# LEAN START-UP:

# A CASE STUDY AT K TECHNOLOGIES

**By**

**YEAP CHUI YI**

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## ABSTRAK

Semua perniagaan akan melaksanakan usaha yang berterusan untuk terus bersaing dalam ekonomi yang berdaya saing. Dalam usaha untuk menangani keadaan ini, mereka cuba untuk melaksanakan teknik-teknik baru dan inovatif iaitu *LEAN* dalam organisasi mereka untuk meningkatkan keberkesanan dan kecekapan.

Dalam kajian ini, punca yang membawa kepada masalah yang timbul daripada pelaksanaan *LEAN* akan diserlahkan . Dari kajian teknikal , analisis punca, analisis *SWOT* dan analisis *TOWS*, kajian itu menemui cabaran yang dihadapi dalam pelaksanaan *LEAN* dan memberikan cadangan untuk penambahbaikan.

Kajian ini akan terus membantu organisasi untuk meningkatkan proses, menyelaraskan kepada kehendak pelanggan dan visi organisasi untuk meningkatkan produktiviti, kualiti dan daya saing.



***Kata Kunci: lean, pembuatan lean , perlaksanaan lean, isu lean***

## ABSTRACT

All businesses has put in continuous efforts in order to survive in this current competitive economy. In order to handle this situation, they are trying to implement new and innovative techniques namely LEAN in their organization to increase its effectiveness and efficiency.

The objectives of this study is to identify the problem arises from the implementation of LEAN, to recognize the root cause and also to recommend how to improve on the implementation of LEAN in K Technologies. The methodology used in this case study consists of data collection, data linkages, data analysis and interview questions. Root cause analysis, SWOT analysis and TOWS analysis will be used to discover the challenges faced in the implementation of LEAN and gives recommendation for improvement. Interviews session were conducted with the managerial and operational level employees to obtain a more comprehensive findings.

This study is very important for the organization as there is no formal review on its progress and this study is expected to highlight on the main issues faced after the implementation. On other hand, managerial level employees will be able to understand what is being perceived by the operational level employees and this will helps the top management to rectify the problem and provide a well-defined training for this group of employees.

This study will further assist the organizations to improve its process, align to the requirement of its customer and organization's vision to enhance productivity, quality and competitiveness.

***Keywords: lean, lean manufacturing, lean implementation, lean issue***

# CHAPTER 1: INTRODUCTION

## 1.0 INTRODUCTION

This chapter elaborate on the research outline of this case study. It will begins with the background of the study, research problem statement, case issues, research objectives, research questions, significance of study and lastly organization of chapters.

### 1.1 Background of Study

LEAN is no longer a strange word to anyone especially those that are directly or indirectly related to manufacturing/production. It is a philosophy that focus on creating value added to customers through a culture of continuous improvement and focus on elimination of waste.

Womack, Jones and Ross (1990) state that lean manufacturing is the systematic elimination of waste. Karlsson and Åhlström (1996) highlight that lean aims to increase productivity, reduce lead time and cost and improve. Liker and Wu (2000) elaborate lean as a philosophy of manufacturing that focuses on delivering the highest quality product on time and at the lowest cost. Hines, Holweg & Rich (2004) remark that lean

has undergone a significant evolution and development and has attracted more attention to be applied in the service sector. Dennis (2007) finds that the foundation of the lean system is stability and standardization. Wilson (2010) says that lean system strives to make one piece at a time; this is true one piece flow.

According to Womack and Jones (1996), there are five principles that form the basis for the concept of Lean manufacturing:

1) Specify value: The most efficient way to create a product is to have a complete understanding of what the end-user wants before production begins.
2) Identify steps: Once value has been identified, a process flow is mapped out to achieve the value.
3) Process flow: When the steps to achieve the value have been laid out, the actual process flow is ready to begin. Each step in the process should flow into the next step without hesitation.
4) Pull inventory: Only the exact number of parts is pulled from inventory and placed at the point of manufacture.
5) Strive for perfection: Improve the system continuously.

In short, the main objective of LEAN manufacturing is to produce an item based on customer specifications, in the fastest and most efficient way with the best possible price. (Campos, 2013).

## 1.2 Research Problem Statement

Before transforming lean production system into manufacturing excellence, K must know how to get things started in achieving lean. For instance, if a group of people were trapped in a completely dark room without any light penetration for an extended period of time and suddenly you were forced to be exposed to bright light, what would actually be the outcome? Without the right glasses on to minimize the discomfort, the spontaneous response is to quickly close your eyes, back to the comfort zone “blindness”.

The same theory applies when transforming batch production system to lean production system can provoke a similar response in a company. If the culture’s behaviors and mentalities (the glasses filtering their reality) are not adapt to lean thinking before lean tools are introduced, the relationship between the changes and the benefits will be doubtful.

As time goes by, when lean developments expose to negative issue in company’s processes and structure, the highest tendency of thoughts in everyone mind is return to working as they were familiar even if it is inefficient and unproductive. This is why so many companies across a

variety industries are struggling to sustain the implemented lean initiatives.

## 1.3 Research Gaps

During the research on the lean manufacturing, tools and techniques of lean manufacturing has been identified. During literature review research, several tools and techniques of lean manufacturing such as TQM, Kaizen, VSM, 5S's and may others were identified. It was also indicated that the procedure for implementation is equally an important issue. Past research has indicated that there are many obstacles that come while implementing LM. Many researchers found some barriers to LM. Teleghani Mohammad (2010) describes the various issues which can come while implementing the lean manufacturing technique in any industry through his research paper. While he has explained some of the barriers of lean manufacturing, he has not provided the inter relationship between them, nor he has suggested ideas to overcome these.

Following gap are identified from the structured review of literature:

Gap 1: Lean Manufacturing Practices in test and measurement industry is not fully explored.

Gap 2: Very little literature review available on Lean Manufacturing Practices in test and measurement industry.

## 1.4 Case Issues

In this case study, we would like to study how LEAN lead K Technologies in achieving their vision and become the most reliable supplier to the customer and to sustain it in future.

In order to achieve K's strategic objectives, investment was pour in for capacity expansion that enable them in the growing demand of electronic measurement devices. Hence, new highly innovative methodology and technologies of manufacturing processes required to improve their competitiveness.

With over 75 years of knowledge in this field, they have been receiving positive feedback as well as negative feedback from their existing and new customers. Hence, it is important that products produced in K are meeting the quality required and on-time delivery at competitive prices. In conjunction to that, lean production concept will be one of the best way to achieve the vision.

From a brief interview with key person involved in implementing Lean principles in K Technologies is conducted by the Operational Excellence and in K's point of view, LEAN is defined as delivery of superior value to their customers, shareholders, end employees through continual elimination of waste. K Technologies applies the LEAN principles in the strategic initiatives namely to identify the voice of the

customer, identify end to end improvement opportunities, improve flow and reduce variation, link support processes and standardize continuously improve. K Technologies also implement the seven waste in one of the LEAN principles. The identified wastes are transportation, inventory, motion, waiting, over processing, over production and defects.

There are three key dimensions that are identified as the factors that affect the implementation in this case – Cultural Transition Issues, Employee Development and Technology Challenges. Firstly, implementing lean requires only small number of employees which need to take up a wider range of responsibilities. This will lead to changing the norm of the employee by assigning unfamiliar work processes. Secondly, talent gap will be created when implementing lean principles in one organization. LEAN requires more educated and trained employees compared to conducting the production in a conventional way. This will refrain the current employees from develop as organization tends to hire qualified employees to fill up the gap. Lastly, technological challenges will be one of the key issue in LEAN manufacturing because in order to achieve continuous improvement, significant upfront investment is important in ensuring statistical analysis can be obtained for monitoring quality improvement purposes.

If K is able to overcome the three key dimensions and reinforce its ability then they will have a higher chance to successfully transform into a more customer focused, waste eliminating manufacturer and sustain

a business model of continuous improvement. Successfully sustaining the LEAN manufacturing processes required true commitment from all key personnel.

## 1.5 Research Objectives

The objective of this research as below:

1. To identify the problem arises from the implementation of LEAN in K Technologies.
2. To recognize the root cause that lead to the problems arises resulted from the implementation of LEAN in K Technologies.
3. To recommend how to improve the implementation of LEAN in K Technologies.

## 1.6 Research Questions

To achieve the objectives above, various research question could be generated in order to obtain more extensive and reliable information especially from the related personnel that are directly and indirectly related in utilizing the lean principles. This research will address the following questions:

1. What are the problem arises from the implementation of LEAN in K organization?

2. What are the root cause that lead to the problems arises resulted from the implementation of LEAN in K organization?

3. How to improve the implementation of LEAN in K organization?

## 1.7 Significance of the Study

This study will be beneficial to the company in term of how the stakeholder perceived on the implementation of LEAN in the organization.

The study contributes to the company by identifying the root cause that lead to the problem arises from the implementation of LEAN. By reducing or eliminate the factor that lead to inefficiency of LEAN implementation will help to smoothen the implementation progress.

## 1.8 Organizations of the Chapters

This study is organized into seven chapters. Chapter 1 present on the introduction of this case study. Chapter 2 elaborates on the industry profile. Chapter 3 contains literature review. Chapter 4 discusses on the research methodology for this case where Chapter 5 presents on the case

write up. Chapter 6 discusses on the case analysis and finally Chapter 7 presents on recommendation, limitation, contribution and conclusion.

# CHAPTER 2: INDUSTRY PROFILE

## 2.0 Introduction

In this chapter, test and measurement industry will be discussed and reviewed in order to have a thorough overview on the industry nature.

## 2.1 Test and Measurement Industry

The test and instrument industry is a dynamic and fast-growing segment of the global economy. They serve as a diverse group of end market and provide critical products and services that helps their customers in improving their quality, safety, productivity and compliance to the international standard.

Companies in this industry produces equipment used to test electrical properties and signals. They deal with the manufacture, research and development of advanced test and measurement tools required in most industries. Major companies in the rest and measurement industries are Agilent, Danaher, and Teradyne (all based in the US), along with Anritsu

(Japan), Rohde & Schwarz (Germany), Spirent Communications (UK), and Yokogawa Electric (Japan).

Test and measurement devices are essential tools for developing new technologies. These tools derived from some simple measurement devices such as ruler to more advances tools like oscilloscopes, millimeter, analyzer and spectrometers. Wireless Internet, desktop computers, aircraft and other electrical infrastructure may not exist without electronic test and measurement tools as the supporting equipment in product's construction. Demand is driven by growth in primary end-use markets, including electronics and semiconductor manufacturing, telecommunications, aerospace and defense. The profitability of individual companies depends on controlling manufacturing costs and maintaining continuous, rapid product innovation. Large companies enjoy economies of scale in sourcing components and product distribution. Small companies can compete by specializing in equipment for niche markets or developing a reputation for high-quality products. The US industry is concentrated: the largest 50 companies account for about 75 percent of revenue.

Based on the test and measurement review by KPMG in year 2013, the growth prospects or this industry are driven by numerous factors. They are being identified as increasing products complexity, shortening product life cycles, increasing healthcare expenditures, tighter regulations and

lastly growing demands for accountability, quality and traceability. The first driver, increasing product complexity which emphasizes on progressively innovated new products are becoming more complex and customized. The continuous need for improvement and efficiencies in materials, costs and capabilities is encouraging manufacturers to further utilize test and measurement companies to test products and processes for compliance with quality, performance and regulatory standards.

Secondly, shorten product life cycles and reduces production time are necessary in ensuring faster and more accurate product development support. Test and measurement companies accompanied with their expertise in test design and ability to leverage investments in technology, are increasing their focus on efficiency and specialized capabilities in order to keep up with competition and enhance their standing with customers.

