

LEAN MANUFACTURING TECHNIQUES IMPLEMENTATION AT
ZEST VENTURE SDN BHD

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ABSTRACT

Lean Manufacturing techniques has been widely implemented in industry. Lean manufacturing is a Japanese approach with a model and group of planned methods that is highlight eliminating non-value added activities (waste) while bringing quality products on time at least cost with greater effectiveness This research is about how to implement lean manufacturing techniques in the selected SME company which is Zest Venture Sdn Bhd with three objectives. The first objectives of this study is to propose relevant lean manufacturing techniques which could be applied in Zest Venture as to eliminate and reduce waste that existing in the production. The second objective is to identify and to eliminate non-value added in Zest Venture. Last but not least is to investigate and analyze production lead time and productivity in Zest Venture. The problem statement of this study is the attitude of the workers, lack of knowledge about lean manufacturing and time constraint in implementing lean manufacturing techniques in the company. In this study several methods were used which are trough observation, interview, survey, distribute questionnaire, time study and distance travel study. The techniques that are implemented in the company is 5S, Kaizen and Standard Operation Procedure (SOP). Results obtained from these studies demonstrate that the techniques of lean manufacturing can have a positive impact on the company since being able to reduce the wastage of time and space at the workplace by eliminating the non-value added activity in production line.

ABSTRAK

Teknik pembuatan *lean* telah dilaksanakan secara meluas dalam industri Pembuatan *lean* adalah satu pendekatan daripada Jepun dengan model dan kumpulan kaedah yang dirancang yang menyerlahkan dengan menghapuskan aktiviti bukan tambah-nilai (sisa) sambil membawa produk yang berkualiti dan dengan lebih berkesan sekurang-kurangnya pada kos. Penyelidikan ini adalah tentang bagaimana untuk melaksanakan teknik-teknik pembuatan *lean* terhadap syarikat kecil dan sederhana yang dipilih iaitu Zest Venture Sdn Bhd dengan tiga objektif. Objektif pertama kajian ini adalah untuk mencadangkan teknik pembuatan *lean* yang berkaitan yang boleh digunakan dalam usaha Zest Venture untuk menghapuskan dan mengurangkan sisa yang sedia ada dalam pengeluaran. Objektif kedua adalah untuk mengenal pasti dan menghapuskan aktiviti bukan nilai tambah dalam Zest Venture. Akhir sekali adalah untuk menyiasat dan menganalisis masa *lead* pengeluaran dan produktiviti di Zest Venture. Pernyataan masalah di dalam kajian ini adalah sikap pekerja, kekurangan pengetahuan tentang pembuatan *lean* dan kekangan masa dalam melaksanakan teknik-teknik pembuatan *lean* dalam syarikat tersebut. Dalam kajian ini, beberapa kaedah telah digunakan iaitu melalui pemerhatian, temubual, kajian, mengedat soal selidik, kajian masa dan kajian dalam jarak perjalanan. Teknik-teknik yang dilaksanakan didalam syarikat tersebut iaitu 5S, Kaizen dan *Standard Operation Procedure (SOP)*. Keputusan yang diperolehi daripada kajian ini menunjukkan bahawa teknik-teknik pembuatan *lean* boleh memberi kesan positif kepada syarikat itu kerana dapat mengurangkan pembaziran masa dan ruang di tempat kerja dengan menghapuskan aktiviti tiada nilai tambah dalam barisan pengeluaran

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LIST OF ABBREVIATIONS

LM	Lean Manufacturing
SME	Small and Medium Enterprise
TPS	Toyota Production System
PDCA	Plan, Do, Check and Act
SOP	Standard Operation Procedure
NSDC	National SME Development Council
ZVSB	Zest Venture Sdn Bhd

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Lean Manufacturing techniques have contributed to a spectacular improvement in efficiency, speed of response and flexibility in production at many industrial enterprises through elimination of waste and the extremely flexible implementation of these processes. Lean Manufacturing techniques also had contributed to an improvement in effectiveness for production in the industries either small or large company which can ensure that the success of the organizations. This chapter will address about the project background, project objectives, and project scope and problem statement of the project.

