiti Teknikal Malaysia Melaka (UTeM)

I/ We hereby declared that I/ we had read through this thesis and  
in my/ our opinion that this thesis is adequate in terms of scope and quality which  
fulfill the requirements for the award of Bachelor of Technology Management  
(Technology Innovation)

SIGNATURE :  
NAME OF SUPERVISOR : DATIN SURAYA BINTI AHMAD  
DATE :

SIGNATURE :  
NAME OF PANEL : DR. CHEW BOON CHEONG  
DATE :

IMPLEMENTATION OF LEAN PRODUCTION TO OVERCOME BARRIERS.

A STUDY ON HUMAN FACTOR.

CHENG SI PEI

This thesis is submitted in partial fulfillment of the requirements for the award of  
Bachelor of Technology Management (Technology Innovation)

Faculty of Technology Management and Technopreneurship

Universiti Teknikal Malaysia Melaka (UTeM)

JUNE 2015

I hereby declared that this thesis entitled  
"THE IMPLEMENTATION BARRIERS OF LEAN PRODUCTION.  
A STUDY ON HUMAN FACTOR."

is the result of my own research except those as cited in the references. This thesis  
has not been accepted for any degree and is not concurrently submitted by  
candidature of any other degree.

SIGNATURE :  
NAME : CHENG SI PEI  
DATE :

## DEDICATION

I would like to appreciate the dedication of my beloved families who educated me and motivate me to learn until this level, the lecturers and friends who give me support and advice throughout the research. Without their blessing and encouragement, this research is impossible to complete in short period of time.

## ACKNOWLEDGEMENT

The author would like to express his/ her sincere appreciation to the supervisor, Datin Suraya Binti Ahmad for her guidance and encouragement given throughout completing this final year project.

Besides that, the author would like to express the thankfulness to Dr Chew Boon Cheong who positively guiding, supporting and contributing his opinion to encourage the author completing the final year project smoothly.

Finally, the appreciation is also extended to those who involved either directly or indirectly towards this project. Hopefully, this report will be a reference to the others in the future.

## ABSTRACT

Lean production has been penetrated to most of the manufacturing sectors across the globe. Despite this, this research study will be focus in electrical and electronic industry. Lean production is a practice which regards the use of the resources, creation of value for the end customer, as waste, and thus as a target of elimination. The aims for implementing lean is to eliminate waste, deliver value from the customer's perspective, and continuously improve the processes. Although there are a number of tools and techniques available to improve the operational performance, but there is only a small number of organization achieved significant results after implementing lean. The purpose to do this research study is to identify the challenges and barriers to be faced and overcome while implementing lean and the measures that could be taken to facilitate it. Human factor plays an important role in ensuring lean production to be successful in long-term run. People has the capability in identifying and eliminating wastages. This research study has been proposed with the theoretical framework of implementing barriers of lean production on human factors. There are several research method been used to do the research such as the descriptive research design with quantitative method, survey questionnaire and cross-sectional studies.

***Keywords:***

Lean production, lean implementation, barriers, management, employees

## **ABSTRAK**

*Lean telah menembusi kebanyakan sektor pembuatan di seluruh dunia. Walau bagaimanapun, kajian penyelidikan ini akan dilakukan dalam industri elektrik dan elektronik. Lean ialah strategi yang berkaitan dengan penggunaan sumber-sumber, penambahan nilai untuk pelanggan, sebagai sisa buangan, dan sebagai sasaran penghapusan. Matlamat mengimplementasikan lean adalah untuk menghapuskan sisa buangan, menyampaikan nilai dari perspektif pelanggan, dan memperbaiki proses secara berterusan. Walaupun terdapat beberapa alatan dan teknik yang sedia ada boleh digunakan untuk meningkatkan prestasi operasi, tetapi hanya sebilangan kecil organisasi yang dapat mencapai keputusan ketara selepas mengimplementasikan lean. Tujuan untuk menjalankan kajian penyelidikan ini adalah untuk mengenal pasti cabaran dan halangan yang akan dihadapi serta mengatasi selepas mengimplementasikan lean dan langkah-langkah yang boleh diambil untuk memudahkan proses mengimplementasikan lean. Faktor manusia memainkan peranan yang penting dalam memastikan pengimplementasian lean dapat berjaya secara berterusan. Manusia mempunyai keupayaan untuk mengenal pasti dan mengurangkan pembaziran. Kajian penyelidikan ini telah dirancang dengan rangka teori untuk membuat kajian tentang cabaran dan halangan semasa mengimplementasikan lean. Terdapat beberapa kaedah kajian telah digunakan untuk menjalankan kajian penyelidikan seperti kaedah kajian deskriptif yang menggunakan kaedah kuantitatif, kajian soal selidik dan kajian keratan rentas.*