Thirdly, more companies are increasingly turning to the test and measurement industry to certify new products and help remain in compliance with tougher, continually evolving laws ad requirement. Regulations have been introduced, effected, altered, amended, withdrawn and reissued multiple times in the past ten years. This often requires significant and ongoing testing and certification services.

Lastly, growing demands for accountability and quality where customers are increasingly aware of the product quality issues and manufacturers has to be prepared to deal with customers concern effectively. Test and measurement companies help manufacturers to understand the complexities and deal with the potential problems before, during or after they arise.

The test and measurement industry includes both products and services. Major products include instruments such as frequency counters, logic analyzers, millimeters, oscilloscopes, voltmeters, and waveform synthesizers. Other products include instruments designed for a specific application, such as communications testing equipment and instruments to test semiconductors. These instruments are used to test electrical equipment and to measure electrical properties.

The collective value of all products and services is estimated at $130 billion globally. KPMG had projected an annual growth rate of 5 percent to 9 percent for the industry subsectors. KPMG has estimated global market of $55 billion for test and measurement instruments and a growth rate of 5 percent to 7 percent has been projected long-term.

Globalization has continue to encourage mergers and acquisitions in this industry. Acquirers are seeking to expand their current market to gain local capabilities and expertise in order to meet the fast changing

customer's demand. In order to meet this demand, larger companies will seek the opportunity to acquire smaller and specialized competitors in order to strengthen and diversify their current offering and also to leverage their resources. This strategy will provide ample opportunities for the sellers to achieve liquidity.

## 2.2 K Technologies in Test and Measurement Industry

K Technologies is one of the company that combine through mergers and acquisitions to be more focus on the test and measurement industry. At the same time, K Technologies had acquired AT organization in order to venture into the wireless space. K Technologies involved in several industry however this study will focus on test and measurement industry. K Technologies provides electronic measurement solutions to the communications and electronics industries in the United States and internationally. It operates through two segments: Measurement Solutions, and Customer Support and Services.

The Measurement Solutions segment sells radio frequency and microwave test instruments and related software, and electronic design automation software tools for use in wireless, and aerospace and defense applications; digital test products, including oscilloscopes, logic and serial protocol analyzers, logic signal sources, arbitrary waveform generators, and bit error rate testers that are used by research and development

engineers; and voltmeters, multimeters, frequency counters, bench and system power supplies, function generators, and waveform synthesizers, as well as related software that are used by engineers in research and development laboratories. This segment also offers semiconductor and board test solutions, such as parametric test instruments and systems, in-circuit test systems, and laser interferometer measurement systems; surveillance systems and subsystems comprising probes for detecting signals and software, which are used by defense and government engineers and technicians; fiber optic test products, including optical modulation analyzers, component analyzers, optical power meters, and laser source products; and atomic force and scanning electron microscopes.

The Customer Support and Services segment provides repair and calibration services for its customers' installed base of instruments; facilitates the resale of refurbished used equipment; and offers parts and self-maintenance tools. The company sells its products through direct sales force, distributors, resellers, and manufacturer's representatives.

Overall, test and measurement industry is positioned as a stable and consistent future growth due to strong fundamental. Both strategic and financial acquirers expect industry consolidation to continue as an attractive market to invest in.

# CHAPTER 3: LITERATURE REVIEW

## 3.0 Introduction

In this chapter, literature review on lean manufacturing/production, cultural issues, employee development, technology challenges incorrect implementation and application of lean will be discussed.

## 3.1 Lean Manufacturing/Production

Lean principles help to examine business processes and focus on minimizing unnecessary costs, reducing waste and improving inefficient procedures. The benefits of implementing lean are able to identifies problem areas and bottlenecks, increase business efficiencies, cost saving and simplify processes.

The first ever lean processes has been originated by Henry Ford followed by Kiichiro Toyoda and Taiichi Ohno in the 1930s for developing the Toyota Production System. The lean concept originated by Toyota helps companied achieve more with less human effort, time and cost. (Womack et al, 1994). It was then popularized by Jim Womack the

author of Lean Thinking, The Machine that Changed the World and Lean Solutions (Womack et al, 1990) was earlier solely implemented on the manufacturing shop floor usually referred to as “lean manufacturing” or “lean production”. In another study conducted by Womack and Jones (1994), Lean production can be defined as an alternative integrated production model because it combines distinctive tools, methods and strategies in product development, supply management and operations management into a coherent whole. According to Womack and Jones (2003) research, lean principles can be applied in any industry. The lean approach consists of various practices which aim to improve efficiency, quality and responsiveness to customers.

According to Shah and Ward (2007) and Ugochukwu et al., 2012 lean is a management philosophy that enhance customer value through waste elimination and continuous improvement in a system, by applying lean principles, practices and techniques. Achieving lean production is a long and practically constant process which the participants must continuously manage and undergo changes. (Karlsson and Ahlström, 1996).

Dankbaar (1997) stated that lean production makes optimal use of the skills of the workforce, by giving workers more than one task by integrating direct and indirect work and by encouraging continuous improvement activities. As a result, lean production is able to manufacture

a larger variety of products, at lower cost and higher quality, with less of every input, compared to traditional mass production: less human effort, less space, less investment and less development time.

Singh (1998) stated that Lean manufacturing is a philosophy, based on the Toyota Production System, and other Japanese management practices that strive to shorten the time line between the customer order and the shipment of the final products, by consistently eliminating waste. Lean manufacturing extends the scope of the Toyota production philosophy by providing an enterprise-wide term that draws together the five elements – product development process, supplier management process, customer management process and policy focusing process.

Alves et al. (2012) stated that lean production is evidenced as a model where the persons assume a role of thinkers and their involvement promotes the continuous improvement and gives companies the agility they need to face the market demands and environment changes of today and tomorrow. Hallgren and Olhager (2009) described lean manufacturing as a program that aimed at increasing the efficiency of operations. Holweg (2007) mentioned that lean manufacturing extends the scope of the Toyota production philosophy by providing an enterprise wide term that draws together the five elements – product development process, supplier management process, customer management process, and policy focusing process.

## 3.2 Cultural Issues

According to research done by Bhasin (2012), every Lean failure is the fundamental issue of corporate culture and change management. The supporting cultural considerations need to be in place to support the appropriate environment ensuring Lean is successful. In other research performed by Kull, Yan, Liu, & Wacker, (2014), lean manufacturing has cultural vulnerabilities that manifest in the observed lean manufacturing practices being less effective. Popular discussion of culture and lean manufacturing focus too much on operators, missing the fact that national culture has facility-wide effects on the shared system of assumption, values and beliefs. (Schein, 2004).

Some managers and employees presumed that the factor behind Toyota success was about the cultural roots, but not lean practices. Despite criticism raised by other organizational management, Toyota as a successful leading organization in lean application has demonstrated high performance with its production system established in all multinational manufacturing sites (Wafa and Yasin, 1998). Many employees reported a culture shock when their organization started to implement lean principles, processes and practices (Czabke, Hansen and Doolen 2008).

## 3.3 Employee Development

Awareness regarding the importance of managing employees during the lean conversion is not new, as the following sentence from 1991 reveals: "*We know very little about the causes of implementation problems, but the evidence seems to suggest that human resource issues often are their root*" ( Huber and Brown, 1991). Even fewer studies consider workers' feelings and perceptions (Brown and Mitchell, 1992 and Shafer et al., 1995), and none of them considers employees' feeling of success, which we think are crucial to successful lean implementation. Employees are usually concerned with their own tasks and "direct" work environment, perception regarding the success or failure of lean manufacturing from employees' point of view can be derived largely via employees' own experience.(Losonci, Demeter, & Jenei, 2011). The source of activation of hidden resources is the creativity and innovative capability of employees (Mertins and Joechem 2001)

Iverson (1996) studies employee acceptance of organizational change and suggests that commitment should be considered as a main determinant, and a mediator of factors in the process. Shadur et al. (1995) study predictors of an employee approval of lean production and find that commitment to the company is one important element. Total quality management (TQM) programs also show that "*the commitment of employees to the goals of the organization is a critical component of any total quality programme*" (Jackson, 2004)

## 3.4 Technology Challenges

It is now common for manufacturing firms to adopt both manufacturing technologies and lean practices and therefore, it is important to understand the synergistic effects of manufacturing technologies and lean practices on improving operational performance. (Challis et al., 2002). Technology implementation not only requires learning new software applications, but also requires learning how to reinvent workflow, how to train employee and assign responsibilities, and the way of modelling construction. (Arayici et al., 2011).

## 3.5 Incorrect Implementation and Application of Lean

According to Marvel and Strandridge (2009), applying lean strategies incorrectly will increase the inefficiencies of an organization's resources and reduced employee confidence in lean strategies there by applying the appropriate lean in a particular process or procedure is very important. Incorrect application of lean concept leads to waste of the organizational resources and reduction in employees' confidence in practicing lean In addition, Marvel and Strandridge also argues that a few organization gain significant improvement after implementation however due to the implementation remain localized, those organization unable to sustain the continuous improvement. It is suggested that scope and content of lean manufacturing should be holistically verified prior to any lean implementation (Crute, Ward, Brown, & Graves, 2003). Complications of

lean implementation are believed to be driven by executive, cultural, managerial, implementation and technical barriers (Flinchbaugh, 1998).

Bhasin and Burcher (2006) study show that the implementation of lean is still facing problems and presented the underlying reasons surrounding low rates of successful lean initiatives.

According to Womack and Jones (1996), most the literature focused on the implementation of lean technique or principles in an organization however the effectiveness and sustainability of these lean has been highly variable (Motely, 2004). The critical issue identified from these review has been categorized as pre-implementation, implementation and post implementation.

### 3.5.1 Pre-implementation Issues

Implementation plan is very important in order to determine the success of lean adoption in an organization. Before implementing lean, an awareness program has to be created for all employees. The objectives of lean should be make clear to all employee especially operational level employees. It is not easy to identify lean drivers and barriers for an organization therefore top management have to commit to ensure reducing barriers and leveraging driver. Develop a full plan of implementation and post-implementation task. Some of these prerequisites cannot be taught

or forced, but should be developed and nurtured through proper training (Anand & Kodali, 2010a).

### 3.5.2 Implementation Issues

The implementation phase focus on identification and elimination of waste through proper lean tools and principle application. This has been agreed by Worley (2004) where they mentioned about lean manufacturing is defined as a systematic removal of waste by all members of the organization from all area of the value stream. Lean is a practice with objectives to generate a system that is efficient and well organized and devoted to continuous improvement and the elimination of all forms of waste. Lean means “manufacturing without waste.” The lean approach is focused on systematically reducing waste in the value stream.

### 3.5.3 Post-implementation Issues

Observation obtained showing that many of the companies reported initial gain from lean implementation often found that improvement remain localized and the company unable to retain continuous improvement. (Mohanty et al., 2007). The post-implementation phase complete the lean implementation process however due to lack of pre-implementation planning it will eventually impact the overall progress. This phase is mainly to observe the outcomes and analyzing the entire process as after implementing lean, the organization needs to be patient in order to observe positive outcome.

# CHAPTER 4: RESEARCH METHODOLOGY

## 4.0 Introduction

This chapter discusses on the methodology used in this case study. They consists of type of research, data collection, data linkages, data analysis and interview questions.

## 4.1 Type of Research

This project will be conducted using case study method. K Technologies is chosen to be the subject in this research. Research is going to be conducted on the issues arises before implementation, during implementation and the current situation after implementation of lean principles in K Technologies. The actual issues and the factors that lead to the issue will be identified. In addition, this case study will be able to come out with a few recommendation in solving the issue arises to improve the progress of implementation of lean principles.

