

Barriers to Implement Lean Manufacturing in Malaysian Automotive Industry

Mohd Azhar Sahwan^{a*}, Mohd Nizam Ab Rahman^b, Baba Md Deros^b

^aDepartment of Manufacturing Engineering, Faculty of Manufacturing Engineering, Universiti Malaysia Pahang, Malaysia

^bDepartment of Mechanical and Material Engineering, Faculty of Engineering & Built Environment Universiti Kebangsaan Malaysia, Malaysia

*Corresponding author: azhar@ump.edu.my

Article history

Received : 2 April 2012
Received in revised form : 19 June 2012
Accepted : 30 October 2012

Graphical abstract

Year	Volume	Issue	Pages
2012	10	1	59-66
2011	9	1	59-66
2010	8	1	59-66
2009	7	1	59-66
2008	6	1	59-66

Abstract

Implementing lean manufacturing in a developing country such as Malaysia is still considered to be a major challenge due to several barriers. It is essential for all managers to understand these barriers and try to minimize them and improve competition strength. The purpose of this study is to investigate the barriers of lean manufacturing in the automotive industry in Malaysia. A survey have been conducted and sent to 250 companies from automotive manufacturing plant and suppliers in Malaysia, giving a 20.8% response rate. The statistical package for the social science (SPSS) software was used to analyze the data from the surveys. The result shows that the lack of skilled is the highest obstacle implement lean and following by lack of awareness and company culture. Attempt was made at finding significance difference between small, medium and large companies on obstacle in lean implementation. The findings of this research provide invaluable information to all desire to implement lean manufacturing and to assist the development of an effective strategic plas as well as to design programs to overcome the lean manufacturing barriers. The findings culminate with conclusion together with some proposed future research directions.

Keywords: Lean manufacturing; barriers; survey approach

Abstrak

Perlaksanaan pembuatan lean di negara yang sedang membangun seperti di Malaysia boleh dianggap sebagai salah satu cabaran utama kepada beberapa halangan-halangan yang perlu dihadapi. Ia amat penting kepada pengurus-pengurus untuk memahami halangan-halangan tersebut dan mencuba untuk meminimalkannya dan meningkatkan daya saing yang lebih teguh. Tujuan kajian ini adalah untuk mengkaji halangan-halangan pengeluaran lean di dalam industri automotif di Malaysia. Satu kajian kaji selidik telah dijalankan dan telah dihantar kepada 250 syarikat pembuatan automotif dan juga pembekal utama di Malaysia dengan kadar maklum balas yang diterima sebanyak 20.8%. Penggunaan perisian SPSS digunakan untuk menganalisa data maklum balas kaji selidik. Hasil daripada kajian menunjukkan bahawa kekurangan kemahiran merupakan halangan yang tertinggi pelaksanaan lean dan diikuti dengan kekurangan kesedaran dan budaya syarikat. Analisa telah dijalankan bagi mengkaji perbezaan yang signifikan di antara syarikat yang berskala kecil, sederhana dan besar terhadap cabaran di dalam perlaksanaan lean. Keputusan dari kajian ini memberikan maklumat yang tidak ternilai kepada syarikat-syarikat yang hendak melaksanakan pembuatan lean dan membantu membangunkan satu rancangan strategik yang berkesan dan merekabentuk program-program untuk mengatasi halangan-halangan pembuatan lean. Penemuan tersebut di simpulkan bersama-sama dengan beberapa cadangan penyelidikan bagi kajian yang akan datang.

Kata Kunci: Pembuatan Lean, halangan-halangan, pendekatan tinjauan

© 2012 Penerbit UTM Press. All rights reserved.

1.0 INTRODUCTION

Over the two decades, the automobile industry in Malaysia has been the focus of long government intervention. The promoting the automobile industry in a developing economy such

as Malaysia requires protective instruments in the form of tariffs, quantitative restriction, and investment control and refund schemes to protect the local automotive industry [1]. The Malaysian automotive industry, including the suppliers and vendors, must be capable to stay competitive their competitor in

this business [1, 2]. In order to be able to achieve the goals, suppliers should apply Lean Manufacturing practices to improve the quality of products while reducing the waste in order to satisfy the customers.

Lean is essentially about increasing customer value and reducing waste by optimization process within and between organizations, departments and teams [3]. Waste can be determined broadly as everything that customer does not want to pay for. Sometimes distinctions are made between different types of waste including defects, overproduction, inappropriate processing, unnecessary transport, excess movements, waiting time, inventory, underutilization of human potential, inappropriate systems and environmental waste [4, 5].

