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ADOPTION OF LEAN THINKING TO REDUCE WASTAGE AT MANUFACTURING PROCESS OF SMES IN MALAYSIA

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This Report Submitted In Partial Fulfillment of The Requirements For The Award
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"I hereby declare that this thesis entitle "Adoption of Lean Thinking to Reduce Wastage at Manufacturing Process of SMEs in Malaysia" is my own work except for the quotations summaries that have been duty acknowledged"

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DEDICATION

For my mother, How May Eng. Although she is a single parent, she never fails to give us the best she can and taught me that the best kind of knowledge to have is that which is learned for its own sake and even the largest task can be accomplished if it is done one step at a time. She is always my best listener when have problem. Thank you Mom.

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ABSTRACT

The purpose of this study is to investigate the adoption of lean manufacturing in the Manufacturing SMEs in Malaysia. Data will are collected from the companies that implemented lean. Questionnaire and interview are used to collect the data. The respondent included managers from lean implemented company to help the researcher understand how lean affect the working style in Malaysian SMEs. Interviewees are expert who have at least one year experience in this field. The results of this study highlight the importance of lean implementation reduce wastage in SMEs. The results will show which is the most common wastage happens in Malaysia so a company can focus on reducing it by implementing lean so that it can be more efficient and effective and it can be their capability and competitiveness towards globalized market. The framework was developed through the process of this thesis.

ABSTRAK

Tujuan kajian ini adalah untuk menyiasat penerimaan "Lean Manufacturing" dalam kilang pembuatan perusahaan kecil dan sederhana (PKS) di Malaysia. Data dikumpulkan daripada syarikat yang melaksanakan "Lean Manufacturing". Interview digunakan untuk mengumpul data. Responden termasuk pengurus dari kilang yang melaksanakan "lean manufacturing" supaya penyelidik dapat memahami kesan "Lean" di kilang pembuatan PKS di Malaysia. Responden merupakan pakar-pakar yang sekurang-kurangnya mempunyai setahun pengalaman dalam bidang "Lean". Hasil kajian ini menekankan kepentingan "Lean" untuk mengurangkan penbaziran terdapat dalam PKS. Keputusan hasil kajian ini akan menunjukkan pembaziran yang paling mudah dijumpa supaya kilang tersebut akan menyelesaikannya dan it berkesan untuk meningkatkan keupayaan dan daya saing industri terhadap pasaran globalisasi. Rangka kerja ini dibangunkan melalui process memhabiskan tesis ini.

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Introduction

1.0 Background

Technology adoption is in absorbing state as we have rarely observing a new technology being abandoned in a favor of the old one (Hall and Khan, 2002). As an SME, they usually do not have enough capital to fund a new technology research and development. Therefore, adopting a new technology is very important for them in order to gain competitive advantages or at least keep up with their competitors. If companies can't be a technology inventor, it's better for them to be an adopters than a laggard.

Lean or Lean thinking, is based on the Japanese quality movement specifically on the Toyota Production System (TPS) and was popularized by Womack and Jones. Lean is a process that assists an organization to eliminate or at least reduce the waste. All non-value added action or those which didn't provide value to customers are all considered as waste in Lean. Waste was defined as "anything other than the minimum amount of equipment, materials, parts, space, and time which are absolutely essential to add value to the product" (Russell and Taylor, 2000).

The main purpose of adopting lean thinking is to eliminate waste, save time and cost. With this a company can eliminate mistakes by analyzing each previous mistake, find out what is the root cause of it and correct the causes to eliminate repeat errors. No

error means no waste in action or time. As Benjamin Franklin says, time is money. The more time you save, the more cost you reduce, it's as easy as that. This principle is simple to adopt, but it requires full participation and relentless attention of all the employee. Even a partial implementation can benefit manufacturing operations and improve performance by reducing waste.

1.1 Problem Statement

According to Yusoff and Norzima (2000), many Malaysian SMEs lack a documented strategy and proper techniques to formulate strategy, develop plans, control activities or measure performance. What if a company can actually reduce a product cycle time and costs but they didn't choose a right strategy? In order to increase revenue, some of the companies might think just increase the price of the product. But, an expensive product might cause them lose their company advantages to their competitors.

Khan and Khalique (2014) stated, developing stronger SMEs require major changes in the manufacturing sector, as SMEs make up over 90% of the Malaysia's manufacturing sector. When most of the SMEs have the knowledge of lean, they will bring a great impact towards the economy in our country. Therefore, this research will be focusing on SMEs.