## 4.2 Data Collection

This case study will be conducted using 2 different methods, which are interviews and document review. 8 sessions of interviews will be conducted to employees from different departments and positions. The list interviewees consist of senior technical manager, senior managers, production managers, project managers, engineers, technicians and other key personnel that are directly involved in this implementation. A few operational employees from various section that are involve in this implementation will be randomly chose to obtain more data. Interviews questions directed for the higher level namely managers level and above intend to understand the preparation before the implementation, resources needed before and during the implementation and the current issue faced in the implementation process. On the other hand, interviews conducted at the operational level may be chosen among supervisors, leaders, technician and operators to obtain more information on the end user point of view. From this approach, the key factors in influencing the progress of implementation will be discovered from end user. The transcription of the interview will be sent to the head of production for validity screening. In the end of this interview sessions, solutions and recommendations will be generated from the data collected.

The next method of data collection is to review documents and observation of visual evidence of the implementation of lean in production

line. Document required for the reviews include organizational chart of this project, project development chart, agenda of meeting for the project, attendance list of the key personnel involve in this project, background or history of top projects, project team's feedback and other documented resourced involved in this project.

## 4.3 Data Linkages

| Research Question | Data Source and Method | Justifications |
|---|---|---|
| What preparation has been done before the implementation of lean in K? | Interview Head of Production, Technical manager, Senior managers and Project manager<br><br>Document Review | Head of Production, Technical Manager and Project Manager are the key person in implementing lean and will set the goal in meeting the Board's expectation.<br>Organization chart, Project team member list and action plans. |
| What is the problem faced during the implementation of lean in K? | Interview Project manager, Production managers, engineers and planners.<br><br>Document Review | Project manager and production manager will get the first hand information on the progress and the result of implementation. Engineers and planners may feedback on the problem faced during the implementation as they are involve directly in the primary stage of the production.<br>Project reports, project review agenda and minutes of meeting. |
| What is the current issue faced by K production in influencing the implementation of lean? | Interview Project manager, Production managers, engineers, planners and operational employees. | Project manager, production manager, engineers and planners will have their own perception on the factors that restraining production in implementing lean. Operational employees will be able to provide technical input and actual problem faced in the production. |

Table 4.1: Data linkages of research question, data source, method and justification.

## 4.4 Data Analysis

Data collected from all sources namely primary and secondary data will be the main input for this research write up. The data used for this research is collected through interview sessions, document review and observations. Interviews recording will be transcribed into word processing documents and the root cause or the case issues. Document reviews will be summarized and only related facts and figures will be extracted for the analyzing processes. Data will then be visualized in order to have a clearer picture on the whole situation. From the visualization, similarities and differences can be easily detected and this will streamline the research area and the main root cause or case issues can be identified.

Three methods will be used in analyzing the collected data namely Root Cause Analysis (RCA), Strength, Weaknesses, Opportunities and Threats (SWOT) Analysis and TOWS Analysis.

### 4.4.1 Root Cause Analysis (RCA)

Root Cause Analysis (RCA) will be used to trace a problem to its origin. This tools help in identifying the origin of the problems by determining what happened, why it happened and to figure out how to prevent or reduce the tendency of the problems from happening. In this research, identifying the root cause in

implementing the lean in K Technologies, problem can be fixed from the underlying systems and processes that is causing the problem and solution will be generated.

### 4.4.2 SWOT Analysis

SWOT Analysis will be used to identify the strength, weaknesses, opportunities and threats in an organization. To conduct a thorough investigation for this research, SWOT analysis will be used to identify the strength, weaknesses, opportunities and threats in implementing lean in K.

- Strengths: The advantages/positive feedback of implementing lean in production
- Weaknesses: The disadvantages/negative feedback of implementing lean in production
- Opportunities: The foreseen positive effect from implementing lean in production.
- Threats: The factors that may cause problem in implementing lean in production.

### 4.4.3 TOWS Analysis

TOWS analysis involve identifying the same element with SWOT analysis. However, in TOWS analysis, threats and opportunities are being identified first and weaknesses and strengths are being identified last. After identifying the threats and opportunities, project manager can take this advantages of the opportunities to minimize the threats arouses from implementing lean by using the strength to overcome the weaknesses identified earlier.

## 4.5 Interview Questions

Interview sessions will be conducted using semi-structured questions formulated from the case issues, research objective and research questions highlighted in Chapter 1. This interview will be conducted for two level namely management level and operational level. Thus two sets of interview questions will be developed in order to fit the respondents' level.

### 4.5.1 Interview questions for Management Level

This session will be conducted with managerial level personnel. They were selected based on their involvement on the LEAN project in order to obtain a more accurate outcome. LEAN champion and managers that are directly involved in LEAN will be this case study target.

Part A: Decision in LEAN Implementation

1) Who is the key person in deciding on the implementation of LEAN in K Technologies?

2) Why LEAN is so important for K Technologies?

3) How will LEAN benefits K Technologies?

4) Is implementation of LEAN one of the preparation for K Technologies on-going expansion project?

5) When is the kick-off date of LEAN implementation in K Technologies?

Part B: Before LEAN Implementation

1) What preparation has been done before the implementation of lean in K Technologies?

2) What is the main consideration when choosing the Project Manager and the team members?

3) What resources has been allocated in this stage?

4) What is the most difficult problem faced in this stage?

5) What is the unforeseen problems happened before the implementation?

Part C: During Implementation

1) What is the problem faced during the implementation of lean in K Technologies?

2) What resources has been allocated in this stage Technologies?

3) What is the most difficult problem faced in this stage?

4) What is the unforeseen problems happened during implementation?

5) What issue has been identified in this stage?

6) What is the corrective and preventive action taken during this stage?

Part D: Current Status after Implementation

1) What is the current issue faced by K Technologies in influencing the implementation of lean?

2) What resources has been allocated in this stage?

3) What is the most difficult problem faced in this stage?

4) What is the unforeseen problems happened after implementation?

5) Has the issues from the previous stage being resolved?

6) What issue has been identified in this stage?

7) What is the corrective and preventive action taken during this stage?

### 4.5.2 Interview questions for Operational Level

This session will be conducted with operational level employees' ranges from supervisors, technicians, clerks and operators, therefore a more simple and direct questions will be developed to avoid any hiatus during interviewing.

Part A: LEAN in General

1) What do you know about LEAN?

2) Did your leader brief you beforehand on the implementation of LEAN?

3) Did you know about the main purpose of implementation of LEAN?

Part B: During Implementation

1) Do you know LEAN better during the implementation?

2) Which of the LEAN's principle is implemented in your production?

3) Is the implementation of LEAN make your work flow easier?

4) What are the issues/problems faced in stage?

5) Has any corrective/preventive action taken by the management level to resolve the issues/problems?

Part C: Current Status after Implementation

1) Is the work flow become more organize in this stage?

2) Has the issues/problems from previous stage been resolved?

3) What are the issues/problems faced in stage?

4) How do you find LEAN benefits to your production line?

# CHAPTER 5: CASE WRITE UP

## 5.0 Introduction

In this chapter, overview of the company profile will be discussed and identification on the case issues and challenges will be revealed in this chapter.

## 5.1 K Technologies

K Technologies is a brand new company with over 75 years of electronic test and measurement success under their belts. It is founded by Bill Hewlett and Dave Packard as H organization, their expertise continues as an Electronic Measurement Group. Currently, K focused on helping companies to tackle the toughest electronic design, test and measurement issues through trusted hardware, innovative software and equipped with their global network of industry experts.

As of fiscal year 2014, K has been earning $2.9 billion of revenue where 64% of them were from outside of US. K has a total of 9600 employees worldwide. The President and CEO Ron Nersesian is based at the global headquarters at Santa Rosa, California. K's customer are

located in more than 100 countries where the manufacturing and R&D is based at US, Europe and Asia Pacific.

K is the industry leader for electronic measurement in communications, industrial, computer, semiconductor and aerospace/defense. In communication, K aim is to help companies win in the first to market race where K offers from the speed of innovation to the cost of test. Industrial, computers and semiconductors content are everywhere thus this is one of the biggest market that K are looking into. K help customers across design, verification and manufacturing to installation and maintenance. As for aerospace defense, K helps customer to reduce risk by updating the radar, satellite and communication systems.

## 5.2 K Technologies Timeline

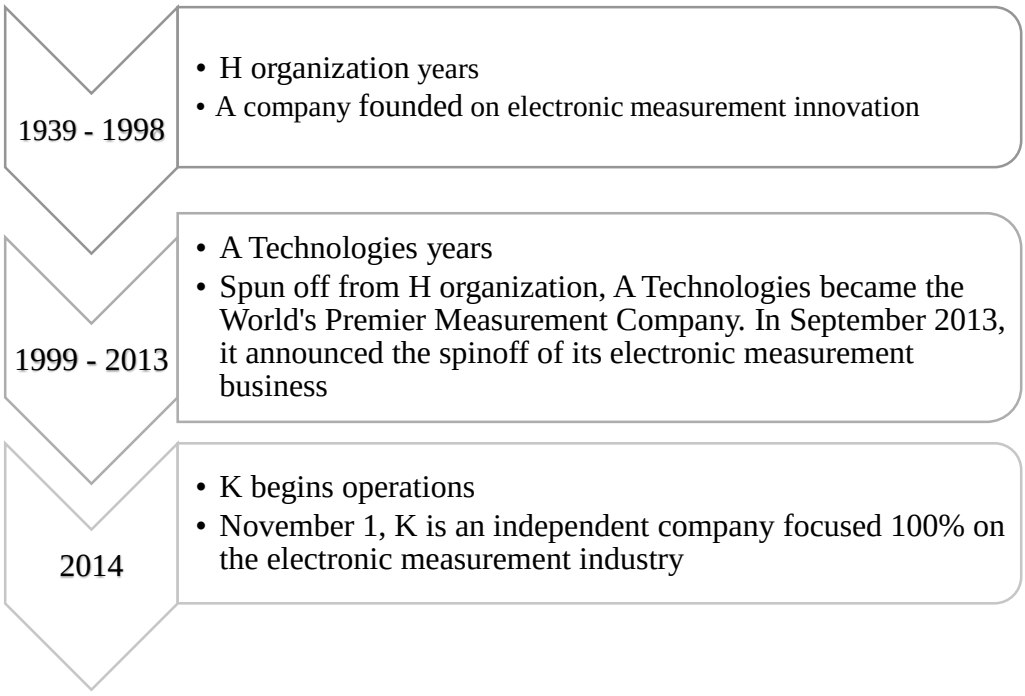


Figure 5.1: K Technologies Timeline

## 5.3 K Technologies Value

### 5.3.1 Sales and Support

K products are sold primarily through direct sales, additionally utilizing distributors, resellers, manufacturer's representatives, telesales and electronic commerce. We have over 40 service locations and mobile teams worldwide, all using one consistent service network.

### 5.3.2 Quality

K create customer satisfaction and earn customer loyalty by providing products and services of the highest quality and greatest value. Through the company-wide focus on quality, K integrate quality management principles and methodologies into critical business and decision-making practices. Their customer loyalty leads the industry.

### 5.3.3 Corporate Citizenship/Environmental Practices

K conduct business in an ethical, socially responsible and environmentally sustainable manner. Their Environment and Sustainability Policy is to act in an environmentally responsible manner in regard to their operations, products and services. K design, manufacture and distribute products that conform to all applicable environmental, health and safety standards. They give back to the communities where their employees live and work through philanthropy and volunteerism.

