

BLUE OCEAN LEADERSHIP FOR SUSTAINING LEAN MANUFACTURING
IN MALAYSIAN AUTOMOTIVE INDUSTRY

LOH KOK LIANG

UNIVERSITI TEKNOLOGI MALAYSIA

BLUE OCEAN LEADERSHIP FOR SUSTAINING LEAN MANUFACTURING
IN MALAYSIAN AUTOMOTIVE INDUSTRY

LOH KOK LIANG

A thesis submitted in fulfilment of the
requirements for the award of the degree of
Doctor of Philosophy

Razak Faculty of Technology and Informatics
Universiti Teknologi Malaysia

MARCH 2019

DEDICATION

Specially dedicated to *my beloved family and Sanyco Grand Industries Sdn Bhd* for
the great support and encouragement.

ACKNOWLEDGEMENT

I am grateful to my supervisors, **Prof Ir Dr Sha'ri M. Yusof, Dr Noor Hamizah Hussain** and external supervisor **Datuk Dr Dominic Lau Hoe Chai** and **Datuk M Madani Sahari** for their encouragement during this research. I am constantly amazed at their knowledge and their willingness to share their time and expertise. Despite their busy schedule, they assisted and supported me in every possible way throughout this journey. I owe them more than I can adequately express and offer them my warmest appreciation and deepest thanks.

My sincere thanks go to Malaysia Automotive Institute (MAI) team, especially to **Datuk M Madani Sahari, En Nasrudin Hashim, En Mohd Sharulnizam bin Sarip and Cik Nur Farhana**. I appreciate your willingness to share and assist in my study.

My sincere thanks also to **Sanyco Grand Industries Sdn Bhd** for the opportunity to further my post-graduate studies. Sincere appreciation to the management, especially to **Mr Ng Wai Kee** (Group Executive Director), **Mr Soo Hak Min** (Executive Director), all head of departments and staffs. Acknowledgement also goes to all who helped me during the data collection and to the respondents of this research.

Not to forget my sincere thanks to **Minister of High Education (MoHE)** for the **MyBrain** scholarship. Without the funding from MyBrain, I would not be able to embark on this doctoral journey.

ABSTRACT

Many automotive related organizations in Malaysia embarked into the Lean journey to reduce cost due to pressure from market liberalization. However, Lean is not sustainable due to many factors and leadership is seen to be the most critical factor. Furthermore, it is not easy to change leadership style as it relates to behavior and traits of the leader. Thus, this study aims to explore the use of the Blue Ocean Leadership concept for sustaining Lean implementation. The purpose of this study is to determine the relationship between Blue Ocean Leadership activities with Lean manufacturing practices and firm performance in Malaysian automotive industry. An exploratory sequential mixed method research approach was carried out. The research began with the qualitative method where four expert opinions were gathered and then the findings were triangulated with information from literature to develop questionnaire for the quantitative method. A total of 64 respondents were involved in the second stage of the survey research. Seven themes of leaders' activities were identified from the literature and experts which were later merged to four themes, namely: Genba-kaizen, motivation, communication and empowering-coaching. Quantitative data was analyzed using SmartPLS (v3.2.6) and revealed that Genba-kaizen mediate the relation between Lean manufacturing practices and firm performance, and could increase the correlation with firm performance by 30 percent. Wilcoxon Signed Rank test confirmed that the leaders did not practice what they perceived as important by 25.9 percent. The difference was much greater in firms without any Japanese staffs by 13 percent. In conclusion, this study has provided a new perspective on how to sustain Lean implementation from leadership strategy perspective. To the Lean practitioners, the findings provide a new strategy for sustaining Lean implementation. It has also provided a better understanding to academics. A small sample size which focused at only two level of management are some of the limitations in this study and suggested recommendations for future study in the area are also given. Hence, this study has successfully created value to Lean practitioners, leaders of Lean implementation companies as well as academics.

ABSTRAK

Banyak organisasi berkaitan automotif di Malaysia memulakan pengamalan Lean untuk mengurangkan kos akibat tekanan daripada liberalisasi pasaran. Namun begitu, pengamalan Lean tidak dapat dikekalkan kerana banyak faktor dan kepimpinan dilihat sebagai faktor yang paling penting. Walau bagaimanapun, adalah sukar untuk mengubah gaya kepimpinan kerana berkaitan dengan tingkah laku dan ciri-ciri seorang pemimpin. Oleh itu, tujuan kajian ini adalah untuk meneroka penggunaan konsep Kepimpinan Lautan Biru bagi mengekalkan pengamalan Lean. Matlamat kajian ini adalah untuk menentukan hubungan antara aktiviti Kepimpinan Lautan Biru dengan amalan Lean dan prestasi syarikat dalam industri automotif di Malaysia. Kajian ini menggunakan pendekatan kaedah campuran berurutan penerokaan. Kajian ini bermula dengan kajian kualitatif yakni pendapat empat orang pakar dikumpulkan dan kemudiannya ditriangulasikan menjadi soal selidik untuk kajian kuantitatif pada peringkat kedua. Sejumlah 64 orang responden terlibat dikumpulkan dalam peringkat kedua kajian berbentuk kaji selidik. Tujuh tema aktiviti pemimpin telah dikenal pasti daripada penulisan dan para pakar yang kemudiannya digabungkan menjadi empat tema, iaitu: Genba-kaizen, motivasi, komunikasi dan bimbingan pemberdayaan. Data kuantitatif dianalisis dengan menggunakan SmartPLS (v3.2.6) dan didapati bahawa Genba-kaizen menengahkan hubungan antara amalan Lean dengan prestasi firma dan dapat meningkatkan korelasi sebanyak 30 peratus ke atas prestasi firma. Ujian Wilcoxon Signed Rank mengesahkan bahawa para pemimpin tidak mempraktikkan apa yang dianggap sebagai penting sebanyak 25.9 peratus. Perbezaannya jauh lebih tinggi dalam firma tanpa pekerja Jepun dengan 13 peratus. Sebagai kesimpulan, kajian ini telah memberikan perspektif baharu tentang cara untuk mengekalkan pelaksanaan Lean daripada perspektif strategi kepimpinan. Untuk pengamal Lean, penemuan ini menyediakan strategi baharu untuk mengekalkan pelaksanaan Lean. Ia juga memberikan pemahaman yang lebih baik kepada ahli akademik. Saiz sampel yang kecil dan tumpuan hanya pada dua peringkat pengurusan merupakan beberapa batasan dalam kajian ini dan untuk kajian masa depan dicadangkan agar mengkaji lagi bahagian tersebut. Dengan yang demikian, kajian ini telah berjaya memberikan nilai kepada para pengamal Lean, para pemimpin syarikat pelaksana Lean dan ahli akademik.

TABLE OF CONTENTS

	TITLE	PAGE
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENT	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENTS	vii
	LIST OF TABLES	xii
	LIST OF FIGURES	xv
	LIST OF ABBREVIATIONS	xvii
	LIST OF SYMBOLS	xix
	LIST OF APPENDICES	xx
CHAPTER 1	INTRODUCTION	1
1.1	Introduction	1
1.2	Historical Development of Malaysia Automotive Industry	1
1.2.1	Contribution of Automotive Industry to Malaysia Economy	2
1.2.2	Liberalization and Trade Policies	5
1.2.3	Evolution of Malaysia Automotive Policies	7
1.2.4	Malaysia Japan Industry Cooperation	8
1.3	Lean Practices in Malaysia Automotive Industry	9
1.4	Statement of the Problem	10
1.5	Research Objectives	12
1.6	Scope of the Research	13
1.7	Conceptual Framework	14
1.8	Significance of the Research	15
1.9	Organization of the Thesis	16

CHAPTER 2	LITERATURE REVIEW	19	
2.1	Introduction	19	
2.2	Lean Manufacturing Practices	19	
2.3	Firm Performance	26	
2.4	Critical Success Factors (CSF) for LM Practices	32	
2.5	Leadership Style	37	
2.6	Blue Ocean Leadership	43	
	2.6.1	Visionary and Forward Thinking	48
	2.6.2	Self-Development	50
	2.6.3	Continuous Improvement (kaizen)	52
	2.6.4	Genchi Genbutsu (Genba)	54
	2.6.5	Empowering-Coaching Oriented	56
	2.6.6	Two Way Communication	59
	2.6.7	Motivation	62
2.7	Previous Studies on Lean and Performance	64	
2.8	Summary	66	
CHAPTER 3	RESEARCH METHODOLOGY	69	
3.1	Introduction	69	
3.2	Research Concept	69	
3.3	Methodology Framework	69	
3.4	Mixed Method Approach	71	
3.5	Qualitative Stage	73	
	3.5.1	Qualitative Data Collection - Expert Opinion	75
	3.5.2	Qualitative Data Analysis	77
3.6	Quantitative Stage	80	
	3.6.1	Type of Survey	80
	3.6.2	The Population	81
	3.6.3	Unit of Analysis	81
	3.6.4	Instrumentation	82
	3.6.4.1	Measurement for Respondents' Demography	84

3.6.4.2	Measurement for LM Practices and Firm Performance	84
3.6.4.3	Measurement for Leaders' Activities/Practices	85
3.6.5	Reliability and Validity of Research Instrument	86
3.6.5.1	Validity	86
3.6.5.2	Reliability	87
3.6.5.3	Generalizability	87
3.6.5.4	Carefulness	88
3.6.5.5	Questionnaire	89
3.6.6	Quantitative Data Collection and Analysis	90
3.6.6.1	Descriptive Analysis	91
3.6.6.2	Inferential Statistics	92
3.6.6.3	Bootstrapping and Mediation Test	94
3.6.6.4	Wilcoxon Signed Rank Test	96
3.7	Summary	97
CHAPTER 4	DATA ANALYSIS AND DISCUSSION	99
4.1	Introduction	99
4.2	Qualitative Data Analysis	99
4.3	Pilot Study Quantitative Data	101
4.4	Data Examination	106
4.4.1	Data Screening	107
4.4.2	Common Method Bias	108
4.4.3	Non-response Bias	110
4.4.4	Outlier Test	112
4.4.5	Normality Test	115
4.4.6	Reliability and Validity Test	117
4.5	Descriptive Analysis	120
4.6	Respondent Profiles	122
4.6.1	Gender	122
4.6.2	Age Bracket	123

4.6.3	Position of Respondents	123
4.6.4	Academic Qualification	124
4.6.5	Working Experience	125
4.6.6	Lean Related Training	125
4.6.7	Organization Size	126
4.6.8	Firm Ownership	127
4.6.9	Full-Time Kaizen Staff in Respondents' Organization	128
4.7	PLS-SEM Model Assessment	128
4.7.1	Assessing R ² Values	129
4.7.2	Assessing Q ² Values	129
4.7.3	Assessing f ² values	130
4.8	Relationship between Leadership Activities - LM Practices and Firm Performance	133
4.8.1	Relationship between LM practices and Firm Performance	133
4.8.2	Relationship between LM Practice and Blue Ocean Leadership Activities and Practices	134
4.8.3	Relationship between Blue Ocean Leadership Activities and Practices, and Firm Performance	136
4.8.4	Leadership Activities and Practices Positively Mediate the Relationship between LM Practices and Firm Performance	138
4.8.4.1	Mediation Effect of Genba-kaizen	139
4.8.4.2	Mediation Effect of Empowerment-Coaching	141
4.8.4.3	Mediation Effect of Communication	142
4.8.4.4	Mediation Effect of Motivation	144
4.8.5	Importance Performance Matrix Analysis (IPMA)	152
4.9	Wilcoxon Signed Rank Test	155
4.10	Summary	159
CHAPTER 5	CONCLUSIONS AND FUTURE RESEARCH	161
5.1	Introduction	161

5.2	Conclusions	161
5.3	Contributions	162
5.3.1	Theoretical Contributions	163
5.3.2	Practical Contributions	164
5.4	Limitation and Future Research	165
REFERENCES		167
LIST OF PUBLICATIONS		213

LIST OF TABLES

TABLE NO.	TITLE	PAGE
Table 1.1	Key milestone of automotive industry development in Malaysia	2
Table 1.2	Vehicle sales and forecasts* for selected Asia countries between 2014 to 2019	4
Table 1.3	Comparison of vehicle export and forecast sales for Malaysia and Thailand	4
Table 2.1	Summary list of Lean practices	22
Table 2.2	5S in Japanese and English with explanations	24
Table 2.3	Measuring items for LM practices with literature reference	25
Table 2.4	Measuring items for LM practices with literature reference (Continued)	26
Table 2.5	List of organization performance measuring item	28
Table 2.6	Measuring items for firm performance	31
Table 2.7	List of Critical Success Factors for Lean manufacturing practices with researchers	34
Table 2.8	Leadership Attributes by Style	41
Table 2.9	Comparison of Blue Ocean Leadership and conventional leadership	45
Table 2.10	List of Lean leaders' activities construct with reference	48
Table 2.11	Measuring items for visionary and forward thinking	50
Table 2.12	Measuring items for self-development and knowledge sharing	52
Table 2.13	Measuring items for continuous improvement	54
Table 2.14	Measuring items for Genba	56
Table 2.15	Measuring items for empowering-coaching oriented	59
Table 2.16	Measuring items for two way communication	61
Table 2.17	Measuring items for motivation	63
Table 2.18	List of previous study	64

Table 2.19	Lean leadership construct with measuring items	66
Table 3.1	Summary of research objectives, questions and analysis methods	98
Table 4.1	Summary of coded nodes with themes	100
Table 4.2	Discriminant Validity Test with Heterotrait-Monotrait Ratio (HTMT)	103
Table 4.3	Discriminant Validity Test (HTMT) after combining Genba, Continuous Improvement, Self-Development and Vision into Genba-kaizen	103
Table 4.4	Reliability and validity result	105
Table 4.5	Return and usable rate of the questionnaire	107
Table 4.6	Harman Single Factor Test result	108
Table 4.7	Distribution of responses	110
Table 4.8	Mann-Whitney U Test	112
Table 4.9	Mahalanobis distance	113
Table 4.10	Test of normality	115
Table 4.11	Reliability and validity statistic	118
Table 4.12	Discriminant validity test result with HTMT ratio	120
Table 4.13	Mean Scores of Dependent and Independent Variables	120
Table 4.14	Frequency Table – Respondents’ Gender	122
Table 4.15	Frequency Table – Respondents’ Age	123
Table 4.16	Frequency Table – Respondent’s position level	124
Table 4.17	Education level of respondents	124
Table 4.18	Year of service in organization	125
Table 4.19	Frequency of Lean related training attended	126
Table 4.20	Organization size by sales turnover	127
Table 4.21	Firm Ownership	127
Table 4.22	Number of full-time kaizen staff	128
Table 4.23	R ² and Q ² results of variables	130
Table 4.24	Result of <i>f</i> ² effect size	132
Table 4.25	Summary Confirmatory Tetrad Analysis result	133