### **Kata Kunci:**

*Lean, implementasi lean, cabaran dan halangan, pengurusan, pekerja*



## TABLE OF CONTENT

CHAPTER	TITLE	PAGE NUMBER
	<b>VERIFICATION</b>	i
	<b>RESEARCH TOPIC</b>	ii
	<b>ADMISSION</b>	iii
	<b>DEDICATION</b>	iv
	<b>ACKNOWLEDGEMENT</b>	v
	<b>ABSTRACT</b>	vi
	<b>ABSTRAK</b>	vii
	<b>CONTENT</b>	viii
	<b>LIST OF TABLES</b>	xii
	<b>LIST OF FIGURES</b>	xiv
	<b>LIST OF ABBREVIATION AND SYMBOL</b>	xv
	<b>LIST OF APPENDICES</b>	xvi
<b>CHAPTER 1</b>	<b>INTRODUCTION</b>	
	1.1 BACKGROUND OF STUDY	1
	1.2 PROBLEM STATEMENT	3
	1.3 RESEARCH QUESTIONS	4
	1.4 RESEARCH OBJECTIVES	5
	1.5 SCOPE, LIMITATIONS AND KEY ASSUMPTIONS OF THE STUDY	6
	1.6 IMPORTANCE OF THE RESEARCH	7
	1.7 SUMMARY	8

<b>CHAPTER</b>	<b>TITLE</b>	<b>PAGE NUMBER</b>
<b>CHAPTER 2</b>	<b>LITERATURE REVIEW</b>	
	2.1 INTRODUCTION	9
	2.2 INTRODUCTION TO LEAN PRODUCTION	10
	2.2.1 LEAN PRINCIPLES	12
	2.2.2 TYPES OF WASTES	13
	2.2.3 LEAN TOOLS	16
	2.3 BARRIERS AND RESISTANCE	19
	2.3.1 BARRIERS TO LEAN IMPLEMENTATION	19
	2.4 HYPOTHESIS	27
	2.5 LEAN IMPLEMENTATION IN MALAYSIA	27
	2.6 SUMMARY	28
<b>CHAPTER 3</b>	<b>RESEARCH METHODS</b>	
	3.1 INTRODUCTION	29
	3.2 RESEARCH DESIGN	30
	3.3 METHODOLOGICAL CHOICES	32
	3.4 PRIMARY AND SECONDARY DATA SOURCES	33
	3.5 LOCATION OF RESEARCH	34
	3.6 RESEARCH STRATEGY	35
	3.6.1 SAMPLING METHOD	37
	3.6.2 PILOT TESTING	38
	3.6.3 DATA ANALYSIS METHOD	39
	3.7 TIME HORIZON	39
	3.8 SCIENTIFIC CANONS	40
	3.8.1 RELIABILITY	40

<b>CHAPTER</b>	<b>TITLE</b>	<b>PAGE NUMBER</b>
	3.8.2 CONSTRUCT VALIDITY	42
	3.8.3 INTERNAL VALIDITY	42
	3.8.4 EXTERNAL VALIDITY	43
	3.9 SUMMARY	44
<b>CHAPTER 4</b>	<b>DATA ANALYSIS AND DISCUSSION</b>	
	4.1 INTRODUCTION	45
	4.2 FREQUENCY ANALYSIS	46
	4.2.1 GENDER	47
	4.2.2 EDUCATIONAL LEVEL	48
	4.2.3 YEARS OF WORKING EXPERIENCE	49
	4.2.4 DEPARTMENT	50
	4.2.5 POSITION	52
	4.2.6 NUMBER OF YEARS LEAN IMPLEMENTED	53
	4.2.7 DEPARTMENT VERSUS TYPES OF LEAN IMPLEMENTED	54
	4.3 DESCRIPTIVE ANALYSIS	56
	4.4 VALIDITY TEST	59
	4.4.1 CORRELATION ANALYSIS	60
	4.5 RELIABILITY ANALYSIS	63
	4.6 INFERENTIAL STATISTICS	64
	4.6.1 REGRESSION ANALYSIS	65
	4.7 HYPOTHESIS TEST	68
	4.8 SUMMARY	70

<b>CHAPTER</b>	<b>TITLE</b>	<b>PAGE NUMBER</b>
<b>CHAPTER 5</b>	<b>CONCLUSIONS AND RECOMMENDATIONS</b>	
	5.1 INTRODUCTION	71
	5.2 SUMMARY OF MAIN FINDING ON DEMOGRAPHICS	72
	5.3 SCALE MEASUREMENT ON VALIDITY AND RELIABILITY	73
	5.4 DISCUSSION OF RESEARCH OBJECTIVES	73
	5.4.1 OBJECTIVE 1	74
	5.4.2 OBJECTIVE 2	75
	5.4.3 OBJECTIVE 3	76
	5.5 SUGGESTION TO OVERCOME AND IMPROVE THE IMPLEMENTATION OF LEAN PRODUCTION	77
	5.6 RECOMMENDATION FOR FUTURE STUDY	78
	5.7 SUMMARY	78
	<b>REFERENCES</b>	79
	<b>APPENDIX</b>	83