## 5.4 K Technologies Strategy

K Technologies strategy is to migrate from hardware-centric products company to software-centric solutions company. As for fiscal year 2015 strategic initiatives, K aims to be the first in 5G wireless,

accelerate pursuit of modular solutions and to transform into the leading software provider.

## 5.5 K Technologies Organization Structure

K Technologies organization structure compromises of 8 main areas. They are Measurement Solution and Worldwide Sales, Customer Support Service and Marketing, Technology, Order Fulfillment and Infrastructure, Finance, General Counsel, Human Resources and Corporate Services.

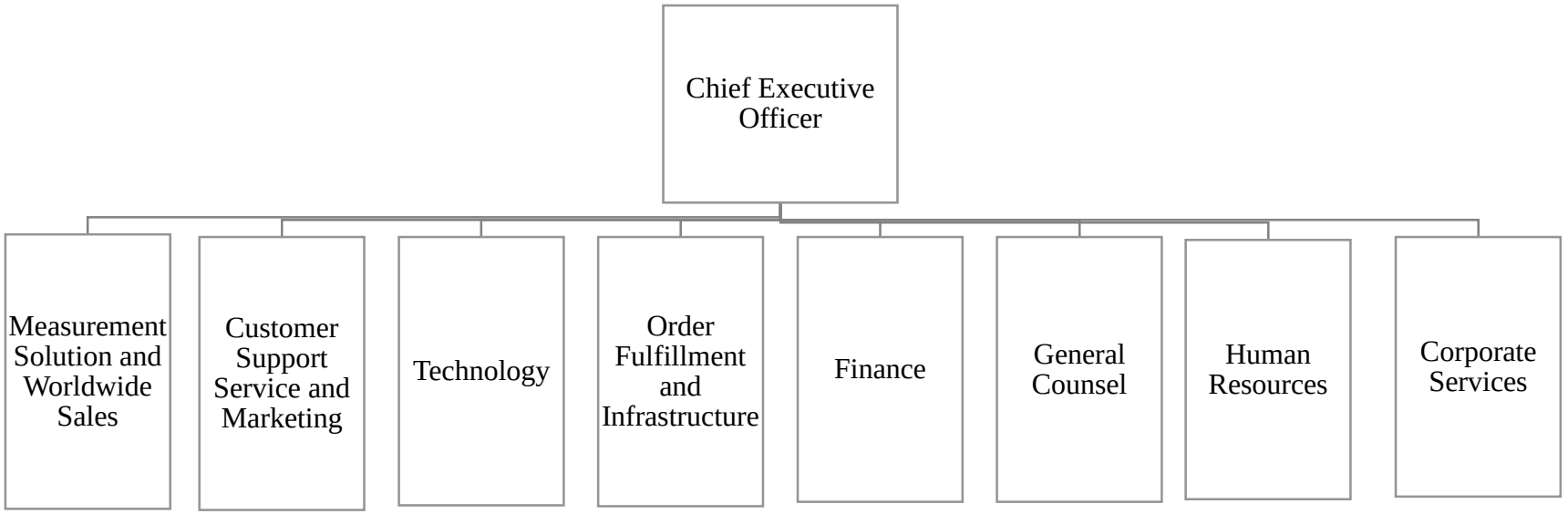


Figure 5.2: Organization Structure of K Technologies

### 5.5.1 Measurement Solution and Worldwide Sales

This department core job is to manage the hardware and software division across the region. Besides that they are also responsible on the worldwide sales channel and central field operations.

### 5.5.2 Customer Support Service and Marketing

This department is focusing on the worldwide customer support and services. Besides marketing, remarketing solutions is also part of their role and responsibilities. Lastly, this department played an important role in corporate marketing.

### 5.5.3 Technology

The roles and responsivities of this department are strategic planning process, R&D resource allocation and technology leadership organization.

### 5.5.4 Order Fulfillment and Infrastructure

This department main roles and responsibilities are on order fulfillment, IT workplace solutions and also global sourcing. This department played an important roles in ensuring customer's order are being produced and delivered on time. They are the key player for the whole organization as they also in charge of the quality and customer experience.

### 5.5.5 Finance

This department is responsible to manage the finance, treasury, tax, internal audit, corporate development and investor relations.

### 5.5.6 General Counsel

This department is responsible on the governance, compliance, litigation, business support and customer contracts.

### 5.5.7 Human Resources

This department is responsible to manage on the compensation and benefits, country compliance, staffing, business HR and also learning and development.

### 5.5.8 Corporate Services

This department is responsible on the quality, government affairs, communication and branding.

## 5.6 LEAN at K Technologies – Penang.

LEAN was officially kick start in November 2014. Before the official launch, workshops were organized in the month of Aug 2014 for management level. Value stream mapping for the manufacturing and service workshop were held for the production and service providers in the organization.

On 12 November 2014, a forum regarding value creation through Lean way of life were held. One of the on-going project Daily Kaizen's One Lean Idea was introduced on 12 January 2015 and on 16 January 2015, all employees were required to participate in the self-paced online

"Lean Awareness Training" where they were encouraged to view the online video from the employee portal and perform the online testing to ensure that all employees on K Technologies were aware on LEAN.

Besides creating awareness among the employees, there were a program where people managers will need to nominate their subordinate to participate in the lean facilitator training held on 1 December 2015. They were divided into two batched and were required to attend numerous training in order to get certified. Upon certified, they will have to form a team to implement whatever LEAN principles that were being taught into their respective department.

Concurrently, Gemba walk were performed by the senior managers at the warehouse, production and laboratory area. K Technologies' Vice President personally lead the Gemba walk for the global procurement and material in April 2015.

Next, 5S Best Practices were shared on 25 May 2015. 5S emphasizes on creating value and improves efficiency by maintaining an orderly workplace and making abnormalities visible. The first S, Sort is to separate the needed from the unneeded and remove the unneeded. Second S, Set in Order represents neatly arrange and identify parts/tools for ease of use. Third S, Shine focuses on sweep and clean the work area. The fourth S, Standardize conducts the first 3S at frequent schedule. Finally the last S, Sustain from the habit of always following the first 4S.

K Technologies launches the Lean Way of Life in enabling its growth and profitability. In order to enhance value creation, K has develop the Kaizen program into three different phases namely Support Kaizen, Project Kaizen and Daily Kaizen. Kaizen is one of the practice for continuous improvement. This principle is introduced by Masaaki Imai in his book Kaizen: The Key to Japan's Competitive Success in 1986. The initial meaning of Kai is Change and Zen is Good thus the overall meaning can be summarized as "Change for the Better".

In K organization, Support Kaizen focuses on developing leadership and motivation with management where they provide management commitment and direction and also to create and sustain lean awareness through Gemba and reward system. Project Kaizen emphasizes on transforming processes with Kaizen project teams where they are required to adopt lean tools for value creation and top management aims to achieve breakthrough result through lean project by discovering more value creation projects. As for Daily Kaizen, top management opt to grow the people in their natural team where they involve all employee in the daily Kaizen activity and at the same time to nurture the continuous improvement culture in every employee mindset and exposing them to 5S, visual management and waste elimination.

## 5.7 K Technologies One Lean Idea

K Technologies Penang site introduces the One Lean Idea Communication Package for all employees. This package emphasizes on what is Daily Kaizen, one lean idea process flow, roles & responsibilities and reward & recognition.

### 5.7.1 What is Daily Kaizen?

Daily Kaizen is all about small improvement at daily work and evaluated by a person (individual) performing at work. Besides that, this concept is more on cultural and behavior rather than financial result. Daily Kaizen aims to make job more efficient, create continuous improvement culture. Employees are encouraged to apply the Daily Kaizen to identify waste or opportunity through their daily process and from there to implement improvement and finally to verify on the effectiveness, standardize and sustainability.

### 5.7.2 One Lean Idea Process Flow

Figure 5.3 shows the process flow of One Lean Idea. Employees are encouraged to contribute idea by following below process flow. Employee also known as suggester will need to identify the opportunity that is suitable for LEAN application.

From there, they will need to discuss with their respective immediate superior on the assistance required and cost impact. If the implementation imposes negative impact to other areas or not justifiable then it should be halted and if the idea will bring positive impact then it should be implemented, standardize and documented. Next, the implementation will be routed to the reward decision where it will be evaluated on the effectiveness. If the execution is not effective then it should be demoted to the stage during implementation or back to the identification stage and if the idea is effective then the suggester will be rewarded.

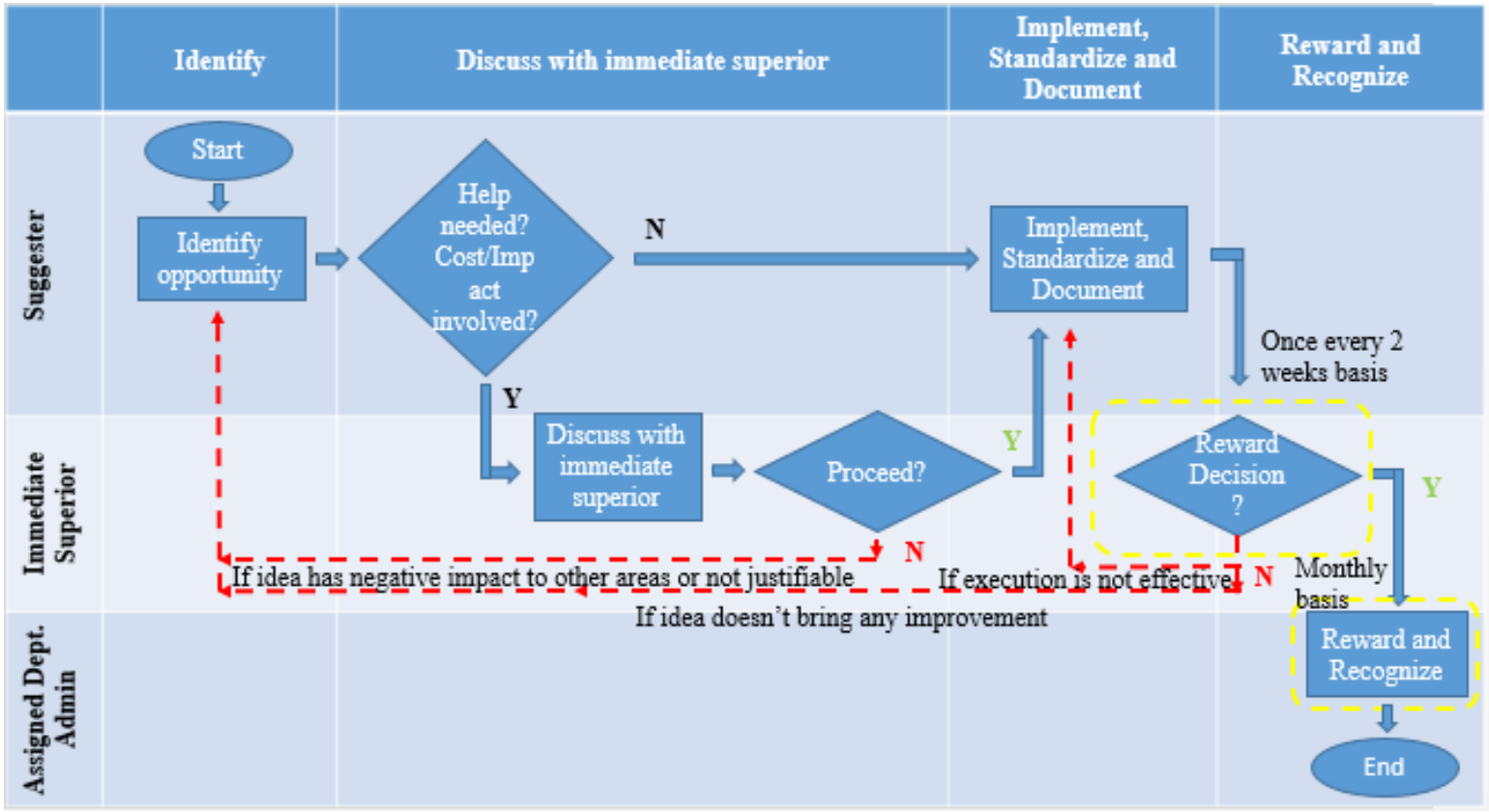


Figure 5.3: One Lean Idea Process Flow

### 5.7.3 Roles and Responsibilities in One Lean Idea

Six key personnel has been identified in this One Lean Idea. They are Lean Champion, Lean Technical Lead, 1st level people manager, assigned department admin., all employees or suggester and lastly implementer.