Table 4.26	Summary Effect with Genba-kaizen as Mediator	140
Table 4.27	Summary Effect with Empowering-Coaching as Mediator	142
Table 4.28	Summary Effect with Communication as Mediator	143
Table 4.29	Summary Effect with Motivation as Mediator	145
Table 4.30	Summary effect with multiple mediators (bootstrap result)	146
Table 4.31	IPMA Firm Performance (construct, standardize effect)	153
Table 4.32	IPMA Firm Performance (Genba-kaizen activity variables, standardize effect)	154
Table 4.33	Wilcoxon Signed Rank test	157

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE
Figure 1.1	Total Industry Volume (TIV) and Total Production Volume (TPV) for Malaysia automotive industry from 2011to 2017, (MAA, 2018)	3
Figure 1.2	Map of ASEAN member countries, (APLF, 2015)	6
Figure 1.3	Conceptual framework	14
Figure 2.1	History of Lean, adapted from Juran (2009)	21
Figure 2.2	Illustration of leadership style and performance, adapted from Topline Consulting (Topline, 2013)	42
Figure 2.3	ERRC Model (Kim and Mauborgne, 2014c)	46
Figure 3.1	Positioning of the research continuum (Tobi, 2014)	71
Figure 3.2	Research Design of Exploratory Sequential Mixed Methods adapted from Creswell (2014)	72
Figure 3.3	Research process flow chart	74
Figure 3.4	Procedure followed in applying Nvivo 11 software (adapted from Hilal and Alabri (2013))	79
Figure 3.5	Interval scale for level of perception	83
Figure 3.6	Interval scale for level of importance	83
Figure 3.7	Interval scale for level of extent	83
Figure 3.8	Flow of the questionnaire contents validity check	89
Figure 3.9	Simple mediation model	94
Figure 3.10	Conceptual Model	95
Figure 4.1	Measurement model of the pilot test result	102
Figure 4.2	Measurement model with combining Genba, Continuous Improvement, Self-Development and Vision into Genba-kaizen	106
Figure 4.3	Measurement model for LM practices and Firm Performance	134
Figure 4.4	Measurement model for LM practice and BOL Activities	136

Figure 4.5	Measurement Model for BOL Activities and Firm Performance	137
Figure 4.6	The Output for Measurement Model with Genba-kaizen as Mediator	140
Figure 4.7	The Output for Measurement Model with Empowering-Coaching as Mediator	141
Figure 4.8	The Output for Measurement Model with Communication as Mediator	143
Figure 4.9	The Output for Measurement Model with Motivation as Mediator	144
Figure 4.10	The Bootstrapping Output for Measurement Model with Multiple Mediators	146
Figure 4.11	Measurement model for Motivation and Firm Performance	151
Figure 4.12	Measurement model for Empowering-Coaching and Firm Performance	151
Figure 4.13	Measurement model for Communication and Firm Performance	152
Figure 4.14	Importance Performance Map – Firm Performance (Genba- kaizen variables, standardized)	155

LIST OF ABBREVIATIONS

ADF	-	Automotive Development Fund
AFTA	-	ASEAN Free Trade Agreement
AGFI	-	Adjusted Goodness of Fit
AMOS	-	Analysis of Moment Structures
ASEAN	-	Association of South East Asian Nations
AVE	-	Average Variance Extracted
BOL	-	Blue Ocean Leadership
CBU	-	Complete Build Unit
CEPT	-	Common Effective Preferential Tariff
CF	-	Comparative Fit Index
CFA	-	Confirmatory Factor Analysis
CR	-	Composite Reliability
EEV	-	Energy Efficient Vehicle
EFA	-	Exploratory Factor Analysis
FTA	-	Free Trade Agreement
GFI	-	Goodness of Fit Index
HTMT	-	Heterotrait-Monotrait ratio
IAF	-	Industrial Adjustment Fund
JIPN	-	Japanese Institute of Plant Maintenance
JIT	-	Just In Time
KATECH	-	Korea Automotive Technology Institute
KATRI	-	Korea Automobile Testing & Research Institute
LM	-	Lean Manufacturing
LPS	-	Lean Production System
MAI	-	Malaysia Automotive Institute
MAJAICO	-	Malaysia Japan Industry Cooperation
MJEPA	-	Malaysia Japan Economic Partnership Agreement
MITI	-	Malaysia International Trade and Industry
MTBF	-	Mean Time Between Failure
NAP	-	New Automotive Policy

NFI	-	Normed Fit Index
OE	-	Original Equipment
QDA	-	Qualitative Data Analysis
RMSEA	-	Root Mean Square of Error Approximation
SEM	-	Structural Equation Modelling
SLSAM	-	Soft Loan Scheme for Automotive and Modernization
SMA	-	Swedish Motor Assemblies
SME	-	Small Medium Enterprise
SMED	-	Single Minutes Exchange of Die
TAI	-	Thailand Automotive Institute
TBS	-	Toyota Business System
TIV	-	Total Industries Volume
TLI	-	Tucker-Lewis Index
TPM	-	Technology Park Malaysia
TPPA	-	Trans Pacific Partnership Agreement
TPS	-	Toyota Production System
UTM	-	Universiti Teknologi Malaysia

LIST OF EQUATION

EQUATION	TITLE	PAGE
Equation 4.1	f^2 effect size	131

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
Appendix A	List of Lean Expert	183
Appendix B	Expert Opinion	185
Appendix C	Content Validity by Expert	189
Appendix D	Survey Questionnaire	199
Appendix E	Confirmatory Tetrad Analysis Result	209

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter provides an overview and development of automotive industries in Malaysia as well as the evolution of automotive policies, Lean initiatives and issues concerning the automotive industries.

1.2 Historical Development of Malaysia Automotive Industry

Malaysia automotive industry began with Swedish Motor Assemblies (SMA) when they started to assemble the Volvo 144 model back in 1967. In 1968, Universal Cars and Associated Motor Industries of Malaysia, signed a ten-year agreement with Ford Motor Company USA (Ford) to import, assemble and distribute Ford motor vehicles in Malaysia. While Kah Motor Co. Sdn Bhd was established in 1969 to manage Honda automotive sales and services in Malaysia and Singapore. Tan Chong and Son Co. Ltd signed an agreement with Nissan Japan to assemble Nissan cars in Malaysia and rolled out first the Datsun model in June 1968 and start assembly in 1967 from Segambut plant (Gomez, 2015). Then Sarawak Motor Industries start to assembly for BMW and UMW Toyota Sejati Motors for Toyota cars in 1981 and 1982 respectively. Table 1.1 shows the key milestone of Malaysia automotive industry. Malaysia's first national car project began with the agreement between Mitsubishi Motor Corporation, Mitsubishi Corporation and HICOM in 1983. Two years later, in 1985, Perusahaan Otomobil Nasional (Proton) successfully manufactured the first Saga model. This was the turning point for Malaysia automotive industry and grew at a very fast pace.

Table 1.1 Key milestone of automotive industry development in Malaysia

No.	Year	Company	Vehicle Type
1	1967	Swedish Motor Assemblies Sdn Bhd	Volvo
2	1968	Universal Cars and Associated Motor Industries of Malaysia	Ford
3	1969	Kah Motor Co. Sdn Bhd	Honda
4	1976	Tan Chong Motor Assemblers (TCMA)	Nissan
5	1981	Sarawak Motor Industries	BMW
6	1982	UMW Toyota Sejati Motors	Toyota
7	1985	Perusahaan Otomobil Nasional Sdn Bhd	Proton
8	1993	Perusahaan Otomobil Kedua Sdn Bhd	Perodua
9	1994	Malaysian Truck and Bus	Bus and small truck
10	1996	Isuzu Hicom Malaysia	Isuzu
11	1997	Inokom Corporation	Hyundai, Mazda, BMW
12	1998	TD Cars Malaysia	TD Cars
13	1999	Bufori Motor Car Company Malaysia	Bufori
14	2003	Naza Automotive Manufacturing	Kia and Peugeot
15	2012	Go Auto Manufacturing	Haval
16	2014	Hino Motor Manufacturing Malaysia	Hino

Source: Gomez (2015)

Second national car Perusahaan Otomobil Kedua Sdn Bhd only established in 1993 with Perodua brand launched the popular compact car, Kancil. This is followed by Malaysian Trucks and Bus a year later to assemble bus and small truck. Isuzu pickup truck was started in 1996 by Isuzu Hicom Malaysia. While Inokom Corporation was established in 1997 and assembled Hyundai, Mazda and BMW in stages. TD Cars Malaysia and Bufori Motor Car Company Malaysia started assembly of TD Cars in 1998 and Bufori cars in 1999 respectively. In 2003 Naza Automotive Manufacturing started to assemble Kia and Peugeot brand vehicles. The China brand car, Haval was assembled by Go Auto Manufacturing from 2012 and recently in 2014, Hino Motor Manufacturing Malaysia started to assemble Hino truck.

1.2.1 Contribution of Automotive Industry to Malaysia Economy

Malaysia with a ratio of 200 cars for every one thousand people was ranked amongst countries with high car ownership in the region (MIDA, 2012). The

automotive industry also contributed 3.2 percent to GDP in 2012, accounted for RM5.3 billion in exports. This figure is projected to triple by 2020 with 10 percent of GDP. Besides, by year 2020, this industry sector is expected to create an additional 150,000 job opportunities (MITI, 2014).

From 1970 the total production volume (TPV) of 28,000 units grew over threefold, for the first time to reach over 100,000 units in 1980. This figure continued to grow to over 600,000 units in the year 2000. Report from the Malaysia Automotive Association (MAA, 2016) showed that the total industry volume (TIV) for the automotive sector increased about 2.7 percent to 666,465 units in 2014 from 2011 as shown in Figure 1.1.

However, vehicle sales for Malaysia were the lowest among the few selected Asia countries as shown in Table 1.2. Although a vehicle sale in Malaysia is projected to grow about 6.0 percent from 2014 to 2019; the total sales are still far below Malaysia’s neighbour countries – Thailand and Indonesia. Besides, Thailand exported over a million vehicles annually, but Malaysia exported only about 30,000 units as shown in Table 1.3. This indicates that the automotive industry in Malaysia is not competitive as compared to Thailand.

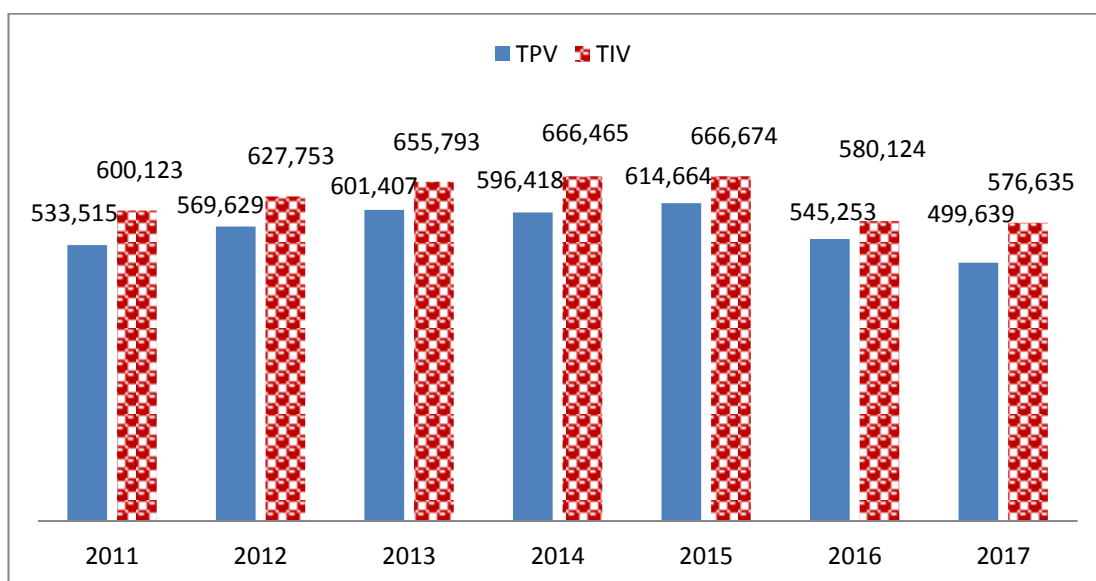


Figure 1.1 Total Industry Volume (TIV) and Total Production Volume (TPV) for Malaysia automotive industry from 2011 to 2017, (MAA, 2018)

Table 1.2 Vehicle sales and forecasts* for selected Asia countries between 2014 to 2019

No.	000 units	2014	2015	2016	2017*	2018*	2019*
1	China	23,492	24,590	28,030	27,600	27,400	27,900
2	Japan	5,563	5,047	4,970	5,075	5,180	5,270
3	India	3,176	3,484	3,727	3,840	3,920	3,970
4	South Korea	1,660	1,833	1,825	1,745	1,715	1,745
5	Indonesia	1,208	1,013	1,061	1,095	1,145	1,205
6	Thailand	1,870	1,890	1,950	1,970	2,080	2,210
7	Malaysia	596**	615**	580	576	618	632

*2014-2016 data are actual, 2017-2019 are forecasts, ** follow MAA 2016 data, (Pugliese, 2017; MAA, 2016; Titikorn, 2016)

Table 1.3 Comparison of vehicle export and forecast sales for Malaysia and Thailand

Country	2015	2016	2017	2020
Malaysia	27,792	30,000*	31,000*	122,610*
Thailand	1,170,000	1,250,000*	1,340,000*	1,650,000*

* forecast, (TAIA, 2017)

According to Natsuda *et al.* (2013), many developing countries expect to have major multinational car makers to use their country as an assembly base for domestic and export market; or even as a regional source of components. For example, in Thailand, they do not have any national car and yet they exported over a million vehicles annually. However, in contrast, Malaysia has had different ambitions, realization of producing its own national car. In order to help the national car and local vendors, Malaysia practices some form of protectionism policies such as local material content requirement, import tariffs and Mandatory Deletion Program (MDP) (Segawa *et al.*, 2014). In 1980, under the MDP, all franchise holders

and automotive makers in Malaysia were prohibited from importing 30 automotive parts listed as mandatorily deleted components.

