

LEAN PRODUCTION SYSTEMS IN THE WORKPLACE

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Abstract

The purpose of this study is to determine the relationships between top management commitment, communication and training and employees' awareness of Lean Production system at workplace. Moreover, the investigation of factors influencing employees' awareness of Lean Production system at workplace was done by analyzing three variables namely top management commitment, communication and training. The study was conducted at a car leather seat manufacturing company at Puchong, Selangor. From 156 respondents, it is found that all three variables showed the positive relationship towards employees' awareness of Lean Production system. Furthermore, the top management commitment is proved as the most influence factor of employees' awareness of Lean Production system as compared to training and communication factor. In order to ensure the effectiveness of Lean Production system, it is recommended to the top management to seriously embed the ongoing encouragement and enforcement of Lean Production system in the organization. The organization should also provide trainings to educate the employees and their role in the system.

Keywords: Employees' awareness, Lean Production System, top management commitment, communication, training

1.0 INTRODUCTION

The implementation of lean manufacturing in an organization leads them to be more productive and practice flexibility to change within the organization to improve customer satisfaction as well as organization effectiveness and efficiency (Karim et al., 2008). According to Melton (2005), the implementation of Lean Production system is crucial to the organization because it gives some huge benefits such as shortening the time waiting for customers, reducing the holding stock for manufacturers, improving the knowledge management and bringing more robust process.

Apart from that, through the implementation of Lean Production system along with the extensive discussion about the tools of this system such as *jidoka* and *poka yoke* enables the employees not only producing a good quality of product, but also creating a necessity for removing the possibility of human errors through this system (Pettersen, 2009). Hence, this makes Lean Production system a very important and physical concept especially for manufacturing that is crucial to be implemented and need employee's awareness in developing this Lean Production system in their organization (Melton, 2005).

In line with Melton (2005), Karlsson and Ahlstrom (1996) found that with the awareness of the leader, the employees should be acknowledged that the parts or components without value added should be eliminated to reduce waste through the implementation of Lean Production system. Some organizations are unaware and failed to implement Lean Production system because they think it needs a lot of requirement and costs for them to implement the system (Bhasin, 2006). Meanwhile, Pingyu and Yu (2010) found that some organizations had never been introduced with the implementation of Lean Production system which there were only 40 managers who have heard about Lean Production system and their labor knowledge is totally low.

Although most of the organizations implement Lean Production system but there are still less companies achieved the best outcomes due to lack of awareness about the system as experienced by a car leather seat manufacturing company stated in Puchong, Selangor. This company has implemented Lean Production system for almost 6 years but they do not fully achieve the target required by Malaysia Automotive Industry (MAI). Therefore, this study is conducted to investigate the factors (top management commitment, communication and training) that influence the awareness of Lean Production system in this company.

2.0 LITERATURE REVIEW

2.1 Awareness in Lean Production

Lean manufacturing has developed from a set of tools and techniques to become a management philosophy. It can be used to reduce waste and improve the efficiency of companies. Many companies worldwide have implemented lean management and achieved great improvements (Salonitis & Tsinopoulos, 2016). Besides, the lower barriers in entering a business world have encouraged the organization to become more competitive in doing their business activities in order to enhance their customer satisfaction through the implementation of lean manufacturing (Karim, 2009). According to Ronald (2001) in Milita Vienazindiene and Ramune Ciarniene (2013), the term “Lean” is a philosophy of manufacturing that is used by businesses to optimize their services to reduce waste by using a collection of principles, methods and tools so that the organization are able to optimize all the inputs and enables them to achieve customer satisfactions. Apart from that, Lean also refers to maximization of value added and provides products or services in the right time at the right place (Browning, 2001).

Top management commitment should create awareness in contributing the benefits of Lean Production implementation to their employees. Besides that, they should also make some changes in the management process and push forward the employees to play their roles effectively in implementing the Lean Production system (Pingyu and Yu, 2010). Hence, awareness among employees within an organization should be run simultaneously with their action in reducing waste and applied by day to day operation (Badurdeen et al, 2011).

2.2 Top Management Commitment

Commitment from top management may be the most critical factor in the success of Lean Production System. Dombrowski and Mielke (2013) highlighted leadership as a cornerstone for engaging employees in continuous improvement initiatives, something that they consider a critical factor for introducing a Lean Production System. According to Boyle et al (2011), top management commitment is a must in implementing Lean Production System. They stated that the employees must see that management is interested in the changes in their organization which they argue that it is not a necessity for them to spend one minutes to think about the project if there is no commitment given from their top management. According to Victor (2008), successful implementations of Lean Production have shown that leadership, participation and commitment from top management are the most critical factors for the organization to

having a smooth management process in being competitive advantages. This is because the involvement and interruption by the top management are important to ensure their employees always follow the terms and requirements that are being measured to achieve the organization targets to have a Lean Production within their operational performances.