Lean is often said to fail in implementation [6]. This is something that lean has in common with other management system and organizational change more generally. With regards to Lean, evidence indicates that failure may be rooted in limited implementation experience, a tendency to return to old routines, low management commitment, lack of training and education, poor linkage between Lean activities and overall strategy, etc [7, 8].

The main barriers to implement lean manufacturing successfully in Malaysia is lack of understanding because it requires new knowledge and cultural change during the transition [9]. Lean manufacturing should be adopted comprehensively and holistically in principles and concepts [10]. According to M. Manzouri [11], the highest level of obstacle for Malaysian companies in implementation improvement programs are lack of experts employees and lack of awareness. Some Malaysian industries do not believe that continuous program can improve their efficiency and cost management because they do not have proper direction and guidelines from the company and the Government side [11].

The purpose of this paper is to investigate the obstacle that has been faced by automotive companies to implement lean practices in Malaysia. Toward this end, a survey was conducted and SPSS software was used to analyze the statistical data of the survey.

2.0 RESEARCH METHODOLOGY

This research aims to identify the barriers to implementing Lean manufacturing in the automotive industry in Malaysia. A survey is an economical method for data collection in order to achieve a quick response rate and it enables to get a larger amount of data to be gathered [10]. The samples of this study were obtained from the 2010 Federation of Malaysian Manufacturers (FMM). The list of companies involved in the automotive industry consists of metal, electrical and electronic, plastic, rubber, interior parts, exterior parts and other components. The respondents consist of directors, general managers, production managers, quality managers and senior executives. They were considered the best candidates to answer the survey because they are directly involved in the process, have first-hand knowledge and are the leader in charge of lean manufacturing processes.

Data collection method was random sampling and phone contact was followed. The questionnaires were forwarded to participating companies via mailing, fax or on-site interview. The questionnaire consists of 4 sections. The first section investigates the general information of the respondent. This includes the size of the company, the age involved in lean, type of company ownership, type of business, the certificates that have been achieved and the award that has been won. The second section of the questionnaire explores the understanding of lean manufacturing. The practical level of Lean implementation in the Malaysian automotive industry was explored in the third section of the questionnaire by using

critical success factors of Lean. And the latest section of the questionnaire determines the barriers or difficulties faced in trying to implement Lean in the Malaysian automotive company. The items in the barriers to implement Lean are measured by a five-point Likert scale with 1 indicating "Strongly disagree" and 5 indicating "Strongly agree".

The process of developing the questionnaire also included a pilot study, which was used to modify and eliminate the number of variables. The experts on the subject were consulted. The comments and feedback were analyzed and a few minor corrections were made for improving the instrument. Most of the experts satisfied the content of the questionnaire and acceptable for the data collection. The questionnaire was checked for its reliability using Cronbach's alpha coefficient to measure the internal consistency of the research instrument. The results proved high internal consistency with a coefficient alpha of 0.852. Thus, this survey instrument has high internal consistency and is therefore reliable.

3.0 RESULTS

The survey was conducted in one phase to 250 automotive manufacturing companies registered in FMM 2010. A total of 55 responses were returned and 2 of the 55 returned were incomplete, resulting in a 20.8% valid response rate. Action was taken by sending follow-up letters to respondents in order to increase the response rate but still did not improve the rate.

The above response rate is considered practically good based on recent survey-based research in operation management (7.4% [12], 13.5% [4]) and supply chain management (6.3% [7]). According to Yusof [15], a response rate of 20–25% is normal for mailed questionnaires. Similarly, a response rate of 12.4% was obtained by Zandry and Yusof [15] in their study in Malaysia. Therefore, the response rate for this research was considered to be reasonable. The response was later analyzed using the SPSS version 14 statistical package.

3.1 Company Demographics

The frequency counts in this particular section of the questionnaire bring out the information about the respondents and their distributions. Table 1 shows the descriptive statistics for the respondent companies in terms of company size and the type of company ownership. There were 35.8% of the respondents from the medium-sized industries, whereas 34% of the responses came from small industries (those with less than 150 employees). Large industries, defined as having more than 500 employees, represent 30.2%. The ownership of the company shows that almost half of the respondent companies are owned by locally owned companies (49.1%). Meanwhile, 28.3% of the companies are fully foreign owned, and the remaining 22.6% are joint venture companies.

Table 1 Profile of respondent

Questions	Elements	Number	%
Size of company	Small company	18	34.0
	Medium company	19	35.8
	Large company	16	30.2
Company ownership	Local company	26	49.1
	Foreign company	12	28.3
	Joint venture	15	22.6

3.2 Perception on Barriers to implement Lean Manufacturing

The analysis of the results summarized in Table 2 indicates the difficulties experienced by Malaysian automotive industries in

lean implementation. It could be expected that Malaysian automotive industries still face particular difficult in implementing lean. In order to explore the barriers faced by the company, the respondents were asked to submit and rank what they felt were the greatest problem or issue they experienced in survey form.