1.2.2 Liberalization and Trade Policies

In 1964, before even any car started to assemble in Malaysia, the government had already laid down tariff protection rules that allow completely-knocked-down (CKD) vehicle packs to be imported without import duty except for batteries, tubes and tires. For completely-built-up (CBU) units, a reasonable duty up to a maximum of 30 percent duty was imposed and 15 percent for semi-knocked-down (SKD) (Gomez, 2015). In order to encourage local manufacturing, an assembly tax was raised from 2 percent to 3 percent of the car value imposed on assemblers who use less than 8 percent of local Malaysian content by February 1968. The assembly tax was raised 2 percent incremental per annum to 12 percent and local content to 20 percent by 1974 (Gomez, 2015).

Over the years, the protectionist policies implemented by the Malaysia government has been relaxed considerably, but not completely abandoned or abolished (Natsuda *et al.*, 2013). However, with the trade agreements signed with partner countries, Malaysia had no other choice but to liberalize the market. Under the rules of World Trade Organization (WTO), Malaysia has to abolish local content requirements. Besides, the ASEAN Free Trade Area (AFTA) agreement in 1992, Malaysia Japan Economic Partnership Agreement 2005 (MJEPA), Malaysia-India Comprehensive Economic Cooperation Agreement 2011 (MICECA), and few other bilateral Free Trade Agreements, Malaysia faced increasing pressure to liberalize the automotive industry (Abidin and Loke, 2008; Natsuda *et al.*, 2013). Under these free trade agreements, the car price in Malaysia was forced to reduce gradually ranging from 20 percent to 30 percent over the next 5 years. Malaysia Automotive Institute (MAI) claimed that Malaysia is on track to achieve its target of reducing the car prices in the country by 25 percent in 2018 (Lee, 2014).

The Foreign Ministers of Singapore, Malaysia, Indonesia, Thailand and Philippines met and signed a document on 8th August 1967; and with this, the Association of Southeast Asian Nations (ASEAN) was established. ASEAN member states (see Figure 1.2) decided to liberalize trade within the region in January 1992. They decided to create ASEAN Free Trade Area (AFTA) by extensively removing trade barriers.



Figure 1.2 Map of ASEAN member countries, (APLF, 2015)

In 2005, AFTA came into effect, permitting the import of parts within the ASEAN region with a maximum of 5 percent tariff. Moreover, an increased in CBU import in the post-AFTA regime already had a negative impact on component sales in the region (Dey, 2002). An intensely competitive scenario had emerged for parts producer in this region. Vehicle manufacturers are importing parts from the network of part manufacturers in the ASEAN region post-AFTA. This had increased competition in the original equipment (OE) segment. The aftermarket also witnessed severe competition with the new entrants as a number of imported brands increased (Dey, 2002).

1.2.3 Evolution of Malaysia Automotive Policies

With the globalization and market liberalization increased the competition; the challenges faced by the automotive industry became greater. Malaysian government felt the need to review the policy framework and strategic direction for the local automotive sector (Sultana and Ibrahim, 2014). Moving towards a less regulated policy is important and crucial to remain competitive for long-term survival. With that, in March 2006, Malaysia launched the National Automotive Policy (NAP). The NAP served as a guide in strengthening the automotive sector under the Third Industrial Master Plan (2006–2020) (Jawi *et al.*, 2012). The main objective was to progressively liberalize the market. In September 2009, the NAP was revised to ensure a long-term sustainability, encourage new investments of the domestic automotive industry, and ensure quality and safety of products and services and environmental protection (Segawa *et al.*, 2014).

The NAP was further reviewed in 2014 with extensive consultations involving industry stakeholders, industry players, ministries and agencies. It has taken on broader views and inputs from these various stakeholders to ensure that measures outlined in NAP 2014 would benefit the automotive industry as a whole. Based on the feedback, NAP 2014 focuses on green initiatives, development of technology and human capital, market expansion and enhancement of the automotive industry ecosystem. The objectives of NAP 2014 were to develop a competitive and capable domestic automotive industry, develop Malaysia as the Energy Efficient Vehicle (EEV) regional automotive hub. Besides, increase value-added activities while continuously developing domestic capabilities, increase export of vehicles, automotive components, spare parts and related products in the manufacturing and aftermarket sectors. Also to increase the participation of competitive *Bumiputera* (a Malaysian of indigenous Malay origin) companies in the domestic automotive industry, including the aftermarket sector, enhance the ecosystem of the manufacturing and aftermarket sectors of Malaysia automotive industry and

safeguard consumer interests by providing better quality and safer products at a competitive price (MITI, 2014).

1.2.4 Malaysia Japan Industry Cooperation

Malaysia government through the NAP has outlined ways to raise the competitiveness of the country's automotive sector, including ensuring planned and structured development of the local automotive industry besides enhancing its capacity and long-term competitiveness (Bernama, 2012). The government has continued to provide a comprehensive grant and initiative package including the Automotive Development Fund (ADF), Industrial Adjustment Fund (IAF) and Soft Loan Scheme for Automation and Modernization (SLSAM). The grants are to encourage automotive related organizations to implement good management system such as ISO 9001, Total Quality Management (TQM), Total Productive Maintenance (TPM) and Lean Production System (LPS). This is extremely helpful for SMEs with had very limited resources. Besides, the government also continues its strategic cooperation with the country's main trading partners under the existing Free Trade Agreements (FTA) such as the Malaysia-Japan Economic Partnership Agreement (MJEPA).

Under Malaysia Japan Economic Partnership Agreement (MJEPA), one of the initiatives was the establishment of Malaysia Japan Industry Cooperation (MAJAICO). With this program, Lean experts were dispatched by Japanese government to level up vendors competitiveness within Malaysia automotive industry (Natsuda *et al.*, 2012). This began with the MAJAICO-A1 program, a collaborative effort between the Japanese government and the Malaysian government. In July 2006, the program was initiated and managed by SME Corp., an agency under the Ministry of International Trade and Industry (MITI). This five-year program (from 2006 to 2011) had a total of 220 projects were successfully implemented by 87 automotive related companies (Natsuda *et al.*, 2012).

1.3 Lean Practices in Malaysia Automotive Industry

The objectives of the Malaysian government encouraging Lean Production System (LPS) or Lean Manufacturing (LM) practices to automotive industry were to improve the vendor companies to have a positive and immediate impact on quality, optimized delivery and competitive cost to Proton and Perodua. This eventually will level up the competitiveness of the automotive industry to face the challenges and pressure from the market liberalization.

Rose *et al.* (2013) found that manufacturing organizations in Malaysia have a high perception of the importance of Lean manufacturing practices. Unfortunately, it was discovered that the lean implementation level is still low and many are not able to sustain (Rose *et al.*, 2013). Lean implementation is very dependent on people, thus, leaders in the organizations play a very important role. Leaders' acts and behavior set the predominant culture for the organization which would affect Lean implementation (Tortorella *et al.*, 2016).

There are five basic principles of Lean, namely: specify or define value, identify the entire value stream, flow, pull and perfection (Isack *et al.*, 2018). The main driver of these principles of Lean is the top leaders. The conventional leadership focuses on senior levels and on behavioral styles of the leaders and from the eye of the customer; they are detached from what the organization stand for (Kim and Mauborgne, 2014c). This causing the leaders slow or take longer time to react or produce fast result. When leaders carry out the right activities which could shorten the process time, then this will reduce in term of cost. For example, when a leader found some abnormally that producing defective products, he can immediately make a decision to stop the line to prevent more defective parts being produce which could incur high cost to the company. This show how important the leaders' activities are and how it could affect the firm performance.

Blue Ocean Strategy was created by world-renowned professors Chan Kim and Renée Mauborgne. Kim and Mauborgne (2014b) published a book called "Blue Ocean Strategy" in 2005. The book summarized the study of 150 strategic

moves from 30 industries covering a span of 100 years. In the book they explained the meaning of strategy and why some of these strategies failed or not sustainable.

Professor Chan Kim and Renée Mauborgne also extended the Blue Ocean concept in the area of leadership. The same way that blue ocean strategy can create uncontested market space, Blue Ocean Leadership can unleash the ocean of untapped talent and employee potential in an organization. Unlike most research in the field of leadership that has largely drawn to psychology and cognitive science, Blue Ocean Leadership developed by Kim and Mauborgne look to the field of strategy to inform the practice of leadership in business. When people value the leadership practices, they in effect buy in the leadership and are inspired to excel and act with commitment. However, if employees don't buy to the leadership, they disengage, becoming noncustomers of this leadership (Kim and Mauborgne, 2017).

Blue Ocean Leadership provides a systematic way to unlock unrealized talents and energy in an organization at low cost and at shorter time. This study is an attempt to apply the Blue Ocean Leadership concept for sustaining Lean implementation in Malaysian automotive industry.

1.4 Statement of the Problem

Lean manufacturing (LM) is a very important tool to improve competitiveness of the automotive industry in Malaysia. However, according to Chew (2015), Lean implementation post-MAJAICO saw a huge decrease in level of adoption due to a few major reasons. Among them are lack of guidance from Japanese experts, lack of commitment from top management, regular heavy work commitment at the shop floor, and kaizen leaders and members are occupied with projects mandated by customers. AlManei *et al.* (2017) highlighted that many organizations still finding it difficult to implement Lean, although various critical success factors have been identified such as leadership skills, leadership styles, management commitment, workplace culture and many more.

Numerous studies have focused on the sustainability of Lean implementation. Literatures have revealed that there are many factors causing organization to fail in Lean implementation. Knapp (2015), Sisson and Elshennawy (2015), Pakdil and Leonard (2015) and McLean and Antony (2014) found that one of the key factors for Lean sustainability is organization culture. Antony *et al.* (2012) believed that Lean can be used as a strategic tool and has been implemented as a means of achieving a deliberated strategy by senior management. In addition to organization culture, many researchers have suggested that leadership behavioral factor is amongst the key Lean failure factor (Abu Bakar *et al.*, 2015; Bortolotti *et al.*, 2015; Balzer *et al.*, 2015; Jadhav *et al.*, 2014; Albliwi *et al.*, 2014; McLean and Antony, 2014; Dorota Rymaszewska, 2014).

From the literatures that were reviewed, very few approached Lean implementation from the strategy angle of leadership. Changing leadership, character or behavioral traits may take long time, afford and cost. This causes Lean taking a long time to be implemented and also difficult to sustain in Malaysian automotive industry. Kim and Mauborgne (2014b), suggested focusing on activities and practices of a leader would be much easier. According to Puvanasvaran *et al.* (2009), companies that fail to unlock the potential of their workforce will be forced to carry out more overhead, have more layers of management, will be slower to react to market change and opportunities.

According to Kim and Mauborgne (2014c), focusing on what activities and practices leaders need to carry out in order to provide a leap in motivation and not on who they need to be. Kim and Mauborgne (2014a) revealed that it is not uncommon to find that 20% to 40 % of the acts and activities of leaders at all three levels provide only questionable value to those above and below them. Survey by Bandiera *et al.* (2017) found that one-quarter of CEO's days are spent alone and remainder 56% spent with at least one other person. This shows that leaders spend big portion of time with others (include subordinates) and if leader not carry out the right acts or activities; it will demotivate the subordinate. The right practices or activities will lead to changes in behavior which will then change the culture after some times, eventually leading to successful Lean implementation. This

study is an attempt to look at leadership from the perspective of Blue Ocean Leadership to help in sustaining the Lean manufacturing practices.

Besides, Lean manufacturing implementation in Malaysia automotive industry still not able to sustain even though necessary training had been given and awareness campaign were carried out. Leaders in most of the organizations that fail the Lean implementation had gone through Lean training; some of them were directly from the Japanese experts during the MAJAICO program. They have the knowledge and experience, but yet Lean still fail. In addition, Lean manufacturing in Malaysian automotive industry found that in general organizations with Japanese staff are better in sustaining Lean manufacturing practices.

1.5 Research Objectives

In previous section, few problems of why Lean manufacturing in Malaysia automotive industry is not able to sustain had been discussed; and the leadership is identified as the key factor. However, changing leadership is not easy and may take long time and effort. As such this study tries to introduce Blue Ocean Leadership concept to speed up and increase the chances for sustaining Lean manufacturing. The aim of this study is to explore the relationship of leaders' activities and practices to LM practices and firm performance. Therefore, this study tries to identify the right activities of the leaders. Besides, the study also tries to explore the mediation effect of these activities. It is also the aim for this study to find out how much the leaders practice what they understand and perceive as important.

The first phase will be a qualitative exploration of a successful Lean leadership activities and practices. Primary data were gathered from Lean experts from industry and academicians. The findings from this qualitative phase will then be used to formulate a questionnaire to test the research questions that relate to Lean leaderships' activities and practices, LM practices and firm performance. With that three objectives are set for this study.

Three research objectives (RO) are:

RO1 To identify the right activities and practices of leaders for LM practices.

RO2 To explore the mediation effect of leadership activities and practices between LM practices and Firm Performance.

RO3 To evaluate the difference on the level of importance and extent of practices on activities and practices for organization leaders

Research questions (RQ) had been formulated to achieve the research objectives and associated with the research aims.

RQ1 What are the leadership activities and practices of successful Lean leaders?

RQ2 Are leadership activities and practices positively mediating the relationship between LM practices and firm performance?

RQ3 Are leaders carrying out activities and practices the same level they perceived as important?

1.6 Scope of the Research

There are many factors that could contribute to failure in LM practices. This research only focuses on identifying leaders' activities and practices related to LM practices. Other factors such as culture, behavior, resources and so on are not included in the scope in this study although, there are important factors which cannot be neglected. Also, this study only focuses on automotive industry in Malaysia, other industries are not within the scope of study.

Kim and Mauborgne (2014c) highlighted that leaders are distributed to three levels of management, namely top, middle and front liner. Different level of leaders may carry out different activities or practices. However, due to limitation of resources, this preliminary study is trying to collect quantitative data to test the theory of Blue Ocean Leadership for the sustainability of Lean implementation. Therefore, this study only focuses on the top and middle level of management as the target population.