Currently in Malaysia, there are a lot of element that cause entrepreneur unable to continue their business such as depreciation of Ringgit Malaysia and the introducing of Goods and Services Tax (GST). According to Liang (2015), small businesses are quietly closing down, never to reopen again due to GST. SMEs can't just depends on finding a cheap supplier to reduce cost. In short, in order to survive in this era, SMEs have to learn the ways of how to operate at the cost as low as possible.

1.2 Research Question

The Research question can be list as follows:

1. What are the major factors that cause waste in Malaysian SMEs?

2. How do Lean Thinking overcome the waste problem faced by Malaysian SMEs?

3. How long it takes to see the percentage of enhancement of the efficiency in Malaysian SMEs after adopting Lean?

1.3 Research Objective

This research consist several objectives. The objectives are shown as follows:

1. To investigate the major factors that cause the waste in Malaysian SMEs.

2. To examine the ways of Lean thinking overcome the waste problem faced by Malaysian SMEs.

3. To measure the time it takes to see the percentage of enhancement of the efficiency in Malaysian SMEs after adopting Lean.

1.4 Scope and Limitation

According to SME Corporation Malaysia 2015 (Official Website), they are 47,823 manufacturing related services SMEs in Malaysia. However, this report only covers a few of the SMEs because companies that apply Lean is not common. This report did not cover Large Enterprise and other department other than Manufacturing Department. Besides, there are some limitations of this research which are the time given to complete this report is limited. Therefore, a longer time frame is needed in order to collect data from more company. Financial is also one of the limitation where the researcher unable to access to some of the criteria because it is not free to access.

1.5 Significance of the Research

The purpose of this study is to measure the reduction of waste after implementing some of the lean thinking in to SMEs and how long does it takes to see the effect of lean. This research shows that will a company can reduce cost by reducing waste or not. The failure rate of lean implementation has been significant in the manufacturing industry as a whole (Bhasin & Burcher, 2006). Some company might just give up because they expect to see an instant result. Therefore, this research will display how long it takes to see the effects of lean thinking. More implementation of lean will be discussed in detail, including studies related to types of waste identified by lean and which way is used to overcome them.

1.6 Key Assumption

There are a few assumptions made by the researcher. The first assumption is that workers and managers are willing to participate in the research and respond to the interview questions that are made by the researcher. The second assumption is that both workers and manager are providing honest and truthful responses to the questions they answer.

1.7 Summary

In short, lean is a practice that the main purpose of it is to exterminate or at least minimize waste along the entire company and creates more value to them. Lean has mainly been applied in manufacturing section and it is notable as this practice originates from Toyota and Toyota Production System. The main purpose of this study is to highlight the waste that occurs in Malaysia Manufacturing SMEs and the tools that are used to solve them. The research methodology approach related to the studies on lean implementation concepts from journals, articles and books. This chapter provides a picture of what the research is about that include research question, research objective, and the aim of research, scope and limitation of the study.

Chapter 2

Literature Review

2.0 Introduction

A literature review is to show the reader what that the researcher have read. Readers will have a good grasp of the main published work concerning a particular topic or question of the researcher done. The researcher needs to be planned to explore data and to develop a theory.

2.1 Lean Manufacturing

Lean is known for its very extensive collection of tools and concepts. Surveying the most important of these, understanding both what they are and how they can help is an excellent way to get started.

Lean manufacturing was known as Toyota Production System (TPS) and developed by Taiichi Ohno, Shigeo Shingo and Eiji Toyoda in between the year 1948 and 1975. It is originally called as "Just-In-Time production" and get the name "Lean Manufacturing" in U.S. Lean is a systematic method to eliminate waste ("Muda") found within a manufacturing system. Besides, waste created through unevenness in workload

("Mura") and Overburden ("Muri") also takes into account by Lean. It is called Lean because, in the end, the process can help a company to consume less space and use less material, inventory and people. The four goals of lean manufacturing are, improve product and process quality, minimize waste, reduce production and process time, and reduce costs.

Improve product and process quality do not only talk about quality itself, but Sæbø, Byfuglien and Johannessen (2003) assert that 'improving process quality is a precondition for better product quality at an acceptable cost'. This means the result to achieve is also to achieve cost-efficiency.

Davidson (2011) said waste minimization involves redesigning products and/or changing societal patterns, concerning consumption and production, of waste generation, to prevent the creation of waste. Therefore, lean is one of the tools and concepts which able to help a company change their culture and focus on what actually are wastes in their process.

Reducing production cycle times is a never ending task. Through reductions, the production function speeds up their processes and effectively "invents" capacity that previously didn't exist. But the benefits of faster production cycles don't end with improvements in capacity utilization. Chen (2013) said that a shorter job cycle time also means it is possible to commit an attractive due date to the customer.