2.3 Communication

Communication is defined as an exchange of information and understanding between two or more persons or groups (Kumar et al, 2013). According to Keyton (2011), communication can be defined as a process to transmit and deliver the idea of an individual in understanding the other person. A good communication between manager and employees will enable a clear understanding of the process in doing something and help the organization to achieve their target towards the continuous improvements process. Organizational communication is one of the most important components of lean philosophy and the savings potentials due to lean communication that must be taken into consideration (Maria Virginia Iuga, 2017). According to Pingyu and Yu (2010), a good communication platform in implementing the Lean Production system should involve the networks and internal platforms. The effective internal communication platforms require the employees to involve and participate in making their decision and voice out their opinion without fear to contribute their ideas towards the implementation of the lean system.

2.4 Training

Training is an activity that will teach all the procedures needed for a business to implement certain programs, process or practical within their organization. Training in Lean Production system is crucial to be provided by every leader or employer towards their employees in the organization because through training, employees will understand more about the new process and changes that are brought within their tasks in the organization and will be more knowledgeable on how to eliminate waste (Sim & Chiang, 2012). Training also can be considered as important tools that must be aware by the organization to provide adequate training towards their employees in implementing the Lean Production system (Puvanasvaran et.al, 2009). Employee awareness will increase when they have been empowered through a continuous improvement by using tools in Lean Production system such as Kaizen and team work that boosts their involvement when they go for training (Abioye and Bello, 2012). This is because the employees will increase their knowledge through the training that is provided by their employers and organization.

As a conclusion, to increase the awareness among employees towards Lean Production system, the leader itself should play the most important roles in ensuring the top management communicates the language of money, operational management of bilingual manner that are required in the production process, and the lowest level of operational management should be discussed only on the quality products and services (Omachunu et al., 2004). Training is crucial to build employees awareness towards Lean Production system in their workplace as it will support the operation objectives within the organization to reduce costs and improve value of the products produced or services provided in eliminate waste (Keyes, 2013).

3.0 METHODOLOGY

The purpose of this study is to describe the relationships between the independent variables, such as top management commitment, communication and training towards the awareness of Lean Production systems (Figure 1).

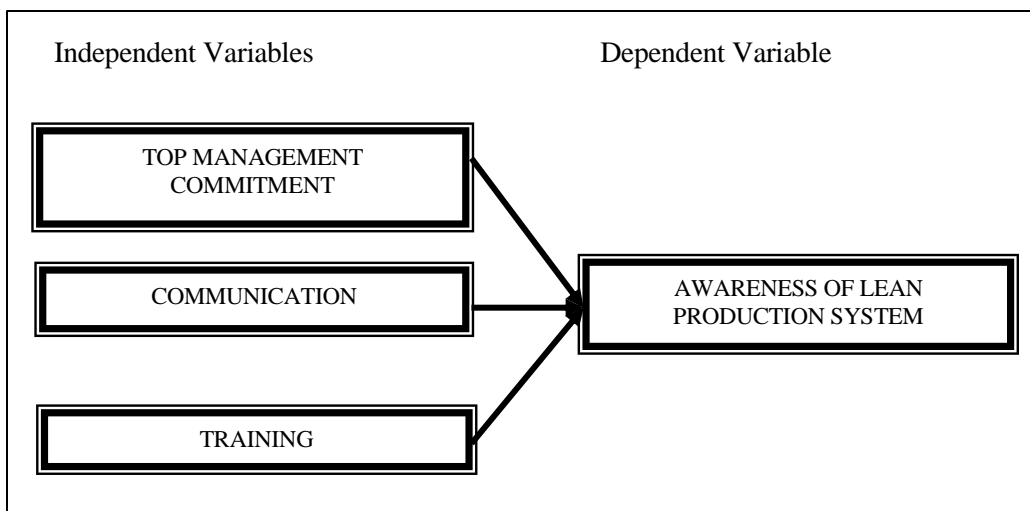


Figure 1 Theoretical framework

The data was gathered using individual unit analysis which each employee's response at the Production Department is treated as an individual data source. The objective is to measure their awareness about Lean Production system that has been implemented in their department. The sampling method used by the researcher is stratified random sampling. The sampling frame is taken from the database focusing on the employees within the Production Department with the population of 260 employees. The population of sampling unit is divided into sub-group and a sample is selected separately per stratum. In Production Department, there are three factories that are divided based on their workcell which are named as Factory 1 for preparatory stages, Factory 2 for tanning and Factory 3 for crusting. According to Roscoe (1975), the suitable sample size for most researches is larger than 30 and less than 500. Hence, the number of sample size that should be selected for this study is 156 employees (Krejcie and Morgan, 1970). The table below shows the sample of employees selected from each factory based on the proportionate stratified random sampling.

