Lean Production Determinant Factors in Malaysia Paper Manufacturer Industry

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Abstract - Nowadays, in daily operations have to alert about the lean production that would be effect of the whole of production management. Lean production is one of the main successful management in operations to keep maintain the organization reputation and its ready to compete the globally in manufacturing firm. The objective of lean production is to make the operation process become smoothly of processing items, reduced waste and successful in every target. However, many organizations fail to apply the lean concepts in their operations. Therefore, this study attempted to examine the relationship between lean production (LP) and three dimensions which are transportation, quality and communication. This study employed quantitative study using questionnaire. Data was collected from 45 employees that chosen by expertise in production and the data was analyzed using Statistical Package of Social Science (SPSS). This study hoped to make new understanding on the important to apply lean concept in production management.

Keywords *- Lean production, lean manufacturing, lean practices, lean implementing, lead time, production management, Six Sigma*

1. Introduction

Production management models are included two measurements which are: the specialized measurement and the social measurement. The specialized measurement refers to production organizations, from now on called the P-measurement, activities, types, process and physical course of action and to the stream of material that outcome in goods and services. The social measurement refers to work in association, and it is called W-measurement [21].

All the more particularly, the impacts of lean production on operation performance fundamentally allude to set-up times [10, 32], quality [11, 18, 29], transportation [1, 32], stock [9, 11], process duration [12, 30], and efficiency [12, 33]. Quality, cost, transportation and inspiration key execution pointers were utilized to quantify the changes accomplished by means of applying this approach. [36] used information envelopment analysis procedures to pinpoint the leanness outskirts as a benchmark for the leanness score.

At the same time, lean concentrated on the disposal about waste and enhancing flow, it need a few optional impact that result quality is improved. That result goes through a chance in the process, thereby lessening those possibilities for ham and more oldness. Likewise rearrangements of the forms within an organization bring about decrease from claiming variety [19, 26].

2. Literature Review

2.1. Lean Production

Based on [37], the definition of lean production (LP) is to eliminate the waste and creation of value in production and manufacturing which is the waste that does not add value to the product or service from the customer's perspective. Lean manufacturing (LM) or lean production, frequently just, "Lean," is a creation logic, which considers the use of assets for any objective other than the making of significant worth for the end client to be inefficient and consequently an objective for its end [3, 32, 38]. For both words lean manufacturing and lean production will refers to it uses less of everything in production process.

Last of all, lean production aims for eliminate of waste in production process [6], making the production department able to control the process and reduces the operational cost of production process [5, 27]. To improve the production process it must eliminate the main of lean which are motion, over-production, processing time, waiting time, rework and inventory [6] and it will improve also in conformance quality, delivery on full time and cost efficiency [18, 26].

2.2. Factors Affect Lean Production

2.2.1. Transportation

The transportation uses to deliver the raw materials to the factory or to finished product to the customer and the transportation also will measure the effectiveness in lean production which is reduction of lead time, faster delivery than the competitors and deliver on time to the customer [7, 29]. [13] identified five lean-based transport that occur in production and manufacturing which are excess load time, fill loses, driver breaks, speed losses and quality delays in production.

[17] distinguished a few hazard factors; those are important to this setting incorporate unsteady climate and street conditions, absence of fuel supply and strike and other business related issue. [35] characterized a few hazard factors into transportation delay including port limit and blockage, port strikes and deferral at ports because of port limit. Waste of waiting time in production will be in movement of raw material to one factory to another factory to continue produce it and also in the same time it will be affect productivity of quality issue [37].

2.2.2. Quality

Quality is the capacity of goods or service to take care of customer demand and fulfilment [15, 19]. In measuring operational execution, quality was one of the item execution, item perseverance and item's acknowledgement inside the utmost of plan determinations [29]. The more it takes for an item to last or the more it takes for it to be broke down, the higher the solidness of the item [29].

Based on [14] manufacturing parts and items that are faulty and in this way should be modified is inefficient or maybe far more atrocious is the rejecting of parts however, they surely don't increase the value of the client. Manufacturing parts which are first blame from the earliest starting point has significant results for productivity [14]. Assembling parts which are blame free from the earliest starting point has significant outcomes for productivity [14].