## LIST OF TABLE

<b>TABLE</b>	<b>TITLE</b>	<b>PAGE NUMBER</b>
2.2.2.1	7 Types of Wastes	14
2.3.1.1	Reasons for Failures (Management)	21
2.3.1.2	Reasons for Failures (Employees)	22
4.2.0	Statistic Analysis of Respondents	46
4.2.1	Frequency Analysis of Respondents by Gender	47
4.2.2	Frequency Analysis of Respondents by Educational Level	48
4.2.3	Frequency Analysis of Respondents by Years of Working Experience	49
4.2.4	Frequency Analysis of Respondents by Department	50
4.2.5	Frequency Analysis of Respondents by Position	52
4.2.6	Frequency Analysis of Respondents by Number of Years Lean Implemented	53
4.2.7	Customized Table Which Analyzed on The Departments Versus Types of Lean Implemented	54
4.3.1	Descriptive Analysis on Barriers of Lean Implementation (Management)	57
4.3.2	Descriptive Analysis on Barriers of Lean Implementation (Employee)	58

<b>TABLE</b>	<b>TITLE</b>	<b>PAGE NUMBER</b>
4.4.1.1	Correlation Analysis between Management and Lean Implementation	61
4.4.1.2	Correlation Analysis between Employee and Lean Implementation	62
4.5.1	Reliability Analysis I	63
4.5.2	Reliability Analysis II	63
4.6.1.1	Regression Analysis of the Relationship between Independent Variables and Dependent Variable	65
4.6.1.2	Regression Analysis on ANOVA	66
4.6.1.3	Regression Analysis on Coefficients	67
4.6.1.4	Regression Analysis on the Multi Regression Equation	68
4.7.1	Guideline for Interpreting Hypothesis Test	68
4.7.2	Hypothesis Test done through Regression Analysis on Coefficients	69

## LIST OF FIGURES

<b>FIGURE</b>	<b>TITLE</b>	<b>PAGE NUMBER</b>
2.2	Topic to be discussed in Lean Production	11
2.3.1	Theoretical Framwork for Lean Production	26
4.2.1	Frequency Analysis of Respondents by Gender	47
4.2.2	Frequency Analysis of Respondents by Educational Level	48
4.2.3	Frequency Analysis of Respondents by Years of Working Experience	49
4.2.4	Frequency Analysis of Respondents by Department	51
4.2.5	Frequency Analysis of Respondents by Position	52
4.2.6	Frequency Analysis of Respondents by Number of Years Lean Implemented	53
4.2.7	Frequency Analysis of Department Versus Types of Lean Implemented	55

## LIST OF ABBREVIATIONS

<b>ABBREVIATION</b>	<b>MEANING</b>
H <sub>0</sub>	Null Hypothesis
H <sub>1</sub>	Alternative Hypothesis
ANOVA	Analysis of Variance
Ca	The management level is lack of a clear vision and strategy
Cb	Lack of management commitment and involvement
Cc	Lack of a strong leadership in management level
Cd	Failure to create a sense of urgency
Ce	Lack of management ability to operate in diverse environment
Cf	The employee is lack of skills and expertise on implementing lean
Cg	The employees have ineffective communication skills particularly across functional boundaries
Ch	The employees are lack of supportive organizational culture to follow
Ci	The employees failure to understand the scope of lean management system
Cj	The employees resist to change



**LIST OF APPENDICES**

<b>APPENDIX</b>	<b>TITLE</b>
APPENDIX 1	Gantt Chart for PSM 1
APPENDIX 2	Gantt Chart for PSM 2
APPENDIX 3	Questionnaire

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 BACKGROUND OF STUDY**

The organization over the globe have been working for improving the flexibility, increasing the overall effectiveness, and reducing the response time to act upon varying customer demands over a period of time. Mass production system unable to cope with the urgent and separate orders of the production with certain characteristics due to the preparation time of the production system is too long and costly. Hence, batch or mass production system has been converted into a new approach of Toyota Production System called Lean Production system. Lean production system has turned out to be broadly acceptable best manufacturing practices across countries and industries.

Lean production system involves eliminating wastes in design, manufacturing, distribution, and customer service processes which was developed by Taiichi Ohno and been popularized by James P. Womack and Daniel T. Jones (1990) in their book "The Machine that Changed the World: Triumph of Lean Production".