Table 1 Table of Sampling Technique using Proportionate Stratified Random Sampling.

Factory	No of Employees	Sample
1	60	$60/260 \times 156 = 36$
2	95	$95/260 \times 150 = 57$
3	105	$105/260 \times 150 = 63$
	Total	156

A self-developed questionnaire was designed to derive relevant information from the respondents according to the research objectives and it consists of five main areas. Part A covers the personal backgrounds or demographic questions which include employees' age, gender, race, marital status, education levels and working experience in the organization. Part B focuses on the dependent variable that is the awareness of Lean Production system. Part C, D and E cover questions related to independent variables such as top management commitment, communication and training.

The analyses that will be carried out in this study are frequency distribution, correlation analysis and multiple linear regressions. The following hypotheses were generated.

- H1: There is a relationship between top management commitments with employees' awareness of Lean Production system.
- H2: There is a relationship between communications with employees' awareness of Lean Production system.
- H3: There is a relationship between training with employees' awareness of Lean Production system.

4.0 RESULTS AND DISCUSSION

The next step after collecting data is analyzing the variables of interest to test the research hypothesis. The data will be examined by using Statistical Package for Social Science (SPSS), a computerized Statistical Software package that is widely used in the natural and social sciences to organize and analyze the data.

4.1 Reliability Test

According to Hair et. al (1998), the cronbach's alpha value should more than 0.60 to consider as acceptable. Based on Table 2, the computed alpha values for all the variable factors are found to be reliable since all values are more than 0.8. It is shown that all items in each variable have a good internal consistency in the scale.

Table 2 Interpretation of Output

VARIABLE	CRONBACH'S ALPHA VALUE	N OF ITEM
Employees Awareness	0.893	7
Top Management Commitment	0.905	6
Communication	0.898	7
Training	0.906	7

4.2 Frequency Distribution

Table 3 shows the demographic profile of the respondents. 69.2% of the respondents are male and the rest are female (30.8%) with the following age distribution: 22-30 (9.6%), 31-40 (41.0%), 41 to 50 years and above (49.4%). Apart from that, among 156 respondents, 84 (53.8%) are Malay, which shows the largest group of race of the employees involved in this survey. Meanwhile, the results show 38 respondents are Indian that is represented by 24.4% and followed by 32 employees whom it refers to the foreigners such as from Indonesia and Bangladesh that constituted 20.5%. However, there are only 2 Chinese respondents in this survey (1.3%). Majority of the respondents are married (80.1%). This study also found that 44.2% of the respondents has SPM/STPM certificates, 19.9% were in primary school/UPSR level, while 18.6% got SRP/PMR Certificates. Remarkably, there are 13 respondents that were unschooled which represent 8.3% of sample in this group. Furthermore, 5.8% and 3.2% of the respondents attained diploma and degree/professional certificates respectively. In addition, majority of the respondents have more than 10 years' working experience with the proportion of 64.1%. It is followed by 1 to 3 years of working experience (14.1%), below 1 year (12.2%), 4 to 6 years (6.4%) and lastly, only 5 respondents were in the category of 7 to 9 years working with the percentage of 3.2%.

Table 3 Frequencies of Respondent Profile

RESPONDENT PROFILE	FREQUENCY	PERCENTAGE (%)	RESPONDENT PROFILE	FREQUENCY	PERCENTAGE (%)
AGE			GENDER		
22-30 years old	15	9.6	Male	108	69.2
31-40 years old	64	41.0	Female	48	30.8
41-50 above	77	49.4			
RACE			MARITAL STATUS		
Malay	84	53.8	Single	26	16.7
Indian	38	24.4	Married	125	80.1
Chinese	2	1.3	Others	5	3.2
Others	32	20.5			
EDUCATION LEVEL			WORKING EXPERIENCE		
Unschooler	13	8.3	Below 1 years	19	12.2
Primary School/UPSR	31	19.9	1-3 years	22	14.1
SRP/PMR	29	18.6	4-6 years	10	6.4
SPM/STPM	69	44.2	7-9 years	5	3.2
Diploma	9	5.8	10 years and above	100	64.1
Degree/Professional	5	3.2			

4.3 Pearson's Correlation

Table 4 Pearson's Correlation Coefficient

Variables	r	p-value	Level of significant
Top Management Commitment	0.825	0.000	Significant
Communication	0.732	0.000	Significant
Training	0.734	0.000	Significant

Based on Table 4, there is a significant relationship between employee's awareness of Lean Production system with all the independent variables. The strength of relationship are strong positive linear correlation between the employee's awareness of Lean Production system with top management commitment ($r=0.825$), communication ($r=0.732$) and training ($r=0.734$).