Lean Champion role is to ensure disciplined execution and sustainability of One Lean Idea System. They owns One Lean Idea Metric and is the one stop information within their own department. They also responsible to sign off cash voucher reward.

Lean technical lead is nominated by the Lean Champion and they are required to attend training and courses related to LEAN and once certified they are required to provide guidance on Lean tools if needed.

First level people manager are responsible to discipline the execution of One Lean Idea System. They act as the first line approver of the ideas. Upon implementation, they have to verify on the effectiveness and standardization of improvements and also on the reward decision.

Assigned department administrator manage and control the reward. All employees or suggester are encouraged to participate

actively in the One Lean Idea System. They are responsible to implement the ideas, verify and standardize on the improvements.

Lastly, the implementer (if different from suggester), they are in charge on the approval of ideas and to ensure that no negative impact to other areas before implementing and standardize on the improvement.

### 5.7.4 Reward and Recognition System

Employees will be rewarded based on the effectiveness on the implementation. The reward will be presented in two categories namely individual and department rewards. Figure 5.4 shows the reward and recognition system. This reward and recognition system is applicable in Penang site only. This system may sound attractive however the participation from the employees is not favorable as the process involved in getting the project recognized is taking a long time and this may reduce the effectiveness of the implementation.

| | Individual Reward | | Department Recognition | |
|---|---|---|---|---|
| | Idea Implemented | Competition within department | Fixed Trophy | Rotating Trophy |
| **Frequency** | Reward given out monthly | Quarterly | 1st 3 quarters | Last quarter |
| ***Reward/Recognition** | • Appreciation token<br>• RM50 cash voucher + Certificate (collect 5 implemented ideas to redeem) | • Excellent: RM 200<br>• Brilliant: RM 150<br>• Smart: RM 100 | Fixed Trophy | Rotating Trophy |
| **Criteria** | Make the job easier/faster/better/cheaper/safer | Quality criteria | Highest total ideas implemented as % of total department headcount | |
| **Approval** | Immediate superior | Department Lean Champion | Lean Office | |
| **Budget** | Department | | Lean Office | |

Figure 5.4: Reward and Recognition System

## 5.8 Conclusion

Upon implementation of LEAN in K Technologies, various issues and challenges has been identified upon interviewing the key personnel in K Technologies. The issues has been identified as poor participation from the employees during the implementation stage and sustainability issue after the implementation. Before LEAN implementation, class room trainings are provided for managers and LEAN champion however this has not been properly cascaded to the operational level employees as the awareness is relatively low. Most of the operational level employees did not know the main purpose of the implementation of LEAN in their workplace and tend to be rather defensive on the changes. This has been identified as one of the reason for poor participation. After the implementation of LEAN, sustainability is very important in order to achieve continuous improvement however this did not happen as most of the initiative to be LEAN has been demoted to the old way as it's not sustainable. LEAN leads will take the initiative to implement LEAN principles namely 5S and Kaizen in the respective workplace however the sustainability is not solely depending on the executor but the overall team in ensuring that the changes is being adapted in their workplace.

# CHAPTER 6: CASE ANALYSIS

## 6.0 Introduction

Root cause analysis, SWOT analysis and TOWS analysis will be used in this case study. They were used to analyze the root causes that lead to the problem arises during the implementation of LEAN in K Technologies and from the analysis, recommendations are being generated.

## 6.1 Root Cause Analysis (RCA)

Root Cause Analysis (RCA) has been selected to be one of the analysis method in this case study as this method aimed at identifying the root causes of problems. RCA not only deemed to provide the best solution to eliminate the root cause but also to immediately address the obvious symptoms when finding the root causes. By performing analysis using RCA, likelihood problem reoccurrence will be reduced. However, to totally prevent reoccurrence is not possible by using RCA thus it has been classified as tool of continuous improvement.

Ishikawa diagram, also known as fishbone diagram or cause and effect diagram has been chosen to conduct the RCA due to its simplicity and is suitable for process based analysis. Upon interviews and data

review, the possible causes that derived from the problem are highlighted in Figure 6.1.

### 6.1.1 Management

After interviewing the technical and production manager, lack of process in idea submission and poor management involvement after implementation has been the factors contributing to poor participation in LEAN implementation. Due to LEAN is still new for this organization thus there is no proper process for employee to follow in order to submit. This will eventually reduce the participation of employees in implementing LEAN in their work area. On the other hand, simplified process has to be developed in order to increase the participation of employees.

Based on the interviews, poor involvement has been one of the main factors from the management point of view. Findings from operational level employees seem to be unfavorable as they did not know who initiate the LEAN and they do not have awareness on the purpose on LEAN in their workplace. This will eventually reduce the effectiveness of the implementation of LEAN. Comprehensive training is recommended to overcome poor involvement that will hinder the LEAN project to sail smoothly if not tackle immediately.

### 6.1.2 Method

Complicated procedure to submit lean idea has been identified as one of the factor under method which lead to the ineffectiveness of implementation LEAN. This has been highlighted by the operational level employees which intend to submit a daily Kaizen based project however due to the complicated procedure known as A3 template developed by LEAN's team in K Technologies, they are reluctant to do so. Besides that, this submission required multiple level of approvals and will prolong the process of getting the project to be approved. This factor has been agreed by the management that it is rather time consuming and will lead to decrease of participation in LEAN.

On the other hand, poor communication on the method used by the top management in conveying the importance of LEAN implementation in the workplace. In addition, there is no fixed method on how to implement LEAN which led to confusion among the employees as do not know where and when to begin. This will a black hole in term of sustainability.

### 6.1.3 Man Power

Lacking of knowledge has been one of the main factor which led to the in effectiveness of implementation of LEAN. In K, LEAN champion will be the key person in communicating any updated on LEAN to their respective department however. LEAN champion will be nominated by the head of department and they are required to attend numerous training in order for them to be qualified as champion. From there, they will pass down the knowledge or responsibilities to the LEAN lead in order for them to implement the technique acquired from the champion in their workplace. However, are the leads really the right person to lead the project? Are they really qualified? This is very subjective depending on how the champion coach the lead on LEAN. This will eventually lead to poor participation from the employees when they are not convince with the capability of their lead in guiding them through the project.

Improper motivation happen almost in all area when poor communication occurred and LEAN project is not categorized as a core job or task for an employee and the participation has not been made compulsory. This is solely depending on volunteerism and employees' self-initiative thus this will impact on the participation level from the employees.

### 6.1.4 Environment

Environment has been identified as one of the root cause which lead to the poor participation from the employees however, there are lots of restriction on international standard and compliance which need to be followed by multinational company operating locally. Packaging size reduction has been one of the project submitted for LEAN approval however in order to reduce the packaging size, operating manual has to be removed and this project has been rejected due to not compliance to the international standard and may lead to inconvenience to the customers when operating the equipment. This has proven that not all job function is suitable for LEAN initiative and may even lead to legal issues.

Under environment, physical demand has been identified as the factor which lead to poor participation and sustainability issues in LEAN and the implementation of LEAN may not be effective in certain area when it required physical movement in a specific area. For instance, a LEAN project implemented in production to reduce unnecessary movement in order to increase the productivity has been negatively perceived by most employees as they have the impression that they are being restricted to move

around during working hours and being monitored from time to time. This is actually reflecting the unwillingness to change from the employees' point of view and forceful changes on this will lead to demotivation.

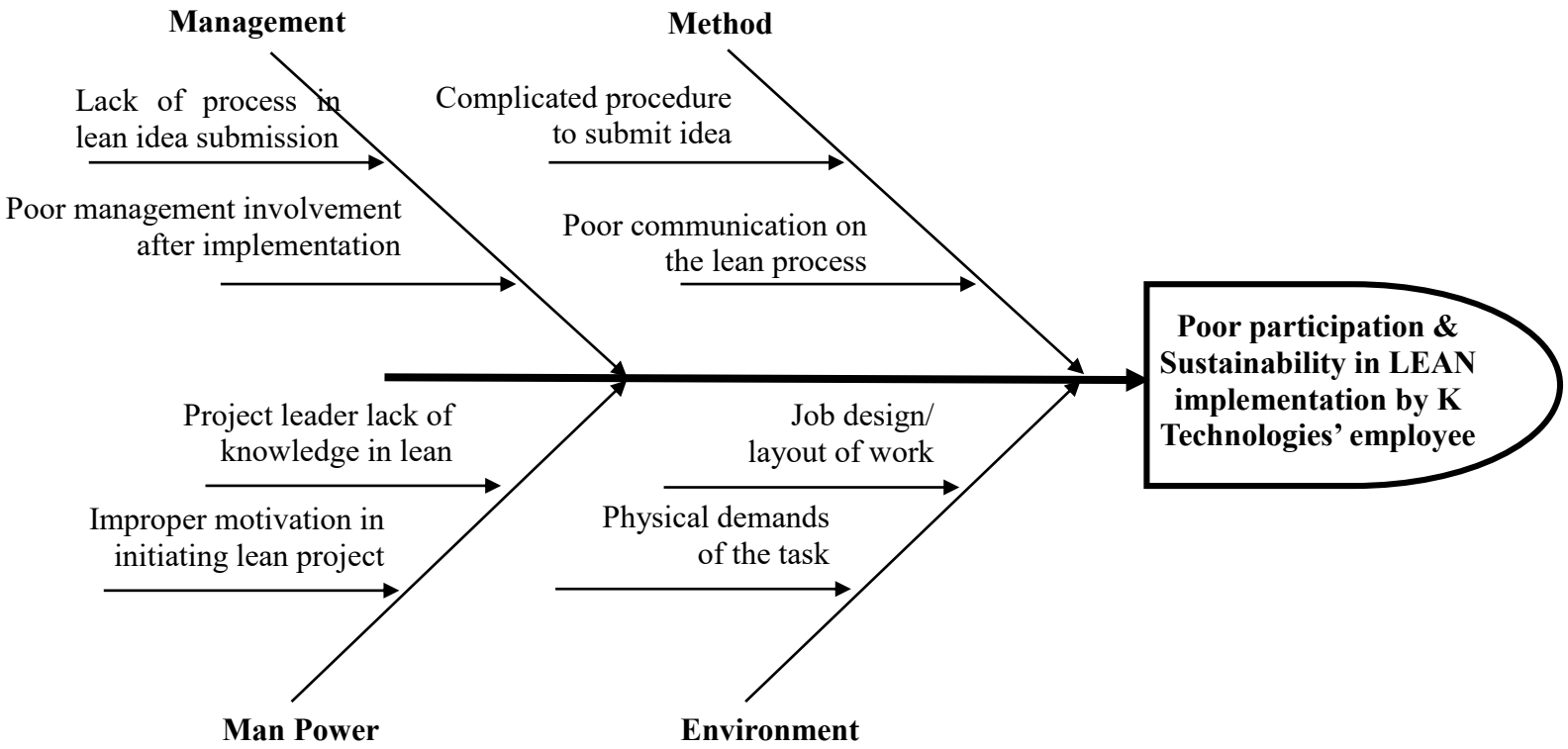


Figure 6.1: Root Cause Analysis - Ishikawa diagram

## 6.2 SWOT Analysis

In this case study, SWOT is used to analyze the current condition in the organization upon implementation of LEAN. The strengths has been identified as innovative culture, continuous improvement, industry leader and strong brand portfolio. Upon implementation of LEAN, it has create an innovative culture which enable the employees to think out of the box on the possibilities to improve on their on-going daily process or procedure. This will eventually lead to the second strength which is continuous improvement. Continuous improvement is very important in ensuring that the organization is always on the par with the fast changing needs. By implementing LEAN, K Technologies will be able to retain its position as the industry leader in test and measurement industry. LEAN helps to eliminate all the unnecessary wastes in production and serve the purpose in cost reduction and continue to build a strong brand portfolio.