1.2 PROJECT BACKGROUND

This study is basically to find out the problems that occur in industries that are associated with waste that can bring or lead to a loss for the company. Therefore, any method that can be employed to reduce costs associated with it is of much interest in the production of the company. This article examines how the principles of lean manufacturing can be used and applies at SME Company which is Zest Venture Sdn Bhd to eliminate waste and reduce costs.

ZVSB is a small scale companies that make wedding cards, invitation & greeting cards, baby & kids' cards and others. This company has been established since 2008 and it has 18 full time employee. The production here needed a system such as lean manufacturing techniques implementation to improve the production performance.

1.3 PROBLEM STATEMENT

This research is focusing on implementation of lean manufacturing techniques in SME manufacturing company. The main problem that faced by the SMEs is unable to implement LM due to lack of knowledge in this system. This problem was also mentioned by (Nordin et al., 2010) in the journals, most of the problem faced by companies in implementing lean manufacturing is lack of knowledge about this system since lean manufacturing requires a new knowledge and cultural change during the transition. Besides that, poor attitude either workers or management also contributed problem in lean manufacturing implementations. Last but not least, time constraint also one of the contributed factors discovered. Therefore, the aim of this study is to assist the selected SME in developing a proper LM system in their company.

1.4 PROJECT OBJECTIVE

The objectives of this project are:

- (I) To propose relevant lean manufacturing techniques which could be applied in Zest venture as to eliminate and reduce the wastes that existing in the production.
- (II) To identify and eliminate non-value added activities in Zest Venture.
- (III) To investigate and analyze production lead time and productivity in Zest Venture.

1.5 PROJECT SCOPE

This project is carried out at Zest Venture Sdn Bhd. The study will be concentrated on production lead time and product arrangement. All unorganized stuff arrangement will be addressed and tackled systematically. This phenomenon will cause troublesome to the company such as long lead time, creates bottleneck and long travel distance. Therefore, this study has focused on three feasible lean manufacturing techniques, which are 5S, Kaizen and SOP. The study area will consume entirely of production area as shown in Figure 1.1(a) and Figure 1.1(b). It's including stores, printing and production area. At the end of the study, efficient layout and stuff arrangement could be introduced and implemented.