4.4 Multiple Regression Analysis

The regression analysis were employed to test the influence of three important variables namely top management commitment, communication and training towards dependent variables namely employees awareness of Lean Production systems in the workplace. A summary for all multiple regressions are shown below.

Table 5 Model Summary of the Investigated Variables

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.867 ^a	.751	.746	.36677

a. Predictors: (Constant), MEAN TRAINING, MEAN TMC, MEAN COMMUNICATION

The R Square value in the model summary above is 0.751. This implies that 75.1% of the total variation in the employees' awareness is explained by the top management commitment, communication and training. However the remaining 24.9% is not known and needs further investigation.

Table 6 Multiple Linear Regressions

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.397	.122		3.256	.001		
1 MEAN TMC	.659	.070	.679	9.427	.000	.315	3.172
MEAN COMMUNICATION	-.023	.076	-.024	-.303	.762	.253	3.959
MEAN TRAINING	.254	.075	.252	3.391	.001	.296	3.373

a. Dependent Variable: MEAN AWARENESS

By using Beta Weight, it indicates the strength of each independent variable that is associated with the employees' awareness of Lean Production system in the workplace. Among the three independent variables, top management commitment is the main critical factor that influences the employees' awareness of Lean Production system because the Beta value is higher with 0.679 and the significant value is 0.000 which shows that the hypotheses for these independent variables are accepted ($B=0.679$, $p<0.05$). Besides that, training variable also influences the employees' awareness towards Lean Production system in the workplace with the Beta value of 0.252 and the significant value is 0.001 which makes the hypotheses for this variable is accepted ($B=0.252$, $p < 0.05$). Unexpectedly, the result shows that communication does not influence the employees' awareness of Lean Production system since the variable is not significant ($B= -0.023$, n.s.). Meanwhile in determining the presence of multicollinearity, the tolerance and VIF value are considered. The tolerance values show that all variables used in this study are more than 0.1 (Tabachnick & Fidell, 2001) which top management commitment (0.315), communication (0.253) and training (0.296). Apart from that, the VIF values for mean independent variables for top management commitment, communication and training are 3.172, 3.959 and 3.373 respectively. It means there is no redundancy for each variable used in this study since these values do not exceed 4 or 5 (Montgomery & Runger, 2003). The findings indicate that top management commitment is significantly affecting the employees' awareness towards Lean Production system in the workplace.

5.0 CONCLUSION AND RECOMMENDATIONS

As a conclusion, it shows that there is a relationship between top management commitment, communication and training towards the awareness of Lean Production system among the employees in the workplace where the top management commitment is highlighted as the most critical influence factor. Although this study found that communication does not influence the awareness of Lean Production system for this company, but there were several studies showed conversely. According to Victor (2008), the feelings of fear, fail to keep people informed about the progress and communication breakdown between the people within the organization are reasons why employees awareness decreases and tends to fail in Lean Production system implementation process. The failure also will cause negative perceptions and lack of awareness about the implementation of the Lean Production system (Langabeer et al, 2009).

Based on the results obtained, it is recommended especially to the top management to seriously embed the ongoing encouragement and enforcement of Lean Production system in the organization. This can be done through many platforms such as establishing a system of rewards and recognition (e.g profit sharing), and creating a team to coordinate the practicing of the system in the organization. The team may include leaders

such as managers, supervisors and the operators. Besides, the top management may also redefine the objectives of the implementation of Lean Production system such as reducing the cost of inventory by 20 percent annually. In a lean management system, one of the essential responsibilities that leaders have is to serve as role models for finding new ways of working. The leaders' perspective lets them see improvement opportunities for the system as a whole, as well as the entire range of innovations that people are starting to apply both inside and outside the organization. A leader's task is to bring those insights together so that the system can keep improving (McKinsey, 2017).

The effectiveness of Lean Production system will be proven if the organization can provide trainings to educate the employees and their role in the system. Training is essential for bringing both management and workforce up to speed with lean (Salonitis & Tsinopoulos, 2016). Talented and experienced trainer should be hired to ensure that all employees are correctly coached.

However, the execution of Lean Production system will be successful if the organization provides more and effective medium of communication regarding the system such as e-mails, brochure, pamphlet and social media. Through this medium, both top management and employees can easily communicate and discuss about the system in the organization. In the previous study done in a Sport Equipment Manufacturer in the United States of America, the result showed that giving workers voice will improve their perception of job security, effort-reward fairness and job satisfaction (Khim et al, 2016). The top management also can address the awareness about the benefits and importance of Lean Production system by opening up sessions of meetings every week with the employees.

Apart from that, it is recommended that researcher use other variable items on independent variables such as employees commitment, teamwork, rewards and customer focus to analyze whether these variables can influence the employees awareness towards Lean Production systems.

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