Most of the respondents have the view that lack of skilled people and awareness of the tools and techniques as the highest obstacle towards achieving successful lean implementation effort. It is followed by company culture; costly consultancies and training program and lack of understanding with mean score more than 3.15, have a tendency to be agreed in Likert scale.

Table 2 Mean Score for perception barriers to lean manufacturing

Barriers to Lean	Mean	Rank
Lack of skilled people	3.47	1
Lack of awareness of some or all of the tools and techniques	3.43	2
Company culture	3.28	3
Costly consultancies, training program	3.23	4
Lack of understanding	3.17	5
Lack of effective measurement criteria.	3.13	6
Employee resistance	3.13	7
Lack of resources	3.09	8
Lack of know-how to implement	3.08	9
Lack of rewards and recognition	3.06	10
Does not practice what is preached	3.00	11
Lack of time to implement	2.87	12
Budget constraints	2.85	13
Lack of customer focus	2.77	14
Production operators are unable to implement change	2.68	15
Lack of finance for operations	2.66	16
Failure of past lean projects	2.64	17
Unable to implement change by senior management	2.62	18

The results are reasonable because it is very difficult and costly to train the skilled people. In addition, there is a problem to change the culture of the company and convince everybody of the usefulness of the changes. Some of them reach negatively because they feel threatened and uncomfortable with the change. So, it requires great effort from the top management to create the whole company lean culture. It also understandable that barriers of costly and consultancies, training program is probably due to lack of financial resources. The lack of understanding is one of the five highest barriers in implementing lean because of 69.8% of respondents come from small and medium enterprise (SMEs). According to Abd Rahman [16], the main difficulties facing in Malaysian SME's is inadequate knowledge and understanding which found that only 16.3% of the respondent in survey had very good understanding and knowledge of implementing continuous improvement program.

3.3 Differences of Barriers Implementing Lean Based on the Size of Company.

This hypothesis test is conducted to find out whether there was any significance difference between small, medium and large companies related to their barriers implementing lean manufacturing. This test involved Kruskal-Wallis test to compare the means since the data are not normal distribution. The following hypothesis was formulated.

Ho: there is no significance difference between small, medium and large companies on the barriers implementing lean mean score.

H1: there is significance difference between small, medium and large companies on the barriers implementing lean mean score.

From the results obtained, it was found that there is significance difference between small, medium and large companies on production operators are unable to implement change, lack of finance for operations and lack of understanding barriers with $p < 0.05$. It was expected that barriers on financial, culture and understanding among the large companies lower and better established than among the SMEs. Many reserchers believed that main problem in implement lean lies on misunderstanding of the real concept and purpose of lean manufacturing [6, 9]. The misunderstanding is due to cultural difference that occurs during translation of lean manufacturing [9]. Employees' resistance to adopt the change is common barrier that every organizations experience while implementing any continuous improvement program. This is because the ability of people to respond and adapt is critical when they face any change in situation [9]. The employees reverted to the old ways of working because lean manufacturing initiatives might have burdened them with additional work [8]. They feel that lean practices ask them to work harder for fewer rewards. The results are summarized in Table 3.

Table 3 Kruskal-Wallis results on Lean Manufacturing barriers for size of company

Barriers in Lean implementation	Mean Barriers			Kruskal-Wallis	
	Small	Medium	Large	p value	Results
Unable to implement change by senior management	2.278	2.789	2.813	0.4202	Not Sig.
Production operators are unable to implement change	3.056	2.053	3.000	0.0106	Sig.
Lack of finance for operations	3.056	2.842	2.000	0.0291	Sig.
Does not practice what is preached	3.056	2.632	3.375	0.2977	Not Sig.
Lack of time to implement	2.722	3.053	2.813	0.5898	Not Sig.
Lack of know-how to implement	3.056	2.842	3.375	0.4322	Not Sig.
Company culture	3.111	3.474	3.250	0.6209	Not Sig.
Budget constraints	3.111	3.000	2.375	0.1126	Not Sig.
Employee resistance	3.333	3.211	2.813	0.3065	Not Sig.
Lack of skilled people	3.500	3.421	3.500	0.9704	Not Sig.
Failure of past lean projects	2.722	2.474	2.750	0.6363	Not Sig.
Lack of understanding	3.0556	3.7500	2.7895	0.0366	Sig.
Lack of resources	3.4444	2.9474	2.8750	0.1491	Not Sig.
Lack of customer focus	2.6667	2.5789	3.1250	0.4343	Not Sig.
Lack of rewards and recognition	2.9444	2.9474	3.3125	0.5531	Not Sig.
Costly consultancies, training program	3.3889	3.1579	2.8125	0.2128	Not Sig.
Lack of awareness of the tools and techniques	3.5000	3.3158	3.5000	0.6874	Not Sig.
Lack of effective measurement criteria.	3.2778	3.0000	3.4375	0.4797	Not Sig.