2.2.3. *Communication*

According to [30], information delay or inaccurate information in term of communication in internal or external manufacturing means of poor communication quality which is lack of advanced technology or lack teamwork in the manufacturing will affect the information quality. Information delay in communication is one of the risks in production process that can make lean production [2]. Besides that, information delay due to communication with other agent will bring delay to transfer the information to complete the document and it will affect at customs rules and regulations with lading permits, wrong of document in customs declaration and wrong information from other agent in the production [17].

Lack of communication and criticism among consecutive stage makes the procedure require an excessive number of configuration changes which makes the procedure require too long improvement time which to be sure makes the procedure be too moderate, too expensive, and regularly of low quality [4].

2.3. Hypotheses Development and Conceptual Framework

Based on [16], theory may be guess proclamations of the relationship between two or that's only the tip of the variable which need aid convey clear suggestions for testing those expressed relations. It will be an advantageous method that good true be used to investigate the relationship the middle of a solitary subordinate variable (criterion) and a few independent variable (predictor or explanatory) at one time [40]. The study ought to further be strong likewise to choose if with accept alternately to reject those invalid alternately exchange theory. The invalid theory is communicated similarly as no critical association between two variables or no huge association between two gatherings.

H_1: There is relationship between transportation and lean production.
H_2: There is relationship between quality and lean production.
H_3: There is relationship between communications and lean production.

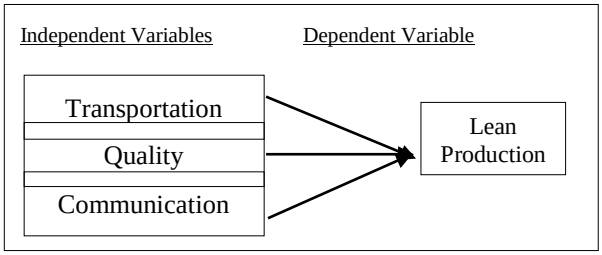

Figure 1 Research Framework

3. Methodology

In this specific research just a single strategy for information gathering will be utilized which is the primary data. Questionnaires are the most regularly utilized information gathering technique in instructive and evaluation research. Questionnaires help gather data on learning, attitudes, opinions, practices, facts and other information. In a survey, the researcher uses a questionnaire to accumulate data from the respondents to answer the researcher questions. The survey instrument (questionnaire) used as a part of this researcher originated from a combination of adopted questions of different writing and new questions that were produced in view of the literature and recommendations from academicians and professionals [28].

In this study, purposive sampling was gathered the exact information and only department that training lean production were picked in completed the survey. The sample size use in this study is around 45 which are chosen by judgment or purposive sampling which is this sampling are selected based on their expertise in the subject investigated. In addition, the sample chosen based on who they think would be appropriate for the study.

4. Findings And Analysis

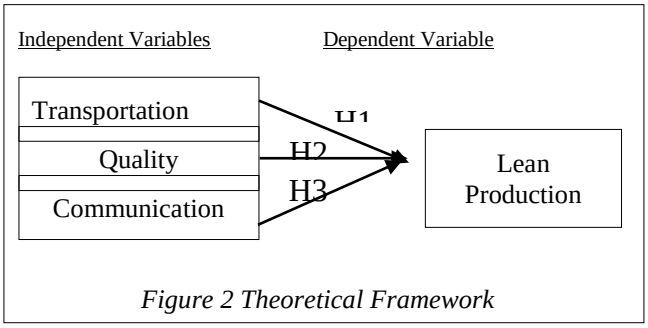

Figure 2 Theoretical Framework

4.1. Frequency Analysis

Frequency analysis is to measures the frequency of events of each subcategory. The recurrence frequency and the rate can be seen
effortlessly in unthinkable shape as demonstrated as follows. Frequency analysis is utilized to mention some broad objective facts about the data gathered.

The discussion about the demographic factors will be presented in the table 1 as showed. The demographic factors including of position, departments, years of working experience and level of knowledge.

4.2. Correlation Analysis

A further correlation statistical run was also performed to examine if there was any significant relationship between the three independent variables. The positive correlation that an increase of one independent variable will be followed by the increase of another independent variables.