1.7 Conceptual Framework

This study has adapted the framework from Sureeratta *et al.* (2014). They investigated the relationship between leadership, Lean and performance. Their study grounded in transformation leadership style which focuses on behavioral, traits and values. The framework is modified to focus only on leaderships’ activities and practices and it is hypothesized that these mediate the relationship between LM practices and firm performance. The model from Habidin *et al.* (2016), who studied the relationship of Lean six sigma, strategic control system and firm performance has also been used to develop the conceptual flow. Figure 1.3 illustrates the conceptual framework to achieve the research objectives and answer the questions stated earlier. The concept of Blue Ocean Leadership Activities and Practices will enhance the success rate for LM practices which eventually will improve the Firm Performance.

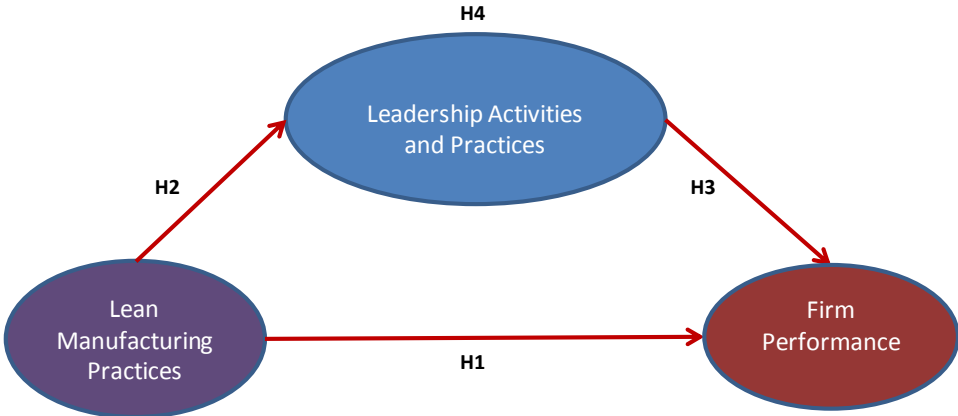


Figure 1.3 Conceptual framework

The hypotheses that will be used to answer the research question RQ2 are:

H₁ There is a significant positive relationship between LM practices and Firm Performance.

H₂ There is a significant positive relationship between LM practices and Leadership Activities and Practices.

H₃ There is a significant positive relationship between Leadership Activities and Practices and Firm Performance.

H₄ Leadership Activities and Practices positively mediate the relationship between LM practices and Firm Performance.

Hypotheses H₂, H₃ and H₄ have been further broken down into sub hypothesis to test relationship between each leadership activities and practices with LM practices and firm performance.

1.8 Significance of the Research

The research findings are able to help companies to improve the LM implementation and to sustain it. In particular, the company leaders (top management), middle management and front liner (lower management) in maintaining the LM culture in the workplace. As the LM key element is human, the leadership plays a critical role in influencing people in the organization for success.

This study tries to identify the right activities and practices as a guide for leaders to put their focus and energy on. By doing so, there is a higher chance for Lean to succeed in implementation and be sustainable.

1.9 Organization of the Thesis

The thesis is organized into five chapters as stated below:

Chapter 1 provides the background of Malaysia automotive industry, the protectionism policy and the pressure for market liberalization. Impact on the market liberalization is also briefly discussed. Besides, the development of Lean adoption under MAJAICO and the problem post MAJAICO as well as some general issues by Lean companies are highlighted. Then the concept of focusing on leaders' activities and practices are introduced before research objectives and research questions are determined.

Chapter 2 provides review of the literature relating to critical success factors for LM practices, attributes for firms' performance, Lean principles and Lean practices. Types of leadership are also briefly discussed with the introduction of the Blue Ocean Leadership concept. From this chapter, Lean leadership activities, firm performance and Lean manufacturing practices items are identified.

Chapter 3 outlines the research concept. It discusses the research framework includes: design, philosophy and approach. The data collection and data analysis method for both qualitative and quantitative stages are discussed. Qualitative and quantitative data analyses are also discussed in this chapter.

Chapter 4 discusses how the quantitative data are analyzed and discussed. Data were screened for outlier and normality test was conducted. Then data validity and reliability test were carried out to check the reliability of data. The descriptive analyses were carried out as well as statistic of the respondent profile. Bootstrapping procedure was carried out in the mediation test using the SmartPLS 3 SEM software. Importance Performance Matrix Analysis (IPMA) was used to present the importance of each leader's activities and practices. Finally Wilcoxon Signed Rank test was used to identify the difference between the level of perception and extent of practices for organizations with and without Japanese leaders. Results

of the three research objectives were described. First, a discussion on the leaders' activities identified to answer research question RQ.

Then, the relationship between LM practices, firm performance and leaders' activities were discussed to address RQ2. The finding, to RQ3 is presented with the result of the level of perception and extent of practices of activities and practices implemented by organization leaders.

REFERENCES

- Aba, E. K., Badar, M. A. and Hayden, M. A. (2016). Impact of ISO 9001 certification on firms financial operating performance. *International Journal of Quality & Reliability Management* 33: 78-89.
- Abidin, M. Z. and Loke, W. H. (2008). Revealed Comparative Advantage of Malaysian Exports: The Case for Changing Export Composition. *Asian Economic Papers* 7: 130-147.
- Abu Bakar, F. A., Subari, K. and Mohd Daril, M. A. (2015). Critical success factors of Lean Six Sigma deployment: a current review. *International Journal of Lean Six Sigma* 6: 339-348.
- Aguinis, H., Cascio, W. F. and Ramani, R. S. (2017). Science's reproducibility and replicability crisis: International business is not immune. *Journal of International Business Studies*.
- Aij, K. H., Visse, M. and Widdershoven, G. A. (2015). Lean leadership: an ethnographic study. *Leadership in Health Services* 28: 119-134.
- Alaskari, O., Ahmad, M. M. and Pinedo-Cuenca, R. (2016). Development of a methodology to assist manufacturing SMEs in the selection of appropriate lean tools. *International Journal of Lean Six Sigma* 7: 62-84.
- Albliwi, S., Antony, J., Abdul Halim Lim, S., *et al.* (2014). Critical failure factors of Lean Six Sigma: a systematic literature review. *International Journal of Quality & Reliability Management* 31: 1012-1030.
- Albliwi, S. A., Antony, J. and Lim, S. A. h. (2015). A systematic review of Lean Six Sigma for the manufacturing industry. *Business Process Management Journal* 21: 665-691.
- Alefari, M., Salonitis, K. and Xu, Y. (2017). The Role of Leadership in Implementing Lean Manufacturing. *Procedia CIRP* 63: 756-761.
- AlManei, M., Salonitis, K. and Xu, Y. (2017). Lean Implementation Frameworks: The Challenges for SMEs. *Procedia CIRP* 63: 750-755.
- Alsmadi, M., Almani, A. and Jerisat, R. (2012). A comparative analysis of Lean practices and performance in the UK manufacturing and service sector firms. *Total Quality Management & Business Excellence* 23: 381-396.
- Antony, J. (2014). Readiness factors for the Lean Six Sigma journey in the higher education sector. *International Journal of Productivity and Performance Management* 63: 257-264.

- Antony, J., Manville, G., Greatbanks, R., *et al.* (2012). Critical success factors for Lean Six Sigma programmes: a view from middle management. *International Journal of Quality & Reliability Management* 29: 7-20.
- APLF. (2015). *S.E Asian Industrial Outlook to 2025 - Low-cost manufacturing hubs emerge in Asean* [Online]. Available: <http://www.aplf.com/en-us/leather-fashion-news-and-blog/news/25938/s-e-asian-industrial-outlook-to-2025-low-cost-manufacturing-hubs-emerge-in-asean> [Accessed 9th December 2016].
- Arlbjørn, J. S. and Freytag, P. V. (2013). Evidence of lean: a review of international peer-reviewed journal articles. *European Business Review* 25: 174 -205.
- Armstrong, J. S. and Overton, T. S. (1977). Estimating nonresponse bias in mail survey. *Journal of Marketing Research* 14: 396-402.
- Avkiran, N. K. (2017). An in-depth discussion and illustration of partial least squares structural equation modelling in health care. *Health Care Manag Sci.*
- Avolio, B. J., Walumbwa, F. O. and Weber, T. J. (2009). Leadership: Current theories, research, and future directions." *Annual Review of Psychology* 60: 421-449. *Annual Review of Psychology* 60: 421-449.
- Awang, Z. (2015). *SEM Made Simple : A Gentle Approach to Learning Structural Equation Modelling*: MPWS rich publication.
- Balzer, W. K., Jiju Antony, P., Brodke, M. H., *et al.* (2015). Lean higher education: successes, challenges, and realizing potential. *International Journal of Quality & Reliability Management* 32: 924-933.
- Bandiera, O., Hansen, S., Prat, A., *et al.* (2017). A Survey of How 1,000 CEOs Spend Their Day Reveals What Makes Leaders Successful. *Harvard Business Review*.
- Baron, R. M. and Kenny, D. A. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology* 51: 1173-1182.
- Bass, B. M. (1985). *Leadership and performance beyond expectation.*, New York: Free Press.
- Bass, B. M. and Steidlmeier, P. (1999). Ethics, Character and Authentic Transformational Leadership. *Leadership Quarterly* 10: 181-217.
- Bernama. (2012). Proton suitor Decided After Detailed Assessment, says PM.
- Bhasin, S. (2013). Analysis of whether Lean is viewed as an ideology by British organizations. *Journal of Manufacturing Technology Management* 24: 536-554.

- Birkie, S. E. (2016). Operational resilience and lean: in search of synergies and trade-offs. *Journal of Manufacturing Technology Management* 27: 185-207.
- Bortolotti, T., Boscari, S. and Danese, P. (2015). Successful lean implementation: Organizational culture and soft lean practices. *International Journal of Production Economics* 160: 182-201.
- Burns, J. M. (1978). *Leadership*, New York: Harper & Row.
- Cardona, P. (2000). Transcendental leadership. *Leadership & Organization Development Journal* 21: 201-207.
- Chay, T., Xu, Y., Tiwari, A., *et al.* (2015). Towards lean transformation: the analysis of lean implementation frameworks. *Journal of Manufacturing Technology Management* 26: 1031-1052.
- Chew, Y. T. (2015). *A Comparative Study on Effectiveness of Lean Production Program and Knowledge Transfer during Malaysia-Japan Automotive Industry Cooperation (MAJAICO) and Post-MAJAICO*: Monash University, Malaysia.
- Chomeya, R. (2010). Quality of Psychology Test Between Likert Scale 5 and 6 Point. *Journal of Social Sciences* 6: 399-403.
- Cohen, J. (1988). *Statistical power analysis for the behavioural sciences*. Mahwah, NJ: Lawrence Erlbaum., Mahwah, NJ: Lawrence Erlbaum.
- Creswell, J. W. (2003). *Research Design - Qualitative, Quantitative, Mixed Methods Approaches*: Sage Publication.
- Creswell, J. W. (2009). *Research Design - Qualitative, Quantitative and Mixed Methods Approaches*, United States of America: Sage Publication.
- Creswell, J. W. (2012). *Educational Research -Planning, Conducting, and Evaluating Quantitative and Qualitative Research*: Pearson.
- Creswell, J. W. (2014). *Research Design - Qualitative, Quantitative, Mixed Methods Approaches*: Sage Publication.
- Dey, A. (2002). *The Impact of AFTA on the ASEAN Automotive Industry*: Frost & Sullivan Market Insight.
- Dickerson, E., Fenge, L. A. and Rosenorn-Lanng, E. (2017). The impact of leadership development on GP mental health commissioning. *Leadership in Health Services* 30: 343-351.
- Doane, D. P. and Seward, L. E. (2011). Measuring Skewness: A Forgotten Statistic? *Journal of Statistic Education* 19.
- Dombrowski, U. and Mielke, T. (2013). Lean Leadership – Fundamental Principles and their Application. *Procedia CIRP* 7: 569-574.

- Dombrowski, U. and Mielke, T. (2014). Lean Leadership – 15 Rules for a Sustainable Lean Implementation. *Procedia CIRP* 17: 565-570.
- Dora, M., Kumar, M., Van Goubergen, D., *et al.* (2013). Operational performance and critical success factors of lean manufacturing in European food processing SMEs. *Trends in Food Science & Technology* 31: 156-164.
- Dorota Rymaszewska, A. (2014). The challenges of lean manufacturing implementation in SMEs. *Benchmarking: An International Journal* 21: 987-1002.
- Dubey, R. and Ali, S. S. (2015). Exploring antecedents of extended supply chain performance measures. *Benchmarking: An International Journal* 22: 752-772.
- Dubey, R. and Singh, T. (2015). Understanding complex relationship among JIT, lean behaviour, TQM and their antecedents using interpretive structural modelling and fuzzy MICMAC analysis. *The TQM Journal* 27: 42-62.
- Eaidgah, Y., Maki, A. A., Kurczewski, K., *et al.* (2016). Visual management, performance management and continuous improvement. *International Journal of Lean Six Sigma* 7: 187-210.
- Edwards, R. and Holland, J. (2013). What is Qualitative Interviewing? London: Bloomsbury Academic, 124.
- Eldabi, T., Irani, Z., Paul, R. J., *et al.* (2002). Quantitative and qualitative decision - making methods in simulation modelling. *Management Decision* 40: 64-73.
- Emiliani, M. L. (1998). Lean Behaviour. *Management Decision* 36: 615-631.
- Fan, Y., Chen, J., Shirkey, G., *et al.* (2016). Applications of structural equation modelling (SEM) in ecological studies: an updated review. *Ecological Processes* 5.
- Filzmoser, P. (2005). Identification of Multivariate Outliers: A Performance Study. *Austrian Journal of Statistics* 34: 127-138.
- Flores, V., Gomide, F., Janusz, A., *et al.* (2016). Outlier Detection and Elimination in Stream Data – An Experimental Approach. *IJCRS 2016, Springer* 9920: 416-426.
- Focht, A. and Ponton, M. (2015). Identifying Primary Characteristics of Servant Leadership: Delphi Study. *International Journal of Leadership Studies* 9.
- Frahm, J. (2016). Effective strategy for lean implementation under a culturally diversified environment case. *The TQM Journal* 28: 377-389.
- Fuller, C. M., Simmering, M. J., Atinc, G., *et al.* (2016). Common methods variance detection in business research. *Journal of Business Research* 69: 3192-3198.