4.0 CONCLUSION

This paper has presented the results of a survey conducted on the Malaysian automotive companies with the main purpose of identifying the obstacle implementing lean manufacturing practices and comparing the barriers had been faced to implement lean between small, medium and large companies. The results show that one of the highest barriers in implementing lean manufacturing practices is lack of skilled people and followed by company culture and financial problem. It will be worst when employees cannot commit themselves to the process that they do not approve of. So, management should clarify organization strategies and policies, motivate employees in order to participate actively in Lean activities, decision making, and use of employee ideas and suggestion in Lean program. The result from Kruskal-Wallis test indicates the barriers of employee unable to implement change, financial and knowledge were significantly different affected by the size of company. Further research will focus on conducting case studies to obtain the actual barriers faced in selected company in implementing lean.

Acknowledgement

The authors would like to acknowledge Universiti Malaysia Pahang and the Ministry of Higher Education of Malaysia for granting a scholarship

References

- [1] Deros, B. M., Yusof, S., Salleh, A. 2006. A Survey on Critical Factors and Problems in Implementing Benchmarking Towards Achieving Business Competitiveness in SMEs. *Jurnal Kejuruteraan*. 18: 29–37.
- [2] Balle, M. 2005. Lean Attitude—lean Application Often Fail to Deliver the Expected Benefits but Could the Missing Link for Successful Implementations be Attitude? *Manufacturing Engineer*. 84: 14–19.
- [3] Narasimhan, R., Swink, M., Kim, S. W. 2006. Disentangling Leanness and Agility: An Empirical Investigation. *Journal of Operations Management*. 24: 440–457.
- [4] Shah, R and Ward, P. T. 2007. Defining and Developing Measure of Lean Production. *Journal of Operation Management*. 25: 785–805.
- [5] Eswaramoorthi, M. 2011. A Survey on Lean Practices in Indian Machine Tool Industries. *International Journal Advance Manufacturing Technology*. 52: 1091–1101.
- [6] Bhasin, S. 2008. Lean and Performance Measurement. *Journal of Manufacturing Technology*. 19: 670–684.
- [7] Sim, K. L. and Rogers, J. W. 2009. Implementing Lean Production System: Barriers to Change. *Management Research News*. 32: 37–49.
- [8] Wong, Y. C., Wong, K. Y., Ali, A. 2009. A study on Lean Manufacturing Implementation in the Malaysian Electrical and Electronics Industry. *European Journal of Scientific Research*. 38: 521–525.
- [9] Nordin, N., Deros, B.M., Abdul.Wahab, D. 2011. Lean Manufacturing Implementation in Malaysian Automotive Industry: An Exploratory Study. *Operation and Supply Chain Management*. 4: 21–30.
- [10] Crute, V., Ward, Y., Brown, S. and Graves, A. 2003. Implementing Lean in Aerospace—Challenging the Assumptions and Understanding the Challenges. *Technovation*. 23: 917–928.
- [11] Manzouri, M., Abd. Rahman, M. N., Arshad, H., Ismail, A. R. 2010. Barriers of supply chain management implementation in manufacturing companies: a comparison between Iranian and Malaysian companies. *Journal of the Chinese Institute of Industrial Engineers*. 27: 456–472.
- [12] Nahm, A. Y., Vonderembse, M. A., Koufteros, X. A. 2003. The Impact of Organizational Structure on Time-Based Manufacturing and Plant Performance. *Journal of Operation Management*. 21: 281–306.
- [13] Li, S., Rao, S.S., Ragu-Nathan, T. and Ragu-Nathan, B. 2005. Development and Validation of a Measurement Instrument for Studying Supply Chain Management Practices. *Journal of Operation Management*. 21: 281–306.
- [14] Yusof, S. M. and Aspinwall, E. M. 2000. Critical success factors in small and medium enterprise: survey results. *The TQM Magazine*. 11: 448–462.
- [15] Zadry, H. R and Yusof, S. M. 2006. Total Quality Management and Theory of Constraints Implementation in Malaysian Automotive Supplier: A Survey Result. *Journal of Total Quality Management*. 17: 999–1020.
- [16] Abd. Rahman, M. N. 2002. A survey findings on quality management practices in Malaysian SMEs. *Standard and Quality*. 95: 2–7.