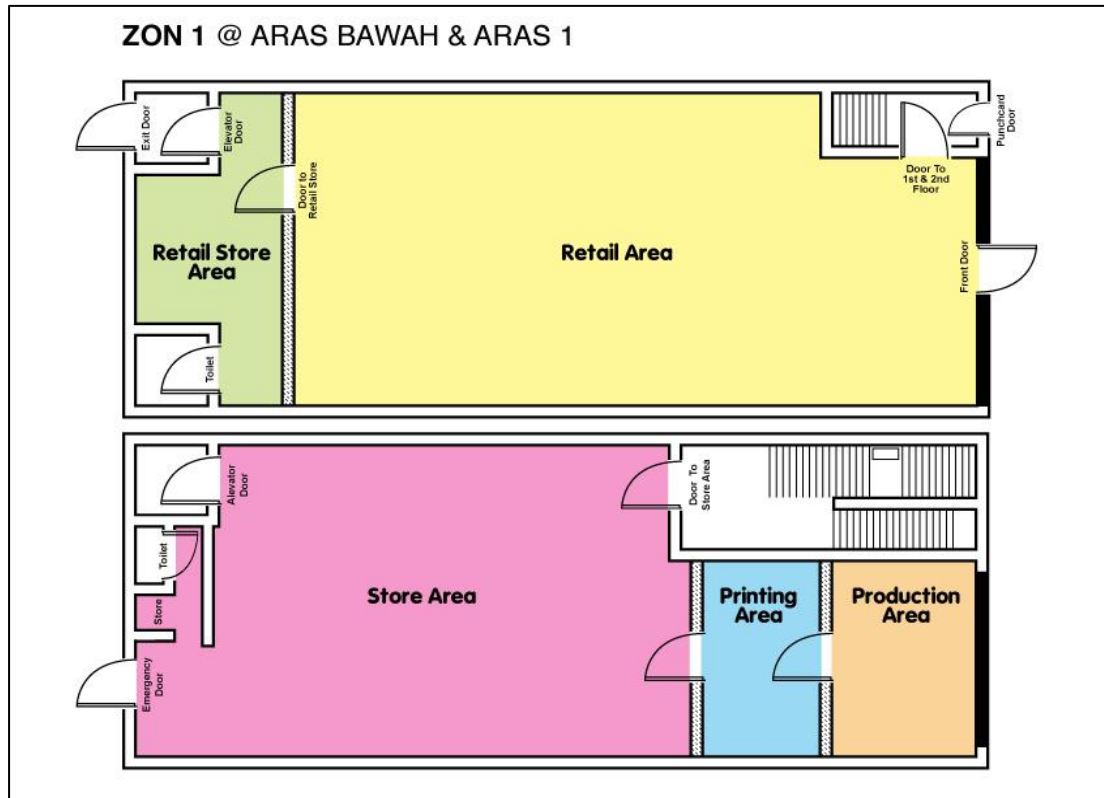


Figure 1.1 (a) : Layout at ground floor and 1st level

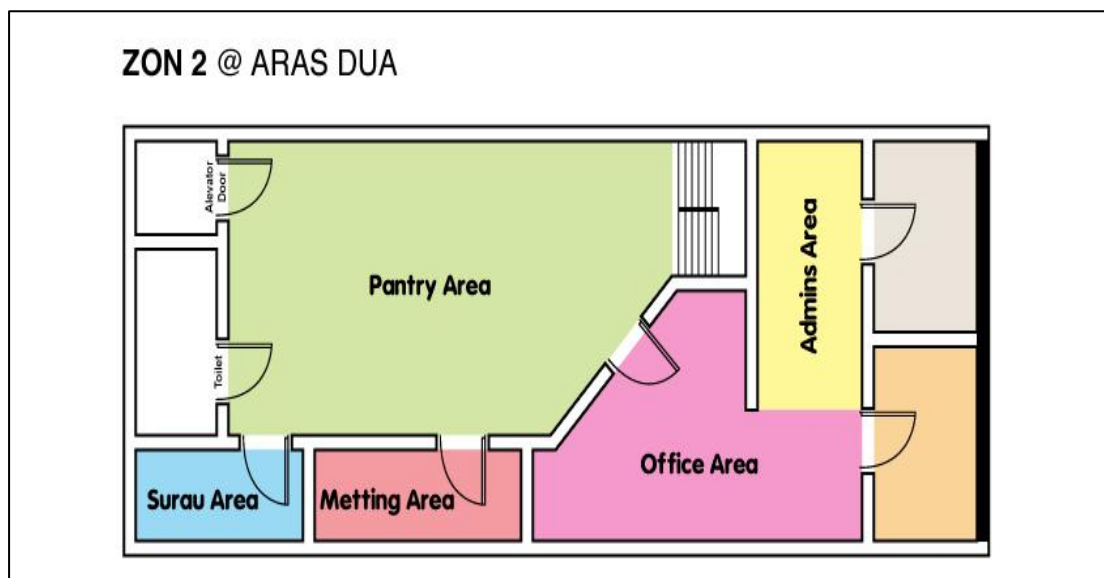


Figure 1.1 (b) : Layout at 2nd level

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter explains the review of lean manufacturing technique in SMEs. This chapter begins with a general review of processes by given a simple definition of what lean manufacturing is and their principal function. Reviews of some of the previous works that are similar and related to lean manufacturing different materials were discussed in this chapter.

2.2 LEAN MANUFACTURING

Lean Manufacturing (LM) is basically inspired by Toyota Production System (TPS) which the goal of LM is to minimize or eliminate waste such as waiting time, set up time, etc. The other focus of LM is to improving customer satisfaction. In a recent year, LM is widely used in many manufacturing sectors either in engineering or non-engineering fields. According to (Sahoo et al., 2008), TPS is now a well-established philosophy in the manufacturing world that really endeavors for integrating and shortening the timeline between the supplier and the customer by eliminating hidden waste. There are more than hundred lean practices available and being practiced by industries. The list of lean manufacturing that is recommended for SME conducted by previous researchers can be referred in the Figure 2.1.