Sustainability and resistance to change has been identified as the weaknesses on the overall implementation of LEAN in K Technologies. From the interviews with both managerial and operational level, sustainability has been pointed out as one of the issues that happen after the implementation of LEAN. For example, 5S has been among the first few initiatives that are being implemented however, not everyone is well

adapted to the process of getting 5S done. They have difficulties in segregating the need from the unneeded as they are afraid they may need them in future thus will lead to the next factor which is reluctant to change. Next, resistance to change was found out to be obstructing the effectiveness of implementation of LEAN in workplace. Employees were relatively used to the way they are working and any changes on their current routine imposed discomfort to them. For instance, upon implementation of 5S in workplace, certain employees find it effective where they able to get what they required faster without need to go through all those hassle as before however certain employees find them ineffective as they tend to loss track on where have the locate the necessities.

| Strengths | Weaknesses |
|---|---|
| 1. Innovative culture<br>2. Continuous improvement<br>3. Industry leader<br>4. Strong brand portfolio | 1. Sustainability issues<br>2. Resistance to change |
| **Opportunities** | **Threats** |
| 1. Improved labor efficiency<br>2. Improved quality<br>3. Changing customer need | 1. Job losses (reduction of headcount)<br>2. New standard and regulations<br>3. Intense competition |

Figure 6.2: SWOT analysis for K Technologies

There are a few opportunities identified in this analysis. Firstly, K Technologies will be able to improve on labor efficiency if the LEAN is successfully implemented and sustain in long run. By reducing or eliminating all wastes namely, transportation, inventory, motion, waiting, over processing, over production and defects will definitely improve on the productivity and even cost saving. Another opportunity identified is improved on products quality. Even though K Technologies has a very strong company profile and brand portfolio, implementation of Kaizen in the daily operation will helps to improve on the quality. Thirdly, implementation of LEAN may help K Technologies in dealing with changing customer need. Customer tend to be more and more demanding when purchasing products or services and implementation of LEAN will be able to tackle this problem as the main purpose of LEAN is to eliminate non-value added process and focus on eliminating waste where it is believe to provide the customers with the best product with minimal cost.

SWOT analysis will end with threats and from this case study, threats has been identified as job losses (reduction of headcount), new standard and regulations and intense competition. Job losses will be the biggest threat to the employees as workplace will be leaner upon implementation thus less headcount is required as process will be simplified and employees are expected to be multitasked and able to take up more tasks within the same period given. New international standard

and regulations introduced by the international counterpart required more investment in terms of time and resources in order to comply with the new standard and retain its market leader status in this industry. However, more profit mean less profit for K Technologies. Lastly, K Technologies will faces more intense competition from other manufacturer. Competitors are catching up with the latest technology equipped with the mission to overtake K Technologies as the market leader.

## 6.3 TOWS Analysis

TOWS analysis will be used as the future strategic plan. TOWS analysis involve identifying the same element with SWOT. Threats and opportunities are being identified first and weaknesses and strengths are identified last.

| Strengths/Opportunities | Strengths/Threats |
|---|---|
| 1. Use the innovative culture and the industry leader privilege to tackle changing customer need. (S1, S3 to O3)<br>2. Use continuous improvement to build strong brand portfolio by improving on labor efficiency and quality (S2 & S4 to O1 & O2) | 1. Use innovative culture to prevent job losses. (S1 to T1)<br>2. Use continuous improvement and the privilege as industry leader to comply with the new standard and regulations. (S2 & S3 to O2)<br>3. Use the privilege as industry leader and strong brand portfolio to compete in the intense competition. (S3 & S4 to O3) |
| Weaknesses/ Opportunities | Weaknesses/Threats |
| 1. Sustainability issue is due to poor communication (W1 to O2) | 1. Can't prevent resistance to change attitude by employees as they are afraid of job losses. (W2 to T1)<br>2. Can't overcome sustainability issues when new standard and regulation keep coming in. (W2 to T2) |

Figure 6.3: TOWS analysis for K Technologies

### 6.3.1 Strengths and Opportunities (SO)

Battling in the test and measurement industry for 75 years has been rewarded with the title as industry leader and K Technologies should equipped this privilege with the innovative culture that will be established through the implementation of LEAN to tackle the ever changing customer needs. Besides that, continuous improvement on the current processes and practices coupled with strong brand portfolio will leads to improving on

labor efficiency and quality. Upon LEAN implementation, continuous improvement will be the next step in ensuring sustainability and it is believe to contribute to better and innovative idea in fulfilling customer's need.

### 6.3.2 Strengths and Threats (ST)

Some threats are unavoidable and this is where the strengths should be used to counter this risk of threats in impacting on the organization operation. Job losses upon implementation of LEAN is unavoidable however the management should us this opportunity to eliminate those employees that has no value added contribution to the company and retain those that provide innovative idea in their job and workplace. Besides that, LEAN will help the management to identify employees that is willing to change for a better future. On the other hand, management should consider to utilize the privilege as industry leader to comply with the new standard and regulation. With strong technical knowledge on the test and measurement devices, it will not take up too much efforts and resources in meeting the compliance plan. Competition is unavoidable in all business, however, K Technologies will be able to enjoy the privilege as industry leader equipped with strong

brand portfolio when competing. This will be an added advantages when competing in the blue ocean along with other competitors.

### 6.3.3 Weaknesses and Opportunities (WO)

To overcome the sustainability issue arises after the implementation of LEAN, a more effective communication path should be establish and this has been identified as the opportunities for K Technologies in run long. Effectives of communication will lead to a more efficient working environment.

### 6.3.4 Weaknesses and Threats (WT)

In order to sustain in this ever changing business world, all the weaknesses identified in the SWOT analysis earlier should be avoided or resolved. For instance, it is normal for employees to have the fear of change when they know that those changes will lead to job losses. In addition, when there is frequent changes on the standard and regulation, it is very tedious for an organization to update on the process and documentation and this will lead to sustainable issues.

# CHAPTER 7: RECOMMENDATION, LIMITATION, CONTRIBUTION AND CONCLUSION

## 7.0 Introduction

In this chapter, recommendation will be generated based on the analysis in Chapter 6. In addition, limitation and contribution for this case study will be discussed and lastly conclusion for this case study will be presented.

## 7.1 Discussion

As mentioned in Chapter 1, this case study is conducted to study how LEAN lead K Technologies in achieving their vision and become the most reliable supplier to the customer and to sustain it in future. Based on the literature review, three key dimensions that are identified as the factors that affect the implementation in this case – Cultural Transition Issues, Employee Development and Technology Challenges however upon conducting interview with the key personnel in K Technologies, the outcome seems to be deviate from the initial key dimensions.

After conducting the analysis, several recommendations are being generated in order to address the root cause of poor participation, resistance to change and sustainability issues.

## 7.2 Recommendations

In this segment, the objective of the case study is to identify the problem arise from the implementation of LEAN, to recognize the root cause that lead to the problem and to recommend on how to improve on the implementation of LEAN in K Technologies. Appropriate recommendations will be generated based on the analysis.

Based on the interview with one of the LEAN champion and also Technical Manager, the participation is expected to be soft for the upcoming quarters due to several reason that has been highlighted in chapter 6. Poor participation has always been a main concern for the top management. This is mainly due to lack of awareness on LEAN among the operational level employees. Poor communication and poor management involvement could be the factor contributing to this issues. Even though all employees are required to participate in the online assessment on LEAN however it seems to be not effective as employees take it as something compulsory and not something important that the management wants them to know. A LEAN environment require a different way of management, different organizational structure, different

style of leadership and performance measurement, different thinking and different culture. Many training has been provided during the pre-implementation stage however did the management select the correct people to implement and execute the LEAN? Did the management aware on the skills needed to be effective in a LEAN environment or what type of training is required to develop to be successful in implementing LEAN?

In order to tackle this issue, management should be improve on the communication path to ensure that the employees perceived the message correctly. Training by managers and leaders is highly recommended in this phase. It does not have to a training with books and operating manual or even procedure and written policies. It can be solely depending on "spoken word" to train and to sustain the knowledge from one to another. Experienced leaders, managers, executives and engineers should be nominated to be the trainers. Besides that, frequent visit on-site and sitting down session should be conducted in order to observe the actual process in action. By doing this, it will help in overcome some of the process issues and find a better solution. This method is believe to be consistent and reliable as every employees will get the same understanding without any conflicting message. There will be no individual interpretation and disagreement from all related parties.

Sustainability issues and resistance to change which derived from cultural transition issue has been identified as the weaknesses the analysis for this case study. Employees feel threaten thus intend to act negatively on the changes. It is not easy to change an employee way of working especially for those who have been working for decades at the same workplace.

In addition, after interviewing the operational level employees, they highlighted on the post implementation outcome that they seems to be naturally work towards the old way thus on- the job training (OJT) is very important to counter this issue. This training shall be imposed before the implementation of LEAN so that the employees are aware on the accurate method to implement LEAN. As mentioned earlier, managers and leader should supervise their team member during the implementation and continuously advice, review, correct and drive the knowledge. As for K Technologies, LEAN champion and LEAN technical leader will be the key player to drive the implementation of LEAN in their respective area. They should train their respective team member not only on how to kick-start the initiative of LEAN but also on the proper use to tools, observation and quality procedure. By going through an extensive on-job-training, employees will have a clearer picture on their roles and responsibilities upon the implementation and it will eventually help to resolve the sustainability and resistance to change issue.

K Technologies should focus on the efforts on training and redefine their knowledge on how to implement LEAN. They should go all out to establish a well-defined training and implementation process

## 7.3 Limitation

This case study is conducted in a multinational company thus there will be some unavoidable limitation such as disclosure of the company actual name due to non-disclosure agreement with the top management.

The main limitation faced while conducting this case study is confidentiality where we are not able to obtain the figures on the lean project submission in order for us to further analyze on the participation trend however it is well ensured that this will not affect the analysis of this case study.

Lastly, due to managers tight schedule, appointment has been postpone several time before an official interview are being conducted however, follow-up session is being conducted in an informal way such as phone conversation and email communication to ensure all information are being obtained and documented.

## 7.4 Contribution

This case study is important for this organization as since its implementation in November 2014, there is no formal review on its progress and this case study is expected to highlight on the main issues faced after the implementation. On other hand, managerial level employees will be able to understand what is being perceived by the operational level employees and this will helps the top management to rectify the problem and provide a well-defined training for this group of employees.

It has also been highlighted to the management that the current rewards and recognition package is not going to be the best way to motivate the employee to participate in the LEAN. A more comprehensive plan should be developed for the employees in order to trigger their interest in participating.