According to Nordin et al. (2010), the ultimate goal of a lean production system to be implemented in the organization is to create a smooth and high quality organization that is able to produce finished goods which fulfill the customer demand with acceptable quality and with no wastes. The organization can develop, produce, and distribute products with less human effort, space, time, tools and expenses after implementing lean production to enables the organization to sustain in the market competition.

In order to minimize the gap to the mature organization in developed countries or challenging industry, many organizations have implemented lean production to improve its competence for better quality products and on time delivery with lower cost. This report is concerning on the implementation barriers in lean production. In order to create the world- class production system, lean production, either in manufacturing company or a service or public-sector organization, managers must learn to embrace a long-term view, with the consciousness that what to do is a part of a continually improving process (John R. Black, 2008).

## 1.2 PROBLEM STATEMENT

Nowadays, lean principles have moved from manufacturing plants to all kinds of operations such as insurance companies, hospitals, government agencies, high-technology product development units, IT operations, publishing companies and others. The aim is to improve the organization's performance on the operating metrics by arranging the employees to eliminate unneeded activities and other operational waste. Lean production is one of the approaches which has been used by many organizations to achieve competitive advantage based on their characteristics. There are several organization do not know which of the lean tools or principles are suitable to be used and how to apply them effectively. But, the most important aspect is that most of the organization does not understand what are the implementation barriers of lean production. The purpose of this report is examining the challenges of organization on applying lean production, as well as their problems concerning the transformation to lean production on human factors.

### 1.3 RESEARCH QUESTIONS

This research has been work out to identify the tendency of different industry in implementing lean in the organization. The main purpose of this research is to investigate the barriers which hinder the implementation of lean production. Although there are a few studies that have been done in Malaysia based on lean production implementation, but the researcher would like to do the research on the barriers of implementing lean production in electrical and electronic industry.

Therefore, the researcher comes out with several research questions to be defined in the research as follow:

- What is the type of lean production's tools and techniques been used in various department within the company?
- What are the human factors that influencing the implementation of lean production?
- Which human factors are the most influencing factor on lean implementation?

## 1.4 RESEARCH OBJECTIVES

This research is aimed to provide a theoretical framework to understand the key concepts of lean production, and the tools and techniques that can be used in implementing lean. Therefore, the researcher purports to answer the research questions by providing the research objectives with the help of electrical and electronic industry through certain research techniques.

The research objectives of this research are to identify the implementation barriers of lean production in the selected industry. Hope that this research study will help the firm's management to identify the problem to implement an effective lean production.

Therefore, the researcher comes out with several research objectives to be obtained in this research as follow:

- To investigate the types of lean production's tools and techniques been used in various department within the company.
- To determine the human factors that influencing the implementation of lean production.
- To identify the dominant human factor that influencing the lean implementation.

## **1.5 SCOPE, LIMITATIONS AND KEY ASSUMPTIONS OF THE STUDY**

The research model was designed to investigate the related question through questionnaire outlined in the preceding section. This research only focused on the electrical and electronic industry in Penang, therefore the respondents will be the managerial and executives employees of the industry. The research instruments include a combination of structured questionnaire and surveys will be used for further validation. The results of this research will provide a solid basis for further research. The research study will only focus on the human factors such as management and employees. Besides that, the respondents will be the managerial and executive level employees.

The limitation of this research will be the lean indicators used for assessing the lean implementation progress in the surveyed companies in Penang and Johor. The limitation that cannot be identified in this research is the knowledge of the respondents on the lean implementation tools and techniques. Besides that, the expected return obtained from the data collection may not fulfill the needs and research objectives of the research. Thus, the result obtained will not be generalized to represent the entire industry.

The key assumptions of the research study are the respondents are to be assumed to answer the survey questionnaire with logical and honestly. The cooperation from the respondents is utmost. The research study can be assumed as very practical and useful for the industry.

## 1.6 IMPORTANCE OF THE RESEARCH

The importance of this research is to understand the relationship between the implementation barriers of lean production in electrical and electronic industry and the most applicable types of lean tools in the organization. In fact, that the understanding of lean implementation is very important to the organization in order to fulfill the role in improving the business performance and reducing waste. This research was done for the purpose to fulfill several significant which considered important to be the references for parties such as:

- To study on the benefits when lean has been applied in the organization. The results of this research to the organization will be such as improve the customer satisfaction, lead time, on-time delivery, productivity, and flow of information between supply chain management.
- To examine the function and benefits of the lean tools can be applied and most applicable types of lean tools. The result of this research to the researcher is to understand the usage of applied lean tools in different organization and the reason of the organization on applying those lean tools.
- To investigate the implementation barriers in lean production. The results of this research to the organization is the organization may find solution to refrain from the situation and perform a different and more detailed perspective of lean to the managers who consider implementing lean as a possible direction towards achieving sustainable performance for the organization.