- Fullerton, R. R., Kennedy, F. A. and Widener, S. K. (2014). Lean manufacturing and firm performance: The incremental contribution of lean management accounting practices. *Journal of Operations Management* 32: 414-428.
- Garson, G. D. (2016). Partially Least Squares: Regression and Structural Equation Models. In: Publishing SA (ed).
- Gelei, A., Losonci, D. and Matyusz, Z. (2015). Lean production and leadership attributes – the case of Hungarian production managers. *Journal of Manufacturing Technology Management* 26: 477-500.
- Gessier, S. (1974). A Predictive Approach to the Random Effects Model. *Biometrika* 61: 101-107.
- Gibson, C. B. (2016). Elaboration, Generalization, Triangulation, and Interpretation: On Enhancing the Value of Mixed Method Research. *Organizational Research Methods*: 1-31.
- Gomez, N. (2015). *Malaysian Automotive Industry Timeline* [Online]. Available: <https://www.linkedin.com/pulse/malaysian-automotive-industry-timeline-nicholas-gomez> [Accessed 5th December 2016].
- Gonzalez, R. V. D. and Martins, M. F. (2016). Capability for continuous improvement. *The TQM Journal* 28: 250-274.
- Greenleaf, R. K. (1977). *Servant leadership - a journey into the nature of legitimate power greatness*, New Jersey: Paulist Press.
- Habidin, N. F. and Yusof, S. M. (2012). Relationship Between Lean Six Sigma, Environmental Management System, and Organizational Performance In The Malaysia Automotive Industry. *International Journal of Automotive Technology* 13: 1119-1125.
- Habidin, N. F. and Yusof, S. M. (2013). Critical success factors of Lean Six Sigma for the Malaysian automotive industry. *International Journal of Lean Six Sigma* 4: 60-82.
- Habidin, N. F., Yusof, S. M. and Fuzi, N. M. (2016). Lean Six Sigma, strategic control systems, and organizational performance for automotive suppliers. *International Journal of Lean Six Sigma* 7: 110-135.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., et al. (2017a). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, California: Sage.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., et al. (2017b). Mirror, mirror on the wall: a comparative evaluation of composite-based structural equation modeling methods. *Journal of the Academy of Marketing Science*.
- Hair, J. F., Ringle, C. M. and Sarstedt, M. (2013). Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance. *Long Range Planning* 46: 1-12.

- Halling, B. and Renström, J. (2013). From Fantasy to reality learning from seven years of lean implementation. *Journal of US-China Public Administration* 10: 368-378.
- Hartley, J. (2014). Some thoughts on Likert-type scales. *International Journal of Clinical and Health Psychology* 14: 83-86.
- Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical Mediation Analysis in the New Millennium. *Communication Monographs* 76: 408-420.
- Henseler, J. (2017). Bridging Design and Behavioral Research With Variance-Based Structural Equation Modeling. *Journal of Advertising* 46: 178-192.
- Henseler, J., Ringle, C. M. and Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science* 43: 115-135.
- Henseler, J., Ringle, C. M. and Sinkovics, R. R. (2009). The Use of Partial Least Square Path Modeling in International Marketing. *Advances in International Marketing* 20: 277-319.
- Hilal, A. H. and Alabri, S. S. (2013). Using Nvivo for data analysis in Qualitative Research. *International Interdisciplinary Journal of Education* 2: 181-186.
- Holland, S. J., Shore, D. B. and Cortina, J. M. (2016). Review and Recommendations for Integrating Mediation and Moderation. *Organizational Research Methods*.
- House, R. J., Mansour Javidan and Dorfman, P. (2001). Project globe: An introduction. *Applied Psychology: An International Review* 50: 489-505.
- Hozak, K. and Olsen, E. O. (2015). Lean psychology and the theories of “Thinking, Fast and Slow”. *International Journal of Lean Six Sigma* 6: 206-225.
- Hu, Q., Mason, R., Williams, S. J., *et al.* (2015). Lean implementation within SMEs: a literature review. *Journal of Manufacturing Technology Management* 26: 980-1012.
- Hulland, J., Baumgartner, H. and Smith, K. M. (2017). Marketing survey research best practices: evidence and recommendations from a review of JAMS articles. *Journal of the Academy of Marketing Science*.
- Hyväri, I. (2016). Roles of Top Management and Organizational Project Management in the Effective Company Strategy Implementation. *Procedia - Social and Behavioral Sciences* 226: 108-115.
- Imai, M. (2012). *Gemba Kaizen: A Common sense Approach to a Continuous Improvement Strategy*, New York: McGraw-Hill.
- Isaac, S. and Michael, W. B. (1995). *Handbook in research and evaluation*. San Diego, CA: Educational and Industrial Testing Services, San Diego, CA: Educational and Industrial Testing Services.

- Isack, H. D., Mutingi, M., Kandjeke, H., *et al.* (2018). Exploring the adoption of Lean principles in medical laboratory industry. *International Journal of Lean Six Sigma* 9: 133-155.
- Jadhav, J. R., Mantha, S. S. and Rane, S. B. (2014). Exploring barriers in lean implementation. *International Journal of Lean Six Sigma* 5: 122-148.
- Janee Ali, A., Islam, A. and Poon Howe, L. (2013). A study of sustainability of continuous improvement in the manufacturing industries in Malaysia. *Management of Environmental Quality: An International Journal* 24: 408-426.
- Jasti, N. V. K. and Kodali, R. (2016). An empirical study for implementation of lean principles in Indian manufacturing industry. *Benchmarking: An International Journal* 23: 183-207.
- Jawi, Z. M., Lamin, F., Manap, A. R. A., *et al.* (2012). *Review of the National Automotive Policy on Car Maintenance Issues: Malaysia's Automotive Ecosystem Explained*: Malaysian Institute of Road Safety Research (MIROS).
- Jia, F., Gao, R., Lamming, R., *et al.* (2016). Adaptation of supply management towards a hybrid culture: the case of a Japanese automaker. *Supply Chain Management: An International Journal* 21: 45-62.
- Johanson, G. A. and Brooks, G. P. (2009). Initial Scale Development: Sample Size for Pilot Studies. *Educational and Psychological Measurement* 70: 394-400.
- Juran. (2009). *Lean vs Six Sigma* [Online]. Juran Institute. Available: www.juran.com/elifeline/elifefiles/2009/09/Lean-vs-Six-Sigma.ppt [Accessed 12th December 2016].
- Kaplan, R. S. and Norton, D. P. (1996). Strategic Learning and the Balanced Scorecard. *Strategy & Leadership* 24: 18-24.
- Kaplan, S. (2014). Mixing Quantitative and Qualitative Research. *Handbook of Innovative Qualitative Research Methods: Pathways to Cool Ideas and Interesting Papers*. Rotman School of Management: Kimberly Elsbach and Roderick Kramer.
- Kim, W. C. and Mauborgne, R. (2014a). Blue Ocean Leadership. *Harvard Business Review*.
- Kim, W. C. and Mauborgne, R. (2014b). Blue Ocean Strategy. *Harvard Business Review*.
- Kim, W. C. and Mauborgne, R. (2014c). The Four Pillars of Blue Ocean Leadership. *Harvard Business Review*.
- Kim, W. C. and Mauborgne, R. (2017). *Blue Ocean Leadership* [Online]. Available: <https://www.blueoceanstrategy.com/blue-ocean-leadership/> [Accessed 20th September 2017].

- Knapp, S. (2015). Lean Six Sigma implementation and organizational culture. *International Journal of Health Care Quality Assurance* 28: 855-863.
- Koenigsaecker, G. (2013). *Leading the lean enterprise transformation*, Boca Raton, FL: CRC Press Taylor & Francis Group.
- Krejcie, R. V. and Morgan, D. W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement* 30: 607-610.
- Lande, M., Shrivastava, R. L. and Seth, D. (2016). Critical success factors for Lean Six Sigma in SMEs (Small and Medium Enterprises). *The TQM Journal* 28: 613-635.
- Laureani, A. and Antony, J. (2016). Leadership – A critical success factor for the effective implementation of Lean Six Sigma. *Total Quality Management & Business Excellence*: 1-22.
- Lee, J. (2014). *Reduction of car prices in Malaysia on track – MAI* [Online]. paultan.org. Available: <http://paultan.org/2014/08/27/reduction-car-prices-malaysia-track-mai/> [Accessed 10th December 2016].
- Liker, J. (2004). *The Toyota Way*, New York: Mc Graw-Hill.
- Liker, J. and Hoseus, M. (2008). *Toyota Culture - The heart & soul of the Toyota Way*: McGraw Hill.
- Lindskog, E., Vallhagen, J., Berglund, J., *et al.* (2016). Improving Lean Design of Production Systems by Visualization Support. *Procedia CIRP* 41: 602-607.
- Lodgaard, E., Ingvaldsen, J. A., Gamme, I., *et al.* (2016). Barriers to Lean Implementation: Perceptions of Top Managers, Middle Managers and Workers. *Procedia CIRP* 57: 595-600.
- Losonci, D. and Demeter, K. (2013). Lean production and business performance: international empirical results. *Competitiveness Review* 23: 218-233.
- Luthra, S., Garg, D. and Haleem, A. (2016). The impacts of critical success factors for implementing green supply chain management towards sustainability: an empirical investigation of Indian automobile industry. *Journal of Cleaner Production* 121: 142-158.
- MAA. (2016). *Malaysia Automotive Info: Summary of Sales and Production Data* [Online]. Available: http://www.maa.org.my/info_summary.htm [Accessed 9th December 2016].
- MAA. (2018). *Market Review for 2017 and Outlook for 2018*: Malaysia Automoyve Association.
- MacKenzie, S. B. and Podsakoff, P. M. (2012). Common Method Bias in Marketing: Causes, Mechanisms, and Procedural Remedies. *Journal of Retailing* 88: 542-555.

- Mackey, A. (2008). The effect of CEOs on firms performance. *Strategic Management Journal* 29: 1357-1367.
- MAI. (2017). *Malaysia Automotive Database* [Online]. Available: http://www.mai.org.my/aidb/index_search.php [Accessed 1st June 2016].
- Mann, D. (2009). The Missing Link: Lean Leadership. *Frontiers of health Services Management*: 15-26.
- Mann, P. S. and Lacke, C. J. (2010). *Introductory Statistics*: John Wiley & Son, Inc.
- Martínez-Jurado, P. J., Moyano-Fuentes, J. and Jerez-Gómez, P. (2014). Human resource management in Lean Production adoption and implementation processes: Success factors in the aeronautics industry. *BRQ Business Research Quarterly* 17: 47-68.
- Masamori, T. (2017). Perodua Monthly Business Communication on 20th April 2017
- Maslow, A. H. (1954). *Motivation and Personality*, New York: Harper and Row.
- McLean, R. and Antony, J. (2014). Why continuous improvement initiatives fail in manufacturing environments? A systematic review of the evidence. *International Journal of Productivity and Performance Management* 63: 370-376.
- Mi Dahlgaard - Park, S., Dahlgaard, J. J. and Mi Dahlgaard - Park, S. (2006). Lean production, six sigma quality, TQM and company culture. *The TQM Magazine* 18: 263-281.
- MIDA. (2012). Business Opportunities: Malaysia Automotive Industries. In: Transport Industry Division MIDA (ed).
- Miina, A. (2012). Lean Problem Why company fail with Lean implementation. *Management* 2: 232-250.
- MITI. (2014). National Automotive Policy. Kuala Lumpur.
- Natsuda, K., Segawa, N. and Thoburn, J. (2012). *Globalisation and the Malaysian Automotive Industry: Industrial Nationalism, Liberalisation, and the Role of Japan*: Ritsumeikan Center for Asia Pacific Studies (RCAPS)
- Natsuda, K., Segawa, N. and Thoburn, J. (2013). Liberalization, Industrial Nationalism, and the Malaysian Automotive Industry. *Global Economic Review* 42: 113-134.
- Nawanir, G., Kong Teong, L. and Norezam Othman, S. (2013). Impact of lean practices on operations performance and business performance. *Journal of Manufacturing Technology Management* 24: 1019-1050.
- Nawanir, G., Lim, K. T. and Othman, S. N. (2016). Lean manufacturing practices in Indonesian manufacturing firms. *International Journal of Lean Six Sigma* 7: 149-170.

- Netland, T. H. (2015). Critical success factors for implementing lean production: the effect of contingencies. *International Journal of Production Research* 54: 2433-2448.
- Nordin, N., Deros, B. M., Wahab, D. A., *et al.* (2012). Validation of lean manufacturing implementation. *Jurnal Teknologi* 59: 1-6.
- Oleghe, O. and Salonitis, K. (2016). Variation Modeling of Lean Manufacturing Performance Using Fuzzy Logic Based Quantitative Lean Index. *Procedia CIRP* 41: 608-613.
- Oropesa Vento, M., García Alcaraz, J. L., Maldonado Macías, A. A., *et al.* (2016). The impact of managerial commitment and Kaizen benefits on companies. *Journal of Manufacturing Technology Management* 27: 692-712.
- Oudhuis, M. and Olsson, A. (2015). Cultural clashes and reactions when implementing lean production in a Japanese-owned Swedish company. *Economic and Industrial Democracy* 36: 259-282.
- Özer, F. and Tmaztepe, C. (2014). Effect of Strategic Leadership Styles on Firm Performance: A Study in a Turkish SME. *Procedia - Social and Behavioral Sciences* 150: 778-784.
- Pakdil, F. and Leonard, K. M. (2015). The effect of organizational culture on implementing and sustaining lean processes. *Journal of Manufacturing Technology Management* 26: 725-743.
- Pakdil, F. and Leonard, K. M. (2017). Implementing and sustaining lean processes: the dilemma of societal culture effects. *International Journal of Production Research* 55: 700-717.
- Perodua, K. V. (2017). *List of Membership* [Online]. Available: <http://site.kvp.my/main/3145/index.asp?pageid=144932&t=list-of-membership-> [Accessed 25th February 2017].
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., *et al.* (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology* 88: 879-903.
- Podsakoff, P. M., MacKenzie, S. B. and Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology* 63: 539-569.
- Poksinska, B., Swartling, D. and Drotz, E. (2013). The daily work of Lean leaders – lessons from manufacturing and healthcare. *Total Quality Management & Business Excellence* 24: 886-898.
- Pollet, T. V. and van der Meij, L. (2016). To Remove or not to Remove: the Impact of Outlier Handling on Significance Testing in Testosterone Data. *Adaptive Human Behavior and Physiology* 3: 43-60.