Practices \ Researchers	1	2	3	4	5	6	7	8	9	10
Multifunction employee		*			*	*	*		*	*
Quality circle		*		*	*	*			*	*
Setup time reduction		*	*			*			*	
5S	*			*		*				
Kanban						*	*	*		
Continuous flow	*					*			*	
Preventive maintenance		*				*			*	
Small lot size	*					*			*	
TQC		*				*				
Kaizen (CI)		*	*							
Cell layout			*			*				
Standard operation	*	*								
Training			*				*			
Focused factory							*			
Supplier management			*							
Visual control		*								
Teamwork										

Figure 2.1 : Recommended practices for SME

Source : Adapted from Rose et al., 2011

2.3 BASIC LEAN MANUFACTURING TECHNIQUES

2.3.1 Kaizen

Kaizen is one of the basic lean manufacturing techniques used in the production all over the world. Kaizen is a Japanese word which gives the meaning of continuous improvement. Meanwhile, for a deeper explanation for the meaning Kaizen word is mentioned by Imai (Smadi, 2009) is defined Kaizen as “the process of continuous improvement in any arena of life, personal, social, home, or work.” In business, he defined it as “the process of gradual and incremental improvement in a pursuit of perfection of business activities.” The important aspect of Kaizen is the standardization and the maintenance of the improvement which are important to the process. The improvement must standardize until further improvement is made. The implementation of Kaizen has its own strategy. According to Imai (Smadi, 2009), there are five major principles that are needed to consider to implement Kaizen which as follows;

Processes and result

According to Imai, a process-oriented approach, referred to as the “plan-do-check-act” (PDCA) cycle is used for process improvement. The plan refers to setting a target for improvement; do is implementing the plan; check is the control for effective performance of the plan; and act refers to standardizing the new (improved) process and setting targets for a new improvement cycle. This cycle is described as “improving cycle.”

Putting quality first

Another principle of Kaizen is improving performance along three dimensions which is quality, cost and delivery (QCD). Quality is usually among the most important criteria customers use to make the purchase.

Hard data versus hunches and feeling

According to Montabon (Smadi, 2009), to solve a problem effectively and efficiently, relevant hard data must be gathered and made available for analysis but not just hunches and feelings. The model viewed this requirement as an imperative for continuous improvement.

The next process is the customer

Kaizen through this principle tried to establish a natural commitment to ongoing process improvement throughout the organization to ensure the customer will always receive high quality products.

Visual management

Abnormalities do occur in almost any workplace. Very often, they arise when a certain process is not fully under control, or totally out of control. In fact, if an abnormality in a process is not detected in real time, it will be difficult to handle later. Visual management is another principle of Kaizen that allows problems to be visible to everyone in the work process, so that a corrective action can be taken in real time, and that similar problems will not arise in the future.

2.3.2 Standard Operation Procedure (SOP)

From the journal wrote by (Stup, 2002), the standard operating procedures give meanings to remove variation in work performance caused by people completing the same work processes in different ways. A process is a set of actions that a person or group of people must follow work in order to complete a job. A standard operating procedure describes the steps that people should be used to complete the process. The purpose of SOP such as to ensure that all operators who carry out any process, whether in a team or across the multi shift operation is carried out in the same way and to train

new operators to carry out the process. Standardized work is based around a set of work sequence and operator movements that are repeatable.

2.3.3 5S

The concept of 5S is the most popular technique used in the production or industry. This concept is developed by Osada in the early 1980s and it is used to maintain and established all aspects of quality in an organization. The elements of 5S clearly stated by (Michalska and Szewieczek,. 2007) as shown in Figure 2.2.