Respondent's Profile		
	Frequency	Percentage (%)
Position		
General Manager	1	2.2
Manager	3	6.7
Executive	11	24.4
Supporting Staff	30	66.7
Department		
Production	3	6.7
Quality	2	4.4
Customer Service	8	17.8
Shipping	3	6.7
Purchasing	1	2.2
Prepress	8	17.8
Maintenance	1	2.2
Proofing	4	8.9
Chrome	3	6.7
Embossing	5	11.1
Engraving	1	2.2
Laser	2	4.4
Packing	2	4.4
Wallpaper	2	4.4
Years of working experience		
More than 10 years	5	11.1
7 – 10 years	5	11.1
4 – 6 years	17	37.8
1 – 3 years	15	33.3
Less than 1 year	3	6.7
Level of knowledge		
High	12	26.7
Moderate	24	53.3
Low	9	20.0

Table 1 Frequency Analysis for demographic

	TP	QL	CM	LP
TP	1			
QL	.338*	1		
CM	.532**	.484 **	1	
LP	.695**	.427**	.774**	1

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 2 Correlation Analysis

Table 2 shows the correlation analysis testing the relationship and the strength of association between variables can be seen.

Relationship between lean production and transportation based on correlation is 0.695 that show correlation is significant at the level 0.01 level and this is moderate correlation which means substantial relationship. For example, internal lean practices such as quality management, team approach and the presence the machine breakdown outlines were found to positively affect the level of requests that are transported on time, normal process duration with stated date confirm and average lead time [24]. Internal lean practices in daily production schedule adherence have been found to influence decidedly on-time delivery [8]. [10] found that changes in queue time, move time, machine downtime and general throughput time were the advantage frequently said by lean production.

Next correlation is between lean production and quality that shows which is correlation is 0.427 that correlation is significant at the level 0.01 and it is low correlation that means definite but small relationship. It is support by [21, 24] that since internal lean practices take a strive for successful by continuously removing the part of detect the waste; it will be take connecting to high risk of quality in production. For example that show the support by [20] that product quality was the most important that will affected by internal lean practices such as material flow. Internal lean practices such as quality management found to enhance quality viewpoints for example the level of requests that pass last inspection without revise and downtime of machines because failure during the processing the products [24].

In term of transportation and quality, for both the result in the manufacturing industry which is in conformity with study conducted by [7] and [20].

Finally, the correlation between lean production and communication is 0.774 and based the table 2 it shows high correlation that marked the relationship. The communication that developed in manufacturing need to develop the processing and training the worker to achieve the strong communication in internal or external manufacturing organizations [22].

Therefore, all the independent variable has positive significant between lean production and it will be supported by few journals from other author about the significant between lean productions

5. Recommendations and Conclusion

5.1. Recommendations

The communication in-term of delivery information in internal and external organization will be huge impact towards lean production. So, to improve in communication, the team that work linkage each other in internal must always deliver the information in correct way and fast the information to make each department

do their work faster without had wrong information that deliver to external organization such as supplier and customer or agent. Using the maximum ways to communicate such as phone calls, e-mail, instant message and face-to-face can make it clearly and smooth the information.

The transportation at the organization only had few lorry and the ton of lorry only 3 tonner and if the item wants to deliver it need to use agent for the bigger lorry so at this point it need to early book for avoid late pick up the item to send to airport or port. The organization at least need one lorry that bigger such 5 tonners or 10 tonners to carry the item and at the same time it will reduced the cost of using agent to use the lorry. Besides, the transportation for air and sea must be the early flight of the day that need to book and always happed in the organization is misunderstanding the date that received from customer service department. In the future, if the transportation had the improvement it can reduced the time and cost of the transportation that pay to the agent and the cost can covered in the any parts in the production to keep it smooth and follow the track.

Lean production happens because the quality control of the item be delayed and it effect the next process of finished item so my opinion the quality control of items need be doing on the spot at the same time and the same day of the item need to checking the quality. After received the item, the quality control need to keep on doing the part, so it can reduced the time of the next process to finished the items. The effect in the future in-term of quality can make the customer satisfied and keep order the items and will be the good partnership in the business.

5.2. Conclusion

As a conclusion, its shows all the list of the factors that affect lean production as transportation, quality and communication can be avoid or minimum their value of each factors to make it achieved the target of the organization. The three factors that bean have the test and study it significant towards the lean production. Significant with the lean production mean the factor had the strength relationship with each other and can changes by take each value to make it more being a good advantage.

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