- Psomas, E. (2016). The underlying factorial structure and significance of the Six Sigma difficulties and critical success factors. *The TQM Journal* 28: 530-546.
- Pugliese, T. (2017). *Asia Motor Business: Asia-Pacific vehicle sales grow 10 % in 2016* [Online]. Available: <http://www.asiamotorbusiness.com/> [Accessed 25th July 2017].
- Puvasvaran, A. P., Tay, C. H., Megat, M. H. M. A., *et al.* (2009). Leanness Achievement through People Development System in Implementing Lean Process Management. *American Journal of Engineering and Applied Sciences* 2: 105-119.
- PVA. (2017). *Member Directory* [Online]. Available: http://www.protonvendors.com/html/member_directory.aspx?GPID=cqWEg3sNYPbyTP13Sjb+8w==&PID=Sp5hrxm2jn/oMY0P8HVLbQ== [Accessed 25th February 2017].
- Ravana, S. D., Taheri, M. S. and Rajagopal, P. (2015). Document-based approach to improve the accuracy of pairwise comparison in evaluating information retrieval systems. *Aslib Journal of Information Management* 67: 408-421.
- Razali, N. M. and Wah, Y. B. (2011). Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors and Anderson-Darling tests. *Journal of Statistical Modeling and Analytics* 2: 21-33.
- Ribeiro de Jesus, A., Antony, J., Lepikson, H. A., *et al.* (2016). Six Sigma critical success factors in Brazilian industry. *International Journal of Quality & Reliability Management* 33: 702-723.
- Rose, A. N. M., Deros, B. M. and Rahman, M. N. A. (2013). A Study on Lean Manufacturing Implementation In Malaysian Automotive Component Industry. *International Journal of automotive and Mechanical Engineering (IJAME)* 8.
- Rost, J. C. (1993). *Leadership for the Twenty-First Century*, United States of America: Greenwood Publishing Group, Inc.
- Sabry, A. (2014). Factors critical to the success of Six-Sigma quality program and their influence on performance indicators in some of Lebanese hospitals. *Arab Economic and Business Journal* 9: 93-114.
- Sarstedt, M. and Mooi, E. (2014). *A concise guide to market research: The process, data, and methods using IBM SPSS statistics*, Berlin: Springer.
- Schmenner, R. W. (2015). The Pursuit of Productivity. *Production and Operations Management* 24: 341-350.
- Schreier, J. H., Biethahn, N. and Drewes, F. (2017). Question order effects in partial least squares path modelling: an empirical investigation. *Quality & Quantity*.

- Segawa, N., Natsuda, K. and Thoburn, J. (2014). Affirmative Action and Economic Liberalisation: The Dilemmas of the Malaysian Automotive Industry. *Asian Studies Review* 38: 422-441.
- Shaaban, M. S. and H. Awni, A. (2014). Critical success factors for total productive manufacturing (TPM) deployment at Egyptian FMCG companies. *Journal of Manufacturing Technology Management* 25: 393-414.
- Shang, G. and Sui Pheng, L. (2014). Barriers to lean implementation in the construction industry in China. *Journal of Technology Management in China* 9: 155-173.
- Shapiro, S. S. and Wilk, M. B. (1965). An Analysis of Variance Test for Normality (Complete Samples). *Biometrika* 52: 591-611.
- Sharma, V., Dixit, A. R. and Qadri, M. A. (2015). Impact of lean practices on performance measures in context to Indian machine tool industry. *Journal of Manufacturing Technology Management* 26: 1218-1242.
- Sharma, V., Dixit, A. R. and Qadri, M. A. (2016). Modeling Lean implementation for manufacturing sector. *Journal of Modelling in Management* 11: 405-426.
- Siddiqui, S. Q., Ullah, F., Thaheem, M. J., *et al.* (2016). Six Sigma in construction: a review of critical success factors. *International Journal of Lean Six Sigma* 7: 171-186.
- Singh, J. and Singh, H. (2015). Continuous improvement philosophy – literature review and directions. *Benchmarking: An International Journal* 22: 75-119.
- Sisson, J. and Elshennawy, A. (2015). Achieving success with Lean : An analysis of key factors in Lean transformation at Toyota and beyond. *International Journal of Lean Six Sigma* 6: 263-280.
- Stangor, C. (2007). *Research Methods for the Behavioral Sciences, United State of America*: Houghton Mifflin Company.
- Stenbacka, C. (2001). Qualitative research requires quality concepts of its own. *Management Decision* 39: 551-556.
- Stone, A. G., Russell, R. F. and Patterson, K. (2004). Transformational versus servant leadership: a difference in leader focus. *Leadership & Organization Development Journal* 25: 349-361.
- Stone, M. (1974). Cross-Validatory Choice and Assessment of Statistical Predictions. *Journal of the Royal Statistical Society* 36: 111-147.
- Suárez - Barraza, M. F., Mi Dahlggaard - Park, S., Ramis - Pujol, J., *et al.* (2012). Applying Gemba - Kaizen in a multinational food company: a process innovation framework. *International Journal of Quality and Service Sciences* 4: 27-50.

- Suarez, E., Calvo-Mora, A. and Roldán, J. L. (2016). The role of strategic planning in excellence management systems. *European Journal of Operational Research* 248: 532-542.
- Sultana, M. and Ibrahim, K. A. (2014). Challenges and Opportunities for Malaysian Automotive Industry. *American International Journal of Contemporary Research* 4: 175-182.
- Sureeratta, C., Napompech, K. and Panjakhajo, V. (2014). Model of Leadership and the Effect of Lean Manufacturing Practices on Firm Performance in Thailand's Auto Parts Industry. *Research Journal of Business Management* 8: 104-117.
- TAIA. (2017). *The Thai Automotive Industry Association - Statistic* [Online]. Available: <http://www.taia.or.th/Statistics/> [Accessed 25th July 2017].
- Taylor, C. M., J. Cornelius, C. and Colvin, K. (2014). Visionary leadership and its relationship to organizational effectiveness. *Leadership & Organization Development Journal* 35: 566-583.
- Titikorn. (2016). *ASEAN Automotive Outlook*: LMC Automotive Limited.
- Tobi, S. U. M. (2014). *Qualitative Research and Nvivo 10 Exploration*, Kuala Lumpur: Aras Publisher.
- Toledo, J. C., Gonzalez, R. V. D., Lizarelli, F. L., *et al.* (2018). Lean production system development through leadership practices. *Management Decision*.
- Topline, C. (2013). *A change or improved leadership can account for up to 45% an organisation's performance* [Online]. Available: <http://toplineconsulting.com.au/topline-leadership-development-program/> [Accessed 23rd December 2017].
- Tortorella, G. L., de Castro Fettermann, D., Frank, A., *et al.* (2018). Lean manufacturing implementation: leadership styles and contextual variables. *International Journal of Operations & Production Management* 38: 1205-1227.
- Tortorella, G. L., Fettermann, D. d. C. and Fries, C. E. (2016). Relationship between lean manufacturing implementation and leadership styles. *International Conference on Industrial Engineering and Operations Management*. Detroit, Michigan, USA: IEOM Society International.
- Treece, E. W. and Treece, J. W. (1982). *Elements of research in nursing* St. Louis: MO: Mosby.
- TSC. (2017). *Toyota Supplier Club Malaysia* [Online]. Available: <http://www.tsclub.com.my/company.asp?sid=1> [Accessed 25th February 2017].

- Tunarosa, A. and Glynn, M. A. (2016). Strategies of Integration in Mixed Methods Research: Insights Using Relational Algorithms. *Organizational Research Methods*.
- Turner, S. F., Cardinal, L. B. and Burton, R. M. (2015). Research Design for Mixed Methods: A Triangulation-based Framework and Roadmap. *Organizational Research Methods*.
- Vanje, A. and Brannmark, M. (2015). Walking around the pyramids: Managers' shop floor activities in Lean-inspired organizations. *Economic and Industrial Democracy* 1.
- Vaszkun, B. and Tsutsui, W. M. (2012). A modern history of Japanese management thought. *Journal of Management History* 18: 368-385.
- Vito, G. F., E. Higgins, G. and S. Denney, A. (2014). Transactional and transformational leadership. *Policing: An International Journal of Police Strategies & Management* 37: 809-822.
- Voorhees, C. M., Brady, M. K., Calantone, R., et al. (2016). Discriminant validity testing in marketing: an analysis, causes for concern, and proposed remedies. *Journal of the Academy of Marketing Science* 44: 119-134.
- Vujica Herzog, N. and Tonchia, S. (2014). An Instrument for Measuring the Degree of Lean Implementation in Manufacturing. *Strojniški vestnik – Journal of Mechanical Engineering* 60: 797-803.
- Wang, Z., Sharma, P. N. and Cao, J. (2016). From knowledge sharing to firm performance: A predictive model comparison. *Journal of Business Research* 69: 4650-4658.
- Wittink, D. R. and Bayer, L. R. (2003). The Measurement imperative. *Marketing Research* 6: 14-22.
- Womack, J. P. and Jones, D. (2003). *Lean Thinking : banish waste and create wealth in your corporation*, U.S.A: Simon & Schuster, Inc.
- Womack, J. P., Jones, D.T. (1996). Beyond Toyota: how to root out waste and pursue perfection. *Harvard Business Review* 74: 140-153.
- Wyrwicka, M. K. and Mrugalska, B. (2017). Mirages of Lean Manufacturing in Practice. *Procedia Engineering* 182: 780-785.
- Yadav, G. and Desai, T. N. (2016). Lean Six Sigma: a categorized review of the literature. *International Journal of Lean Six Sigma* 7: 2-24.
- Yukl, G. (1999). An evaluation of conceptual weaknesses in transformational and charismatic leadership theories. *The Leadership Quarterly* 10: 285-305.
- Yukl, G. (2013). *Leadership in Organization*, Boston: Pearson.

APPENDIX A

List of Lean Expert

1. Prof Ir Dr Sha'ri bin Mohd Yusof (Dr SMY)

- An academic from Universiti Teknologi Malaysia
- Over 30 years industrial experience
- Graduated with Doctor of from the University of Birmingham
- Registered Professional Engineer with the Board of Engineers Malaysia (BEM)
- Senior Member of the American Society for Quality (ASQ)
- Dean of Razak School of UTM in Engineering and Advanced Technology, Universiti Teknologi Malaysia

Note: There shouldn't be any bias from Prof Ir Dr Sha'ri in the expert opinion interview; since during the interview (17th May 2016), Prof Sha'ri is still not my supervisor. He was only appointed as my supervisor 3 months (1st Aug 2016) after the interview session.

2. Dr Salwa Hanim binti Abdul Rashid (Dr SH)

- An academic from Universiti Malaya
- Over 17 years experience
- Head of Sustainable Manufacturing Group, Center for Product Design and Manufacturing, Department of Mechanical Engineering, Faculty of Engineering, University Malaya
- Member of The Institute of Engineering and Technology and Board of Engineers Malaysia

3. En Nasruldin Hashim (En NH)

- Industrial expert from Malaysia Automotive Institute
- Over 6 years experience relates to Lean production system
- In charge of improvement (Lean) program for Malaysia automotive vendors carry out by Malaysia Automotive Institute

4. En Azli Haffiz bin Baharom (En AH)

- Industrial expert from Perodua Manufacturing Sdn Bhd
- A trained Lean expert with around 10 years experience
- Carry out Lean production system implementation together with Japanese experts in Perodua.

APPENDIX B

Expert Opinion

INTERVIEW SURVEY

Date: 13-5-2016

Time: 2.55pm

Category: Lean Practitioner Academician/Consultant/Expert

Type: Telephone Personal/Site

Location: UM Engineering Faculty

A) Demography:

Respondent's Name: Dr Salwa Hanim

Designation: Senior Lecturer

Organization: University Malaya

Age: NA

Gender: Female

Number of Years Practicing/Consulting Lean Practices: more than 15 yrs

1. What do you think about lean practices in Malaysia currently?

Proton had been working with Mitsubishi Japan; they tried to adopt lean production system. Actually lean is a practice by car manufacturers like Toyota, Perodua and many more. The car manufacturers will insist the suppliers to comply to certain practice of lean. For now like Proton and Perodua are educating their suppliers because they want to implement lean and their suppliers are able to support them by supplying quality parts according to require quantities.

This could be done by lean production system. For the supplier, they start with simple program like 5S and JIT. They are not fully implemented lean as it is not easy to fully implement lean.

2. What do you think about lean practices contribution to Malaysia automotive industries?

In term of lean it is contribute to quality. Lean is able to meeting the QCD requirements of the car manufacturers like Proton and Perodua. Sustainable means featuring something unavoidable for the company to face the open market challenges. Because the given standard is a requirement in certain part of the world for eg. ELV. Meet certain environment regulation when export to certain part of the world. So Malaysian manufacturers need to comply to that. But to be able to implement sustainable manufacturing. I think if they have lean manufacturing in place, the company is then familiar with sustainable manufacturing. It would be easier for them to implement sustainable manufacturing. Lean eliminate waste, for manufacturing to sustain, it have to eliminate waste, material waste, pollution and etc.

Actually it is much easier for manufacturing company to adopt sustainable manufacturing if they already lean. They have the lean concept. Similarly, it is easier for Japanese manufacturers to implement green manufacturing.

3. In your opinion what are the critical success factor for lean sustainability in Malaysia automotive industry?

I think culture play a role (for lean sustainability). Malaysian culture and Japanese culture are different. The root of Lean is from Japanese, they have good 5S as foundation; supervisors and operators have good relationship and long term employment. They like to identify by their company, like Toyota family, they like to be identified who they are and proud of the company. The Japanese factories are clean. They are very structure and discipline. For Malaysia we have culture challenge.

To be able to compete, we have to use the lean principles because it reduced cost a lot. So only the culture is something that constraint the implementation. Lean in Malaysia automotive is not matured, it just started.

If you look at how the Japanese implement Lean, leaders must be open to suggestions; Malaysia is not easy to voice out their suggestion. Something must try to encourage from the workers.

4. What do you think about lean leaders' role in lean sustainability?

Leaders need to have short, medium and long term strategies. According to Lean you must encourage new ideas. Actual it is Toyota Production System and later the western academic called it Lean. Leader also need to conduct quality circles.