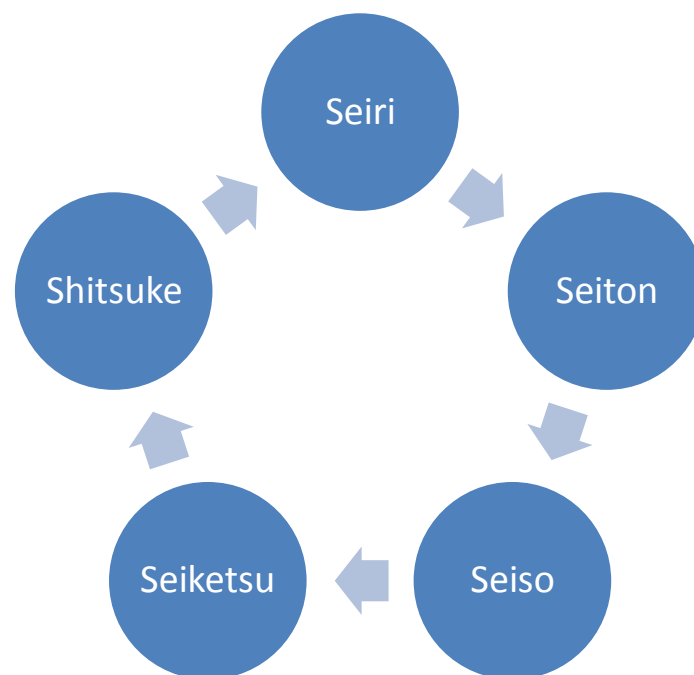


Figure 2.2: Diagram of 5s items

Seiri (proper arrangement)

The first point which is Seiri gives meaning of proper arrangement or sorting out. This method is identifying what the things that are needed or what the things that is not needed. The thing that is needed is kept while the things that are not needed can be eliminated.

Seiton (orderliness)

To determine the needed items easier, the location of the items must clearly determine. By doing this, time for finding the items can be saved. Therefore, for making it easy to everyone finds out the items, use and return the item by providing information as to where the items should be stored.

Seiso (cleanliness)

Seiso or shine is a process of cleaning the work area and any equipment or machinery in it. It indicates the need to keep the work area always clean. One of the examples is at the end of each shift, the work area is cleaned up and everything is restored to its place.

Seiketsu (standardizing)

This is a state beyond the first three S's, in which they are thoroughly maintained by sharing information so there is no searching for information.

Shitsuke (discipline)

Shitsuke is a process of sustaining discipline. Standards need to be maintained and the facility or work area must always be in safe and efficient condition every time.

The 5S procedure is a process of defining the normal to see abnormal. Strong 5S implementation can lead to improve behavior because the wrong thing or abnormal become clearly see. According to Bhasin, 2005 5S also defined as to reduce the untidiness and disorganization of any typical production and office environment.

2.4 TYPE OF WASTE

The main reason of implementing lean manufacturing is to eliminate or to reduce waste. Waste is any activity that does not add value to the product or service. The activity does not add value is meaning customer is not willing to pay more money for this activity. There are seven types of waste that are normally being considered in the lean manufacturing;

Overproduction - Overproduction is occurring when product is made earlier or faster than the actual date of request.

Waiting - Time is the main problem for this type of waste. This is because idle time will created while waiting for items that are not immediately available for example.

Transportation - Moving of work over short or long distance without adding value to the organization.

Inventory - Inventory is an accumulation of finished products or raw materials at any stages of the production process. Inventory waste also can affect the other production process and increases the lead time and response time.

Motion - Any movement either people or machines that do not add value to the product or service of the customer.

The defect - defect is any work that is done to contain errors or other deficiencies is waste. This will require the customer to call back repeatedly because their issue was not

correctly resolved initially is waste. Having to process the same item twice because the first processing batch did not produce the desired product is waste.

Inappropriate processing - Process and efforts that add no value to the product or service can lead to over processing waste.

2.5 SMALL MEDIUM ENTERPRISE (SME)

Small and medium enterprises (SME) play a vital role in the Malaysian economy and are considered as the backbone of industrial development in the country. The criteria that are highlight stated in the journals wrote by Abdullah, 2011 said that Small and Medium Enterprise Corporation Malaysia (SMECorp) give the characteristic of the standard definitions of SMEs in Malaysia, which is the number of employees or annual sales turnover.