The systematic implementation of Lean Manufacturing in SMEs will provide huge benefits for the company such as in reduction in cycle time, good customer responsiveness and quality improvement (Spann, Adams, Rahman, Czarnecki & Schroer, 1999). Finch (1986) and Lee (2004) both said that SMEs faced difficulties when dealing with their suppliers and customers on parts delivery and demand, but it is still applicable for SMEs to implement lean by focusing on internal process such as the involvement and participation of employee (Golhar, Stamm, & Smith, 1990)

Rose, Deros, Rahman, Ab & Nordin, (2011) said that SMEs are reluctant to implement Lean Manufacturing before foreseen the benefits of lean and this is because they have financial and resources constraints. They also suggest that 5S, visual control & display, standardization of operation, Statistical Process Control (SPC) and quality circle are few of the lean practices that require least financial investment. Therefore, SMEs should apply these practices first and then followed with other practices such as Kanban, small lot sizes.

Pearce and Pons (2013) suggest that high-value manufacturing should intelligently implementation of lean is necessary and it is complementary to strategic decision making base on manufacture and environmental considerations. Lean implementation involves a transformation of the organization. Initially the journey, for example, the human dimension of the change process is as important as the destination. Pearce and Pons (2013) also noted that lean has been applied effectively beyond manufacturing or production businesses.

2.2 Wastage identify by Lean

Wastage is a production that's contained zero value. Producing something which does not contain any value will increase costs and reduce the revenue. According to T.Ohno, one of the thought leaders with respect to TPS, there are seven sources of waste.

i. Overproduction

Wilson (2010) said that overproduction is the most egregious of all the wastes, since it not only is a waste itself but aggravates the other six wastes. Manufacturers might worry that they are unable to produce fast enough, they will have the mindset of standby for emergency. It will lead them to produce too much too soon and causes additional waste such as material handling,

storage and transportation. Earley (2016) said overproduction is making products in too large number or before it is actually needed leading to excessive inventory. Overproduction obscures all of the other problems within a processes, hence it is the worst of the seven wastes. The principles of Lean Manufacturing require you to make what the customer wants when they want it, pulling only what is ordered through your workflow. Overproducing cause a company to tie up with its capital in stock, raw materials, work in progress (WIP) and finished goods. In a business cash is what a company relies upon to keep their business running. So, a company will either leave themselves short or end up paying charges to the bank they loaned from. Many businesses have failed due to unable to buy raw materials to provide their customers because they have used their cash to buy materials that are not required.

ii. Waiting

Waiting can occur when workers are not working for whatever reason. It could be short term waiting, such as what occurs in an unbalanced line, or long waits, such as for stock outs or machinery failure (Wilson, 2010). Earley (2016) said waiting is the act of working slowly or doing nothing whilst waiting for a previous step in the process. It is the time operators just stood there waiting for a delivery of products or a previous operation to arrive or just slowly working so as not to highlight that they have run out of materials. Waiting occurs when supply unable to keep up or produce much faster than demand. For example, resources wait for flow units, leading to ideal time. When waiting time increases, the flow time of a product increases and make it longer than the value added time.

iii. Transportation

Transportation is the waste of moving parts around and it occurs between processing lines, between processing steps, and happens when the product is shipped to the customer (Wilson, 2010). Transport is one of the wastes identify by lean manufacturing, it is the movement of products from one location to another. Earley (2016) said that this movement could be from the machining shop to the welding shop, or from the production facility in China to the assembly line in America. Transportation does not just means receiving or delivering product to supplier or customer. It can also be an internal transport. For example, a forklift carrying semi finish goods around. The process should be laid out such that the physical layout reflects the process flow to minimize the distance flow units must travel through a process. The transport waste causes the company to hemorrhage money at an alarming rate. This means one company will have to spend money on extra space for the movement of material, staff to operate it, training, safety precautions, material handling equipment and so forth (Earley, 2016).

iv. Overprocessing

Worker often spends more time on a flow unit than necessary. Meaning, performing value added process more than once making the 2nd time non value added. Earley (2016) mention that overprocessing is adding more value to a product than the customer actually requires, such as painting areas that will never be seen or be exposed to corrosion. Take this as an example, in the automotive industry, they are parts in the car may not be visible. Spending time trimming material in areas of the part that will not be seen in the vehicle is a waste. By adding work that is non-value added, overprocessing costs you money with regards to the wear on your equipment, the materials and used the time of your staff. These costs can stack to a shocking amount over a period of time, they will also reduce a company