In Lean they have to follow strict SOP and give suggestion. How can they have the freedom to play with the process?

Lean is more to bottom up, however, for communication, it should be both way.

Normally in an organization they have many department or functional team. They need to communicate for example the customer feedback not receive by the operation, but by the marketing example. So it should able to communicate to others.

The role of the top management in Lean implementation. In the first place they agreed to implement Lean. Then need to give full support, any program giving reward if staffs giving suggestion. The rewards on the ideas, announce and celebrate and launch the ideas to let everybody know. So lean need management support, management need to award and give motivation and financial support. Also, the lower management should go for training.

Knowledge sharing from each department, each group in the department, inter company. Because the small things can give different result.

5. What are the 3 most important activities lean leaders should do for lean sustainability?

Lean is requires strong culture, ownership and teamwork.

6. What is the most important activity lean leader should not do for lean sustainability?

Leaders need to be consistent, it is more like culture. Leaders should not be inconsistent. As lean is a long term practice. The culture must be build. They have to really know what Lean Production really is.



Dr Salwa Hanim at her office, Center for Product Design & Manufacturing, UM

APPENDIX C

Content Validity by Expert



SURVEY ON THE LEADERSHIP'S DAILY ACTIVITIES/PRACTICES FOR LEAN PRODUCTION SYSTEM IMPLEMENTATION IN MALAYSIA AUTOMOTIVE INDUSTRY

The questionnaire consists of three main sections:

- (1) PARTICIPANT & BUSINESS BACKGROUND INFORMATION
- (2) LEAN SUSTAINABILITY AND OPERATIONAL PERFORMANCE
- (3) LEAN LEADERSHIP ACTIVITIES/PRACTICES

Please note that your responses are anonymous and confidential and will be used by the researcher only for the purposes of research. There are no rights or wrong answers. Please answer all questions to the best.

SECTION 1: RESPONDENT & BUSINESS BACKGROUND INFORMATION

A: Respondent Profile

Please answer ALL questions by filling in the blank spaces provided or by checking (✓) the number of the item that BEST describes your situation.

1. Company /Organization Name:

2. Name (optional):

3. Position: *(Please choose one)*

- Top Management (Management Level & Above)
- Middle Management (Executive, Engineer, Officer, Equivalent)
- Front Liner/Lower Management (Leader, Supervisor, Equivalent)

Double check the example of middle management: they should be 'middle management' position

4. Age: *(Please choose one)*

- Below 20 years
- 21 to 30 years
- 31 to 40 years
- 41 to 50 years
- Above 50 years

5. Nationality:

6. Gender: *(Please choose one)*

- Male
- Female

7. Please indicate the highest level of education you have achieved. *(Please choose one)*

- Primary School
- Secondary school
- Certificate
- Diploma
- Degree
- Master
- PhD

What about advanced diploma? Should add, which is equivalent...?

8. How many years have you worked for this firm? *(Please choose one)*

- Below 1 year
- 1 to 2.9 years
- 3 to 4.9 years
- 5 to 9.9 years
- Above 10 years

Please refer to literature or other questionnaire how to categorise year of experience?

9. How frequent did you attend lean related training? *(Please choose one)*

- Never
- Once so far
- Once for the past 3 years
- 1 time every year
- More than 1 each year

Add one more question on level of lean certification

10. How long have you in this position? *(Please choose one)*

- Below 1 year
- 1 to 2.9 years
- 3 to 4.9 years
- 5 to 9.9 years
- Above 10 years

B. Organization Profile

Please tell us about your firm, tick (✓) where applicable:

1. Approximately, the number of employees in your firm is: *(Please choose one)*

- Below 30
- 31 – 50
- 51 – 100
- 101 – 150
- 151- 200
- Above 200

Should refer to category of company in Malaysia:
<http://www.smeCorp.gov.my/index.php/en/policies/2015-12-21-09-09-49/sme-definition>

2. Work force distribution

Malaysian %

Foreign worker %

3. Approximately annual sales are: *(Please choose one)*

- Below RM5,000,000
- RM5,000,001 – RM10,000,000
- RM10,000,001 – RM30,000,000
- RM30,000,001 – RM60,000,000
- RM60,000,001 – RM100,000,000
- Above RM100,000,000

This also have to refer to:
<http://www.smeCorp.gov.my/index.php/en/policies/2015-12-21-09-09-49/sme-definition>

4. How many years has the firm been established? *(Please choose one)*

- Below 5 years
- 6 to 10 years
- 11 to 20 years
- Above 20 years

5. Firm Ownership: *(Please choose one)*

- Fully local
- A foreign firm operating in Malaysia
- Joint venture with foreign company
- Government Link Companies
- Others

6. Market Segment:

Export (%)

Local (%)

7. Number of Japanese expatriate in the company: *(Please choose one)*

- Nil
- One
- 2 – 5
- 6 – 10
- More than 10

8. Number of full time kaizen staff: *(Please choose one)*

- Nil
- One
- 2 – 5
- 6 – 10
- More than 10

Do you need to ask
about average no
of kaizen project
has been
conducted in the
company within a
year?

SECTION 2: Lean Sustainability and Operational Performance

Answer ALL questions by circle the rating number of the item that BEST describes your perception.
Please rate level of your acceptance using a scale 1 (disagree strongly) to 10 (agree strongly)

A. Lean Sustainability

How agree are the following items in sustaining lean implementation?

		Disagree Strongly									Agree Strongly
1. S	Die (SMED)	1	2	3	4	5	6	7	8	9	10
2. C		1	2	3	4	5	6	7	8	9	10
3. T	enance (TPM)	1	2	3	4	5	6	7	8	9	10
4.	Reduce inventory	1	2	3	4	5	6	7	8	9	10
5.	Just-in-time (JIT)	1	2	3	4	5	6	7	8	9	10
6.	Pull/flow production	1	2	3	4	5	6	7	8	9	10
7.	Develop supplier	1	2	3	4	5	6	7	8	9	10

B. Operational Performance

How agree are the following items in improving operational performance?

	Disagree Strongly										Agree Strongly
1. High quality product or services	1	2	3	4	5	6	7	8	9	10	
2. Effective cost management	1	2	3	4	5	6	7	8	9	10	
3. On-time delivery or fulfillment	1	2	3	4	5	6	7	8	9	10	
4. High efficiency	1	2	3	4	5	6	7	8	9	10	
5. High Customer Satisfaction	1	2	3	4	5	6	7	8	9	10	

SECTION 3: LEAN LEADERSHIP ACTIVITIES/PRACTICES

For ALL questions in below, please rate both the level on importance and extent of practices:

1. Please rate how important do you consider the following activities/ practices to be in contributing towards lean sustainability using scale of 1 (very not important) to 10 (very important).
2. Please rate to what extent you had carried out the following activities/practices ,using a scale 1 (not at all) to 10 (to a large extent).

Please consider:
Lean Leadership – 15 Rules for a sustainable Lean Implementation
U. Dombrowski, T. Mielke (2014) into your study.
Reword to suit yr questionnaire content.

1. Visionary & Forward

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Long term plan	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Creator of new ideas	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Explain Lean strategies to employees	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Try something new	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Take reasonable risk	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

2. Self Develop

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Be a role model to employee	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Continuous learning and improving	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Practices lean principles and concepts	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Learning on the job	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Visiting successful lean company	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

3. Continuous Improvement (Kaizen)

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Constant attempt to "find better way"	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Seek to understand customer needs	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Ask "why" several times to find root causes	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Don't blame employees for highlighting mistakes	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Encourage employees to contribute ideas	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

4. Genchi Genbutsu (go and see /genba)

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Conducting daily genba	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Solve problem by going to the actual site	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Coaching employees during genba	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Identify and eliminate waste during genba	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Identify abnormality during genba	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
6. Share knowledge with floor people during genba	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

5. Empower & Coaching oriented

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Empower team to self-manage	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Develop mentoring relationships with direct subordinates	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Giving advice at the right moment	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Able to put oneself in the employee's shoes	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Authorized employees to stop line when detected abnormality	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

6. Communication

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Communicate with the employees during "gozaba"	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Inform employees what reward they can be expected	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Inform employees what task is expected from them	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Communicate face to face with the employee	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Use visual control to help employee self monitoring	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

7. Motivation

20

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Acknowledge employees' achievement	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. A motivating character brings out the best in people	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Can inspire people work towards common goal	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Have regular informal meeting with employees	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Create mutual trust and respect among employees	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
6. Have good relationship with employees	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

Thank you for your participation

Comments:

Please refer to main text for my comments.
 Basically, what ever questions asked should relate
 to LB and have reference.

APPENDIX D

Survey Questionnaire



SURVEY ON THE LEADERSHIP'S DAILY ACTIVITIES/PRACTICES FOR LEAN PRODUCTION SYSTEM IMPLEMENTATION IN MALAYSIA AUTOMOTIVE INDUSTRY

The questionnaire consists of three main sections:

- (1) PARTICIPANT & BUSINESS BACKGROUND INFORMATION
- (2) LEAN SUSTAINABILITY AND OPERATIONAL PERFORMANCE
- (3) LEAN LEADERSHIP ACTIVITIES/PRACTICES

Please note that your responses are anonymous and confidential and will be used by the researcher only for the purposes of research. There are no rights or wrong answers. Please answer all questions to the best.

SECTION 1: RESPONDENT & BUSINESS BACKGROUND INFORMATION

A: Respondent Profile

Please answer ALL questions by filling in the blank spaces provided or by checking (√) the number of the item that BEST describes your situation.

1. Company /Organization Name:

2. Name (optional):

3. Position: *(Please choose one)*

- Top Management (Management Level & Above)
- Middle Management (Executive, Engineer, Officer, Group Leader or Equivalent)
- Front Liner/Lower Management (Leader, Supervisor, Team Leader or Equivalent)

4. Age: *(Please choose one)*

- Below 20 years
- 21 to 30 years
- 31 to 40 years
- 41 to 50 years
- Above 50 years

5. Nationality:

6. Gender: *(Please choose one)*

- Male
- Female

7. Please indicate the highest level of education you have achieved. *(Please choose one)*

- Primary School
- Secondary school
- Certificate
- Diploma

- Degree
- Master
- PhD

8. How many years have you worked for this firm? *(Please choose one)*

- Below 1 year
- 1 to 2.9 years
- 3 to 4.9 years
- 5 to 9.9 years
- Above 10 years

9. How frequent did you attend lean related training? *(Please choose one)*

- Never
- Once so far
- Once for the past 3 years
- 1 time every year
- More than 1 each year

10. How long have you in this position? *(Please choose one)*

- Below 1 year
- 1 to 2.9 years
- 3 to 4.9 years
- 5 to 9.9 years
- Above 10 years

B. Organization Profile

Please tell us about your firm, tick (✓) where applicable:

1. Approximately, the number of employees in your firm is: *(Please choose one)*

- Below 30
- 31 – 50
- 51 – 100
- 101 – 150
- 151- 200
- Above 200

2. Work force distribution

Malaysian % Foreign worker %

3. Approximately annual sales are: *(Please choose one)*

- Below RM5,000,000
- RM5,000,001 – RM10,000,000
- RM10,000,001 – RM30,000,000
- RM30,000,001 – RM60,000,000
- RM60,000,001 – RM100,000,000
- Above RM100,000,000

4. How many years has the firm been established? *(Please choose one)*

- Below 5 years
- 6 to 10 years
- 11 to 20 years
- Above 20 years

5. Firm Ownership: *(Please choose one)*

- Fully local
- A foreign firm operating in Malaysia
- Joint venture with foreign company
- Government Link Companies
- Others

6. Market Segment:

Export (%)

Local (%)

7. Number of Japanese expatriate in the company: *(Please choose one)*

- Nil
- One
- 2 – 5
- 6 – 10
- More than 10

8. Number of full time kaizen staff: *(Please choose one)*

- Nil
- One
- 2 – 5
- 6 – 10
- More than 10

SECTION 2: Lean Sustainability and Operational Performance

Answer ALL questions by circle the rating number of the item that BEST describes your perception.

Please rate level of your acceptance using a scale 1 (disagree strongly) to 10 (agree strongly)

A. Lean Practices

How agree are the following items in sustaining lean implementation?

	Disagree					Agree				
	Strongly					Strongly				
1. Single Minutes Exchange Die (SMED)	1	2	3	4	5	6	7	8	9	10
2. Cleanliness (5S)	1	2	3	4	5	6	7	8	9	10
3. Total Productive Maintenance (TPM)	1	2	3	4	5	6	7	8	9	10
4. Reduce inventory	1	2	3	4	5	6	7	8	9	10
5. Just-in-time (JIT)	1	2	3	4	5	6	7	8	9	10
6. Pull/flow production	1	2	3	4	5	6	7	8	9	10

B. Operational Performance

How agree are the following items in improving operational performance?

	Disagree					Agree				
	Strongly					Strongly				
1. High quality product or services	1	2	3	4	5	6	7	8	9	10
2. Effective cost management	1	2	3	4	5	6	7	8	9	10
3. On-time delivey or fulfilment	1	2	3	4	5	6	7	8	9	10
4. High efficiency	1	2	3	4	5	6	7	8	9	10
5. High customer satisfaction	1	2	3	4	5	6	7	8	9	10
6. New technology development	1	2	3	4	5	6	7	8	9	10

SECTION 3: LEAN LEADERSHIP ACTIVITIES/PRACTICES

For ALL questions in below, please rate both the level on importance and extent of practices:

1. Please rate how important do you consider the following activities/ practices to be in contributing towards lean sustainability using scale of 1 (very not important) to 10 (very important).
2. Please rate to what extent you had carried out the following activities/practices ,using a scale 1 (not at all) to 10 (to a large extent).