## 7.5 Conclusion

Being inspired by the excellent of Toyota performance, many companies are interested in looking for more knowledge about LENA and the conditions required for implementation of the system in their own organization. The distinction between LEAN thinking at the strategic level and lean production at the operational level plays a crucial role in understanding LEAN as a whole, in order to apply the right tools and strategies for achieving the customer value.

In short, a very dynamic and comprehensive training is very important for when an organization decides to implement LEAN. All managers and leaders must know how to manage in a LEAN environment and apply this knowledge daily. They should be accountable for the success and failure of LEAN implementation process.

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## APPENDICES

Interview transcribe with Technical Manager (LEAN Champion) of K Technologies

Name of Interviewee: Mr Ong
Date: 15 September 2015
Time: 10.00am to 11.30am
Location: Learning Center at K Technologies

Content

Yeap: Good morning Mr. Ong. Thank you for accepting my invitation for this interview session.

Mr Ong: Good morning. It's my pleasure since it's for academic purposes.

Yeap: As I have written in my email, this purpose of this interview is to know more about the LEAN implementation in K Technologies and I'm sure you are the right person to guide me throughout this session since you are the LEAN champion.

Mr Ong: Haha…I will try my best to answer your question and doubts related to LEAN.

Yeap: Shall we begin?

Mr Ong: Sure.

Yeap: What is the difficulties faced during the implementation of LEAN?

Mr. Ong:  For K Technologies, when they talked about this LEAN programme in about one year ago. So, in fact we are not facing a lot of difficulties because of the K's culture. Previously we also having the similar programme in place.

Yeap: Which mean the same programme under LEAN?

Mr. Ong:  It's a LEAN programme but we are not really call it LEAN.

Yeap: Ok.

Mr. Ong: So it is about the cause of this just call it "Waste Hunting", "Waste Removal", similar activities.

Yeap: Ok. So the first thing that we really focus in LEAN is about the waste as in TIMWOOD right?

Mr. Ong: Yup

Yeap: Ok that's the first thing. Before we go to "LEAN Way of Life" am I right?

Mr. Ong: It's perform concurrently. "LEAN Way of Life" is more on the tagline and it is a mainly to bring people to become a so called type of their behaviour or type of their culture in the work life. So actually that's a tagline to remind people about lean way of life. Means like in this working environment, we expecting everyone to be having a lean concept in their working constitution.

Yeap: So it's to plant the tagline in their mind set. Ok. So who is the key person in deciding on the implementation of LEAN in K Technologies?

Mr. Ong: It is from the Corporate Management from the Dato Gooi level. Beyond his level I'm not sure is there any initiative being talk about this.

Yeap: So for K Technologies he is the one that initiative that LEAN has to be start up in K Technologies?

Mr. Ong: Actually for my level I'm not sure. Is either from his initiative or it is from the CEO Ron Nersesian's initiative.

Yeap: Ok, understand on that. So in your point of view, why is LEAN so important for K Technologies?

Mr. Ong: For a technology company and the manufacturing based in Penang and today's market is very competitive. So we have no choice but we have to go into this LEAN to remove the operational waste. On top of operational waste, we also want to remove those R&D waste, financial waste, product planning, logistic, inventory, all kind of the supply chain from head to tier waste that we are looking into optimizing the whole operational resources. That's why LEAN is one of the so called direct match tools that we are using to achieve that goals.

Yeap: I think this answer my third question, how would LEAN benefits K's technologies as what you mentioned to do all the cost saving in the whole supply chain management. Is K Technologies having any expansion on their current production as of now? Especially during the enquiry of AT Organization.

Mr. Ong: For K Technologies' direction definitely we are out for this expansion. Enquiring of of AT Organization.is more on the software enhancement, so the operational definitely we are looking on this in organic growth. That is the reason why we need to optimize the operation in here in order to get ourselves ready for the expansion.

Yeap: Alright. Now I eventually need to go to the part two of our interview section, where is before LEAN implementation. By the way what preparations have been done

before the implementation of LEAN? I mean before really kickoff the LEAN there are a lot of preparation. For example you have to setup a team. So what are the preparations?

Mr. Ong: For this LEAN programme, we launched a year ago. Actually we segregate it into three categories, which is the support Kaizen, project Kaizen and daily Kaizen. So we purposely split into these three Kaizen in order to have different level of support. This is the how the prep work that we are working on so that from the support Kaizen. Means from the management point of view, from top down we are providing a very strong support and on top of the execution, top management also putting very strong support as well to support the GEMBA walk and etc. So for the project Kaizen, we do invest quite number of people to attend this project Kaizen courses. We invite this external trainer, they fly all over from the Europe and Australia to Penang to teach them. So these are part of the career growth for this project Kaizen people who will be leading on the projects base on the LEAN initiative.

Yeap: So before the startup K Technologies actually engage external trainer, right?

Mr. Ong: Yes we actually engage external consultant firm to help us to define the programme scope and execution proposal as well. That why appoint launching we have the senior manager and middle manager training. Then we have these project Kaizen all the project lead to go into this specific three years programme and also the basic training for those to support the daily Kaizen.

Yeap: Ok, so these programmes have been set up to be completed in three years. I mean is ongoing programmes for three years right, for the whole group?

Mr. Ong: No, for project lead only.

Yeap: Ok. Basically what is your main consideration when choosing the project manager and the team members?

Mr. Ong: Team members we are not very picky on the people, as long as the person has the commitment on that. Because this more on the additional beyond their normal working effort. Anything about this LEAN project people they must be voluntarily and also got appointed.

Yeap: This is for the members' right? Even project managers?

Mr. Ong: Yes. So in order to select the appropriate projects, definitely we are having the selection guidelines and projects must achieve certain numbers of the saving.

Yeap: I think these have been shared during the communication right? The template that they eventually have to summit.

Mr. Ong: Yea, we are using the A3 template. From that A3 template we talk about these values stream mapping, waste hunting and also the project and also the project timeline and also the saving.

Yeap: Ok. So before the implementation, what resources have been allocated? Which means from higher management. Is there a specific resources for example they provide more budget for the training or they provide more training programmes and so on before the implementation?

Mr. Ong: Before the implementation actually I am not aware. So when the programme launch then the immediate cost we are spending is on the technical lead that we invested into.

Yeap: This is during the implementation?

Mr. Ong: Yes.

Yeap: Since just now you mentioned about not much difficulties faced. I can assume that it is actually quite smooth.

Mr. Ong: Yes. For the implementation we are not having a lot of the roadblocks but moving forward it might be an issue because of the momentum and also the sustainability. Is a key challenge.

Yeap: So what is the problem faced during the implementation? Perhaps is maybe hard to gather the team to have the same understanding. Do you have such problems?

Mr. Ong: The only challenge that we only face is the momentum on the on lean idea. Because we do see a search on the idea submissions and early stage we seeing a slowdown in terms of idea submission.

Yeap: This is during the earlier stage?

Mr. Ong: Earlier stage until now. Now is the pretty soft in term of submission. So we do see an earlier search volume, now is getting softer.

Yeap: So do you foresee that is going to reduce the along the way?

Mr. Ong: I would say we need to find a minimum sustainable quantity. Because I don't believe the one lean idea will be always at the high quantity all along the year.

Yeap: Yea, because once it is implemented, it is more about sustainability.

Mr. Ong: Yea correct. So next year we are expecting on the flat but much more lower target for the one lean idea.

Yeap: So the target will eventually be adjusted right.

Mr. Ong: Right.

Yeap: In this stage is there any corrective and preventive action taken for those issue that you feel like you have been facing?

Mr. Ong: So far for the issue I mentioned earlier of the slowdown one of the area I talked to one of the project lead about this issue and actually in fact we are looking into the checking through on all the critical process within the quality department. Means the quality CE and compliance group to recheck again which area we are not really look into the one lean idea implementation. So this is to balance the whole (___) function within the quality department.

Yeap: Do you have the feeling when implemented LEAN everyone is require to submit, contribute their ideas. Are you aware that some of them eventually don't really have the complete picture of what LEAN is about? Because I did some interviews with the lower working level, like technicians and engineers. Their impression on LEAN is actually different.

Mr. Ong: Actually I did not go into that level of checking. Perhaps I believe it is a normal that different level, we have the different understanding and expectation. It is a very normal it will be happen. So it is good, since you bring this to me then I will find someday to check it.

Yeap: (Perhaps I can share my findings with you after interviewing lower level like technician and even PRE or QRE. Some even give me their thoughts that LEAN is very burden because it will create more work for them. Eventually to my understanding is yes definitely. During the start-up stage it's going to be very difficult but once it's implemented in future it's going to flow smoothly, reduce whatever waste that K Technologies don't want from the co-operation.)

Mr. Ong: Ok this is very interesting. Why they say is a burden to them?

Yeap: To them lack of flexibility, one of the feedback that I got.

Mr. Ong: What do they mean by flexibility?

Yeap: Perhaps there are some changes on the current process that they are used to it. To me is the mindset of the people.

Mr. Ong: So they are refuse to change, right?

Yeap: Yes. I think it will be great that after I collect all the data I should do a summary and share with you my finding so you are aware that certain level have different understanding on this.

Mr. Ong: Yea, that's excellent.

Yeap: Alright, perhaps is there anything you can tell me during the current situation of LEAN or what is being plan for future for next year, upcoming quarters.

Mr. Ong: So this year we have four projects being executed to target for the minimum of the cost saving. Next year we expecting will be on the cycle time production/reduction of the critical process. So this what we plan for next year. So, we are executed this project last Friday, we have been talking about this critical time production/reduction programme and we are expecting in term of the total of 30% of production/reduction by end of next year.

Yeap: So will there be any additional resource allocated for this stage?

Mr. Ong: For this programme we are not expecting any additional resources because we have the technical lead been trained and also we have also sent additional three engineers for the in house training about LEAN programme. So we believe that with the

current technically that we have, we are able to advice the engineers or working level to get into this LEAN project.

Yeap: One more thing I know that there will be rewards and recognitions for the employees for LEAN. Do you think this is the good way to encourage them to participate more on volunteer work in this programme?

Mr. Ong: At early stage I'll say yes, it is good to have. In long run I don't think this is sustainable.

Yeap: Alright, when you said reward is not something that you will do in long run. So what is your action or what will be your suggestions besides rewards?

Mr. Ong: Ok, this reward system I still have to back to this LEAN office's decision. They are the one who making decision whether they want to continue the reward or not. If I in the discussion meeting with them, I definitely will bring this up and my expectation will be this should be go into, more on the cultural base rather than in the reward base. Actually is a human nature. How much reward is reward? If today I reward you RM10 for a project, next year are you expecting RM15, RM20 a project.

Yeap: So is not on monetary basis but you want to change their mindset to adapt this into their culture right.

Mr. Ong: Correct.

Yeap: I think more or less you have answer my questions. Thank you very much Mr Ong. Thank you.

Interview transcribe with Division Project Manager of K Technologies

Name of Interviewee: Miss Fiza
Date: 21 Sept 2015
Time: 2.00pm – 2.30pm
Location: CET area, HTC Lab

Content

Yeap: In general, do you know who is the key person in deciding of LEAN in K or perhaps in your department?

Miss Fiza: My department I know the lead champion is Farid. For K I believe is manage by Jia Chai and he reports to Cherrie, programme office.

Yeap: In your point of view, why do you think LEAN is important?

Miss Fiza: The objective why we go as a company, we do this LEAN initiative is to reduce waste. Waste comes from many waste. It could be waste in your material, document is not lean enough, not efficient enough. Your lean in design stage, so you reduce the waste in doing multiple prototype if you come out with a better design at the first place. Is more like do it right and remove the layers, so that how I know.

Yeap: So in your explanation I can know the focus of LEAN in your department will be waste reduction. Basically focus on the seven waste right.