2.5.1 Annual Sales Turnover and Number of Employees

Sales turnover is purely the revenue from selling a good or service. It excludes things like return on investment, interest earned and asset appreciation which are also included in the annual turnover. According to Radam, 2008 an SME in the manufacturing sector is defined as an enterprise with full-time employees not exceeding 150 employees or with an annual turnover not exceeding RM25 million. On the other hand, SMEs in the service and primary agricultural sector and ICT are enterprises with full-time employees not exceeding 50 or annual turnover not exceeding RM5 million. The SMEs in both sectors is further categorized into medium, small and micro enterprises, as shown in Table 2.1.

Table 2.1 :Definition of SMEs in Malaysia

Category	Micro Enterprise	Small Enterprise	Medium Enterprise
Manufacturing, Manufacturing - related services and agro based industries	Sales turnover of less than RM250.000, or fewer than 5 fulltime employees.	Sales turnover of less than RM250,000, or fewer than 5 fulltime employees.	Sales turnover between RM10million nd RM25 million, or between 51 and 50 ulltime employees.
Services, primary agriculture and information and communication technology (ICT)	Sales turnover of less than RM200.000, or fewer than 5 fulltime employees.	Sales turnover between RM200,000 and RM1 million, or between 5 and 19 full-time employees.	Sales turnover between RM1 million and RM5 million, or between 20 and 50 full-time employees.

Source: Adapted from website (<http://www.smecorp.gov.my>)

2.6 ADVANTAGES IMPLEMENTATION OF LEAN MAUFACTURING

By focusing the philosophy of LM which is 5S, Kaizen or others, we need to know the method on how it is can be implemented. Besides that, there are some barriers in implementing the process or technique. The barrier such as, difficulty in accepting change, carrying out planning and evaluation task were considered difficult, etc.

However, if the entire barrier can be addressed, the company will have a lot of advantages. Anthony and Kumar (Rose et al., 2011) said that, the increasing demand for high quality and highly capable business processes by large organization has left no choice for the SMEs to consider LM implementation. The small company has advantages such as they are more agile, much easier to get management support and commitments, as opposed to the large organizations. Past literature also showed that, most of the practitioners and researchers have highlighted LM could reduce inventories, lead times, improved knowledge management, rapid product development and robust

processes. Besides that, Lathin and Mitchell (Rose et al., 2011) said that, producers can expect a reduction of 90% in lead time, 90% in inventories, 90% in the cost of quality and 50% increase in labor productivity, as a result of implementing LM. In addition, according to Ferdousi and Ahmed (Rose et al., 2011) had highlighted in their research on LM that the productivity had improved from 10%~60%, product lead time was reduced 8%~50% and product quality was improved to 8%~80% after the implementation.

2.7 PREVIUOS STUDY ABOUT LEAN MANUFACTURING

From the previous study by researchers about the Lean Manufacturing, the further information and study can be done. As stated by Bhasin , 2005 in his research, the analysis intimates that the major difficulties companies encounter in attempting to apply lean are a lack of direction, a lack of planning and a lack of adequate project sequencing. Knowledge of particular tools and techniques is often not a problem. Evidently, a mixture of common ingredients is viewed indispensable for a successful implementation:

- (I) Simultaneously apply five or more of the technical tools;
- (II) View lean as a long term journey;
- (III) Install a continuous improvement viewpoint; and
- (IV) Make numerous cultural changes embracing empowerment and sponsor the lean principles throughout the value chain.

In other hand, Rahman et al., 2010 using data collected from 187 manufacturing companies in Thailand, this research examined the extent to which lean practices are adopted by manufacturing organizations and their impact on firms' operational performance.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter presents a detailed on how the study of this project is conducted. The flow chart, description about the data collections, method of analysis and it is provided in order to complete the project. The methodologies for this study are divided into 4 phases. Further explanation is described in the point data collection method below.

The flow chart as in Figure 3.1 describes the overall of research methodology. It consists of data collections, method analysis, improvements done, validation and finally the conclusion.