1. Visionary & Forward Thinking

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Long term plan	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Creator of new ideas	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Explain Lean strategies to employees	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Try something new	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Take reasonable risk	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

2. Self-Development

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Be a role model to employee	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Continuous learning and improving	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Practices lean principles and concepts	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Learning on the job	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Visiting successful lean company	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

3. Continuous Improvement (Kaizen)

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Constant attempt to “find better way”	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Seek to understand customer requirement	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Ask “why” several times to find out the true root causes	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Don’t blame employee for highlighting the mistake	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Encourage employee to contribute idea	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

4. Genchi Genbutsu (go and see /genba)

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Conducting daily genba	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Solve problem by going to the actual site	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Genba to get better understanding of issues	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Identify and eliminate waste during genba	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Identify abnormality during genba	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
6. Share knowledge with floor people during genba	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

5. Empowering & Coaching oriented

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Empower team to self-manage	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Develop mentoring relationships with direct subordinates	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Giving advice at the right moment	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Able to put oneself in the employee's shoes	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Authorized employees to stop line when detected abnormality	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

6. Communication

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Communicate with the employees during "genba"	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. Inform employees what reward they can be expected	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Inform employees what task is expected from them	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Communicate face to face with the employee	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Use visual control to help employee self monitoring	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

7. Motivation

	Level of Importance										Extent of Practices									
	Very Not Important					Very Important					Not At All					To A Large Extent				
1. Acknowledge employees' achievement	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2. A motivating character brings out the best in people	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
3. Can inspire people work towards common goal	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
4. Have regular informal meeting with employees	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
5. Create mutual trust and respect among employees	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
6. Have good relationship with employees	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

Thank you for your participation

APPENDIX E

Confirmatory Tetrad Analysis Result

Comm	Original Sample (O)	T Statistics (O/STDEV)	CI Low adj.	CI Up adj.
1: CO1,CO2,CO3,CO4	0.06	0.435	-0.297	0.41
2: CO1,CO2,CO4,CO3	-0.188	1.016	-0.672	0.287
4: CO1,CO2,CO3,CO5	-0.106	0.61	-0.545	0.354
6: CO1,CO3,CO5,CO2	-0.216	0.736	-0.995	0.525
10: CO1,CO3,CO4,CO5	-0.045	0.659	-0.223	0.131
EmpCoa	Original Sample (O)	T Statistics (O/STDEV)	CI Low adj.	CI Up adj.
1: EC1,EC2,EC3,EC4	0.081	0.556	-0.265	0.389
2: EC1,EC2,EC4,EC3	0.223	1.327	-0.176	0.58
Firm Per	Original Sample (O)	T Statistics (O/STDEV)	CI Low adj.	CI Up adj.
1: Cost,Delivery,Efficiency,Quality	0.139	0.775	-0.367	0.635
2: Cost,Delivery,Quality,Efficiency	0.075	0.471	-0.368	0.521
4: Cost,Delivery,Efficiency,Satisfaction	0.058	0.323	-0.443	0.563
6: Cost,Efficiency,Satisfaction,Delivery	0.031	0.193	-0.415	0.483
7: Cost,Delivery,Efficiency,Technology	0.059	0.309	-0.482	0.585
10: Cost,Delivery,Quality,Satisfaction	0.006	0.044	-0.393	0.418
16: Cost,Delivery,Satisfaction,Technology	0.07	0.403	-0.397	0.569
22: Cost,Efficiency,Quality,Technology	-0.178	1.015	-0.64	0.336
26: Cost,Efficiency,Technology,Satisfaction	0.023	0.109	-0.548	0.598
Genba-kaizen _	Original Sample (O)	T Statistics (O/STDEV)	CI Low adj.	CI Up adj.
1: CI3,CI4,CI5,GG1	-0.255	1.393	-0.893	0.391
2: CI3,CI4,GG1,CI5	-0.338	1.713	-1.007	0.38
4: CI3,CI4,CI5,GG2	-0.109	1.139	-0.446	0.23
6: CI3,CI5,GG2,CI4	-0.283	1.606	-0.882	0.358
10: CI3,CI4,CI5,GG4	-0.299	1.479	-1.011	0.412
13: CI3,CI4,CI5,SD1	-0.004	0.036	-0.412	0.416
17: CI3,CI4,SD2,CI5	-0.212	1.292	-0.772	0.38
20: CI3,CI4,SD4,CI5	-0.164	0.951	-0.769	0.446
24: CI3,CI5,SD5,CI4	0.215	0.721	-0.814	1.277
27: CI3,CI5,VF1,CI4	-0.118	0.695	-0.704	0.487
31: CI3,CI4,CI5,VF3	-0.365	0.834	-1.932	1.148

36: CI3,CI5,VF4,CI4	0.05	0.118	-1.402	1.594
37: CI3,CI4,CI5,VF5	-0.473	1.463	-1.612	0.659
41: CI3,CI4,GG2,GG1	0.104	0.444	-0.74	0.909
47: CI3,CI4,GG4,GG1	0.37	1.72	-0.408	1.102
50: CI3,CI4,SD1,GG1	0.031	0.148	-0.719	0.754
52: CI3,CI4,GG1,SD2	0.072	0.332	-0.702	0.827
54: CI3,GG1,SD2,CI4	0.01	0.063	-0.532	0.572
66: CI3,GG1,VF2,CI4	-0.251	0.909	-1.233	0.709
73: CI3,CI4,GG1,VF5	-0.309	1.12	-1.27	0.668
76: CI3,CI4,GG2,GG3	0.014	0.135	-0.343	0.373
79: CI3,CI4,GG2,GG4	-0.057	0.269	-0.816	0.686
86: CI3,CI4,SD2,GG2	-0.059	0.527	-0.452	0.341
98: CI3,CI4,VF2,GG2	0.008	0.075	-0.371	0.378
108: CI3,GG2,VF5,CI4	0.532	1.664	-0.6	1.647
121: CI3,CI4,GG3,SD5	-0.283	1.152	-1.15	0.579
122: CI3,CI4,SD5,GG3	-0.012	0.095	-0.465	0.438
139: CI3,CI4,GG4,SD1	0.209	1.822	-0.204	0.6
143: CI3,CI4,SD2,GG4	-0.134	0.761	-0.744	0.495
152: CI3,CI4,VF1,GG4	-0.212	0.986	-0.966	0.545
159: CI3,GG4,VF3,CI4	0.192	0.768	-0.679	1.08
161: CI3,CI4,VF4,GG4	-0.075	0.331	-0.868	0.729
170: CI3,CI4,SD4,SD1	0.375	2.221	-0.233	0.955
174: CI3,SD1,SD5,CI4	0.319	1.302	-0.538	1.183
218: CI3,CI4,VF2,SD4	0.102	0.786	-0.351	0.56
220: CI3,CI4,SD4,VF3	-0.014	0.031	-1.6	1.475
225: CI3,SD4,VF4,CI4	0.193	0.556	-0.997	1.438
236: CI3,CI4,VF3,SD5	0.466	1.652	-0.55	1.432
256: CI3,CI4,VF2,VF3	-0.494	0.817	-2.645	1.608
265: CI3,CI4,VF3,VF4	0.555	1.958	-0.467	1.524
266: CI3,CI4,VF4,VF3	0.25	0.787	-0.886	1.343
361: CI3,CI5,GG3,VF2	0.099	0.973	-0.261	0.453
372: CI3,GG3,VF5,CI5	0.097	0.913	-0.283	0.464
397: CI3,CI5,GG4,VF5	0.301	1.82	-0.284	0.878
424: CI3,CI5,SD2,SD4	0.257	2.199	-0.162	0.659
446: CI3,CI5,SD5,SD4	0.491	2.681	-0.186	1.102
453: CI3,SD4,VF2,CI5	-0.127	0.925	-0.599	0.366
461: CI3,CI5,VF5,SD4	0.091	0.766	-0.334	0.504
489: CI3,VF1,VF5,CI5	0.079	0.641	-0.359	0.511
549: CI3,GG3,SD2,GG1	0.047	0.365	-0.395	0.503
577: CI3,GG1,GG4,SD4	-0.083	0.954	-0.388	0.223
588: CI3,GG4,VF2,GG1	-0.529	2.663	-1.203	0.192
619: CI3,GG1,SD1,VF5	-0.148	0.827	-0.782	0.474
645: CI3,SD4,SD5,GG1	0.311	1.763	-0.305	0.936
647: CI3,GG1,VF1,SD4	0.084	0.321	-0.835	1.007
654: CI3,SD4,VF3,GG1	0.122	0.716	-0.47	0.73
661: CI3,GG1,SD5,VF1	0.092	0.57	-0.477	0.655
664: CI3,GG1,SD5,VF2	0.194	1.484	-0.275	0.645
684: CI3,VF1,VF4,GG1	0.252	1.377	-0.391	0.897
687: CI3,VF1,VF5,GG1	0.159	0.833	-0.509	0.83
706: CI3,GG2,GG3,GG4	-0.046	0.43	-0.417	0.343
756: CI3,GG4,VF3,GG2	-0.093	0.727	-0.538	0.36
766: CI3,GG2,SD1,SD4	0.288	1.6	-0.359	0.906

812: CI3,GG2,VF1,SD4	0.3	1.335	-0.505	1.074
900: CI3,SD1,SD2,GG3	0.148	2.11	-0.104	0.389
911: CI3,GG3,VF2,SD1	0.187	1.571	-0.243	0.593
971: CI3,GG3,VF4,SD5	0.578	2.025	-0.441	1.566
984: CI3,VF1,VF4,GG3	-0.006	0.057	-0.344	0.333
986: CI3,GG3,VF5,VF1	0.132	1.178	-0.27	0.518
1073: CI3,GG4,VF2,SD5	-0.384	1.796	-1.122	0.381
1115: CI3,SD1,SD4,SD2	0.073	0.753	-0.275	0.406
1157: CI3,SD1,VF2,SD5	-0.281	1.402	-0.962	0.449
1217: CI3,SD2,VF1,SD5	-0.101	0.66	-0.647	0.426
1295: CI3,SD4,VF5,VF2	-0.054	0.447	-0.478	0.37
1345: CI3,VF1,VF3,VF4	0.522	1.312	-0.875	1.925
1480: CI4,CI5,GG4,VF2	0.131	0.632	-0.616	0.842
1559: CI4,CI5,VF2,SD5	0.541	2.744	-0.175	1.21
1585: CI4,CI5,VF2,VF4	0.164	0.999	-0.427	0.724
1724: CI4,GG1,VF2,SD2	-0.022	0.134	-0.594	0.558
1804: CI4,GG2,GG3,SD2	0.091	0.772	-0.326	0.499
1871: CI4,GG2,VF3,SD1	-0.296	0.833	-1.564	0.931
1877: CI4,GG2,VF5,SD1	-0.381	1.314	-1.4	0.637
1989: CI4,GG4,VF5,GG3	-0.45	1.876	-1.286	0.398
2046: CI4,SD4,VF3,GG3	-0.147	0.52	-1.153	0.833
2180: CI4,GG4,VF3,VF1	0.202	0.83	-0.684	1.026
2203: CI4,GG4,VF4,VF5	0.272	1.609	-0.335	0.856
2218: CI4,SD1,SD2,VF3	0.043	0.335	-0.401	0.498
2245: CI4,SD1,SD5,VF1	-0.299	1.242	-1.145	0.546
2325: CI4,VF1,VF2,SD2	-0.103	0.675	-0.628	0.447
2338: CI4,SD2,VF2,VF4	-0.243	1.48	-0.799	0.355
2368: CI4,SD4,VF1,VF2	-0.148	1.174	-0.589	0.295
2450: CI4,VF2,VF5,VF3	-0.064	0.282	-0.868	0.742
2539: CI5,GG1,GG4,VF3	0.011	0.104	-0.367	0.399
2709: CI5,GG4,VF4,GG2	-0.166	0.582	-1.165	0.838
2770: CI5,GG2,SD4,VF4	-0.033	0.358	-0.359	0.295
2802: CI5,VF1,VF5,GG2	-0.042	0.308	-0.517	0.43
2809: CI5,GG2,VF2,VF5	-0.005	0.04	-0.44	0.43
2995: CI5,GG4,SD2,VF4	0.169	1.155	-0.347	0.68
3357: GG1,GG4,SD5,GG2	-0.211	1.203	-0.833	0.4
3540: GG1,SD2,VF1,GG3	0.052	0.695	-0.206	0.317
3759: GG1,SD4,VF4,SD1	-0.24	1.021	-1.077	0.577
3861: GG1,VF2,VF5,SD2	-0.012	0.077	-0.541	0.535
3996: GG2,GG4,VF3,GG3	0.128	1.038	-0.315	0.554
4437: GG2,VF3,VF5,SD5	0.023	0.092	-0.827	0.902
	Original Sample (O)	T Statistics (O/STDEV)	CI Low adj.	CI Up adj.
LM Prac				
1: Cleanliness,Inventory,JIT,Pull	0.432	1.023	-0.706	1.476
2: Cleanliness,Inventory,Pull,JIT	0.239	0.602	-0.819	1.238
4: Cleanliness,Inventory,JIT,TPM	0.009	0.04	-0.537	0.569
6: Cleanliness,JIT,TPM,Inventory	-0.856	2.192	-1.831	0.188
10: Cleanliness,JIT,Pull,TPM	-0.101	0.696	-0.473	0.277

Motiv	Original Sample (O)	T Statistics (O/STDEV)	CI Low adj.	CI Up adj.
1: MO1,MO2,MO3,MO4	0.01	0.087	-0.323	0.326
2: MO1,MO2,MO4,MO3	-0.321	1.216	-1.042	0.429
4: MO1,MO2,MO3,MO5	0.189	2.202	-0.058	0.42
6: MO1,MO3,MO5,MO2	-0.371	1.462	-1.058	0.355
7: MO1,MO2,MO3,MO6	0.136	1.502	-0.126	0.377
10: MO1,MO2,MO4,MO5	0.442	1.559	-0.384	1.194
16: MO1,MO2,MO5,MO6	0.261	1.451	-0.263	0.738
22: MO1,MO3,MO4,MO6	0.208	1.072	-0.351	0.73
26: MO1,MO3,MO6,MO5	0.207	1.17	-0.303	0.682

LIST OF PUBLICATIONS

Journal with Impact Factor

1. **Kok Liang Loh**, Sha'ri Mohd Yusof, Dominic H.C. Lau, (2018) "Blue ocean leadership in lean sustainability", *International Journal of Lean Six Sigma*, <https://doi.org/10.1108/IJLSS-06-2016-0029>. **(Q2, IF:0.89)**
2. **Kok Liang Loh**, Shari Mohd Yusof, (2019) "Blue ocean leadership activities improve firm performance", *International Journal of Lean Six Sigma*, <https://doi.org/10.1108/IJLSS-09-2018-0102>. **(Q2, IF:0.89)**

Indexed Conference Proceedings

1. **Kok Liang Loh**, Dominic H.C. Lau, (2018) "L.E.A.N Concept for Lean Sustainability", *International Journal of Economic and Management Perspectives*. 12 (4).