Miss Fiza: Yup. Waste could come in many ways, like cost avoidance, cost saving.

Yeap: ok. But still the main thing is reduction on the waste for division right.

Miss Fiza: Yes

Yeap: I think this question I no need to ask you about the kick-off date, which is last year in Penang. So before the implementation of LEAN what preparation has been done in your department?

Miss Fiza: The lead for our department, the LEAN lead, Farid has also said in the management meeting that management level he will introduce the program, the LEAN program. Provide introduction, objective and how we going to execute as a division. Then there is a follow on after that, we wanted focus on multiple programs under the one big program. So there is a project Kaizen, there is a GEMBA walk, there is one more smaller version of project Kaizen, daily Kaizen. So for my side, as R&D or engineering we focus on project Kaizen where the engineering design take place and daily Kaizen is mainly focus on operators, operations side.

Yeap: What they can improve on their daily process right.

Miss Fiza: Yea. GEMBA walk is where management check the working environment, you know the 5S.

Yeap: Yes. I
think 5S is one of the main principle or concepts have been implemented in your production right.

Miss Fiza: Correct.

Yeap: In that case, as you are mentioning about project Kaizen, are you the leader for whole project or you were appoint a team to work on that project?

Miss Fiza: My team involved in multiple project Kaizen. So we make it into the specific project. I'm not the lead, I'm the manager of the engineer who lead that project. For

example in my team I have two project Kaizen submitted and I have a few more coming soon.

Yeap:  So you have already submitted the two under the one LEAN idea right.

Miss Fiza: Under project Kaizen.

Yeap: In terms of choosing the team members, what is your consideration or criteria you look into?

Miss Fiza: I would advise the lead, the people that would lead the project Kaizen, "When you choose a team member, he has to be directly involve. And you also can include the supporting team member but the core team member have to be included." If not, if it is a one person project just put a one person. But if normally project Kaizen involve at least three people. The lead and another two team members. And there's properly some supporting team members that are properly less than 10% of involvement. It depends on the bandwidth, the workload by that person in the project. So that how it goes. It has to be expertise in their field.

Yeap: Ok. So the main consideration, expertise and direct involvement.

Miss Fiza: Yes

Yeap: Alright, ok. In that case, any resources have been allocated for this stage? Or nope, you just use whatever resources is being allocated or have as of now.

Miss Fiza: Yea. We don't specifically allocate dedicated resources for LEAN because LEAN is whatever that we do we can think of LEAN projects. So for R&D, R&D does design. New product introduction, new product design. So whatever the design that have characteristic of LEAN, been LEAN ideas, change from what we do traditionally to a better. Then whatever the resource that is doing that R&D we put it as it is.

Yeap: Ok. So you are using the existing resource and also no addition resources. From your point of view, what is the most difficult problems face in this stage before the implementation? Maybe to explain to them, to make them understand? Do you have such difficulties?

Miss Fiza: Not really. I think once you get the awareness, kicks in and you explain what the program is about, definition of LEAN, what is the objective. I think it comes on straight forward.

Yeap: I think for your division is quite adaptable.

Miss Fiza: For my team, yes.

Yeap: For your team the awareness is already there right.

Miss Fiza: Yup

Yeap: ok, I would say that there aren't any problems during this stage right.

Miss Fiza: Yea, understanding is not an issue. When we are submitting the projects there are requirements. I mean K make the requirements on what template we should use all that. That give us some complication on that.

Yeap: Yea because is something new for us right. It's the A3 template thing right.

Miss Fiza: Yea, then the template change from version one to latest version.

Yeap: I think upon feedback from the submitter or from the LEAN leader, so perhaps can make some changes in order to improve.

Miss Fiza: The first time of course we also, first time submit feedback. But second time we follow the first experience so it become better.

Yeap: I think is the same for RRS system as well. We always thinking of space for improvement. What can we do and this also we actually get a lot of feedbacks from all sorts of people. From there I think we should be able to be leaner. And adapt to the current culture right.

Miss Fiza: Right.

Yeap: So I will go to part C, where is during the implementation. So in this stage what is the problem face? During the implementation. For example 5S. I mean 5S done by your APTE or whoever that have the right.

Miss Fiza: Individual, everybody is responsible for their 5S

Yeap: So do you have any problem when doing 5S?

Miss Fiza: It takes awareness of individual. For my side, you know when you into something like projects, very busy. You don't have time for that actually, but once you allocate, clean up and follow, you have to maintain it. I think depends on the person also. For me, maintaining is once I clear the things, I identify where my things are and I am ok to maintain it.

Yeap: Is sustainable?

Miss Fiza: Sustainable

Yeap: Alright. So in this case I should say there is no resources being allocated since is more on your personal right especially 5S. Program one you answered earlier. So do

you foresee any issue that will arrives? For example, I have a lot of answer from my interviewees that they have problem with sustainability, that's why I ask this question.

Miss Fiza: It depends on that person's personality. If you are not that type want to keep everything sorted all that, everything in order, it would be hard for them

Yeap: Some find it difficult to grab the things when they sorted well

Miss Fiza: Ok that's a surprise to me *laugh*

Yeap: I mean like you said it depends on that person. Whether are they adaptable to the new environment right.

Miss Fiza: I think is more like culture that we need to nurture with the people.

Yeap: By the way is not really easy to change that person in overnight.

Miss Fiza: Right.

Yeap: Especially for yourself where have a bigger department, is not easy to pursuit everyone. Especially when do sorting, you have a very hard decision whether do you need to keep this or not. You have been there for two years but you never use them but you still leave it there.

Miss Fiza: Correct. At one point you need to decide

Yeap: So is time for you to scrap. Even all those equipments and whatever. Eventually we need to do this in order to keep our production leaner.

Miss Fiza: Right.

Yeap: Ok, so currently do you have any initiative on what you can think of to be lean in your process, in your department or K. Things that you can see where we can implement LEAN.

Miss Fiza: Ok, I am looking at not just a scrap or waste reduction. I also looking at into efficiency of people working. It is good that one of the core value that K has is high performance. I am a very big believer in that, so when you value high performance you cultivate that culture. When you cultivate that culture, you are training your people to become more effective in working. Into ways want to be more efficient, reduce the idle time and you have higher productivity. Better performance. My suggesting is to like really look into the people. Not just only the process, material that we scrap all that, but the efficiency of that people we have in the company. I think that one is good.

Yeap: Ok. That is really help to measure. In terms of process and everything we can measure. I shouldn't say is measureable but is hard to measure

Miss Fiza: It takes a manager to be as a coach and to be able to identify, cultivate the people. It's not like we want to down play the people and bring up other people. We want everybody to become more effective. I think once you are effective, you will be more lean.

Yeap: A few good feedback I shall get back to KT on that. Ok thank you very much.

Interview transcribe with Division Project Testing Lead of K Technologies

Name of Interviewee: Miss Ilmi

Date: 18 Sept 2015

Time: 10.00am – 10.30pm

Location: Control Room, HTC Lab

Content

Yeap: Now you are LEAD for EMC right. Perhaps I'll ask you question that related to the operational level. In general, what do you know about LEAN?

Miss Ilmi: LEAN is a process improvement. I mean that to improve process to be more cost saving, time and things like that.

Yeap: Alright, so before the implementation, did your leader brief you what is LEAN about?

Miss Ilmi: Yes

Yeap: So there will be a session between you and all the colleagues right.

Miss Ilmi: Yes

Yeap: Alright, after the briefing, from there do you know the main purpose of implementation LEAN in the lab? Basically they will focus on our lab right

Miss Ilmi: Yup. During the briefing session we usually go through, brainstorming some ideas. I mean to get everybody into the same picture.

Yeap: In that case which of the LEAN principles is implemented in the lab or your work station?

Miss Ilmi: 5S

Yeap: 5S is one of them right, and if you aware there is a Gemba walk as well perform by the senior managers, is also one of the LEAN principles. Cost saving definitely, if you attended the comm session by CG is also one of the principles that being implemented to reduce the cost of the packaging. So in your opinion do you think the implementation of LEAN make your workflow easier or is more efficient or more redundant to you?

Miss Ilmi: Yea I agree is more efficient and it can improve our performance. I mean lab performance

Yeap: Ok. So do you face any problems in this phrase? During the implementation, for example 5S. Do you have any problem in segregating the things that you need and you don't need?

Miss Ilmi: Yea but depending. Because our lab we have too many things. So at certain things maybe we are facing that problem in segregating those things.

Yeap: So from just now you mentioned that the workflow become more organize right. So how do you find LEAN benefits to the labs in overall? After implementation. Do you think is sustainable?

Miss Ilmi: Yea. One thing is sustainable, second thing is like we make the APTE task easier

Yeap: So is more organize right. So I'll proceed to the last question already. Basically, do you have anything in mind that LEAN can be implemented? For example what you have been doing now, your process flow can it be leaner? Do you have anything in mind you want to simplify?

Miss Ilmi: Yea. Basically now for EMC focus we are on monitoring side in collecting data. During buyoff process there are too many data we are collecting, so we are lengthy of time to get the data and to get the buyoff approval. So the downtime is long, so we are focusing on that.

Yeap: So you are trying to reduce time allocated for monitoring and buyoff. Yes I do agree with that is because it eventually eat up all our chambers just to do the buyoff and a very long approval route. If you eventually think of anything to reveal on that, I think it would be a great help to the labs

Miss Ilmi: Yea. Ok

Yeap: Do you intend to submit this idea?Or already have in mind as one LEAN idea?

Miss Ilmi: Yes. For one LEAN idea we have a few things to submit already and for the management side because for FY16 we need to do around 20% of the improvement.

Yeap: So this is part of the FY16 plan?

Miss Ilmi: Yes FY16 plan

Yeap: Alright. Thank you for your time.

Interview transcribe with Product Engineer of K Technologies

Name of Interviewee: Mr Koay
Date: 15 Sept 2015
Time: 2.00pm – 2.30pm
Location: CET area, HTC Lab

Content

Yeap: In general what do you know about LEAN?

Mr Koay: 5S and cost saving

Yeap: Ok, I think basically this is the answer that have been given by most of the interviewee. Did you implemented LEAN in your production area?

Mr Koay: Yes, of course 5S

Yeap: By the way did your lead brief you beforehand on the implementation on LEAN in your production area? Your direct boss

Mr Koay: Yes, my previous manager.

Yeap: Did you know the main purpose of the implementation of LEAN in K?

Mr Koay: Not really sure but mainly on cost saving.

Yeap: Ok I'll move to part two, where is about during implementation. Do you know LEAN better during implementation? I mean before 5S and after 5S. During the process of implementing 5S, do you know LEAN better? Why you need to do the 5S?

Mr Koay: For workplace wise, my item more organize. Then easier for me to get all my items.

Yeap: So is all about sorting

Mr Koay: Yea

Yeap: So if you sort it correctly, you arrange it correctly it will be more organize.

Mr Koay: Yes, more organize.

Yeap: So besides 5S, what other LEAN principles that you know.

Mr Koay: I don't know

Yeap: Did you heard of Gemba Walk? I pretty sure they did it at your area. It is also one of the LEAN principles.

Mr Koay: Yea. My senior manager did that once in the while.

Yeap: But you didn't know that Gemba is eventually plug under LEAN principles?

Mr Koay: I didn't know but I heard Gemba Walk?

Yeap: Ok. Upon implementation of LEAN, will it make your workflow easier?

Mr Koay: Yes of course.

Yeap: In terms of?

Mr Koay: Shorten my time to get all the items I need

Yeap: Ok. Because is more organize so you don't need to search every corners to look for the items that you need right. Do you face any issues during the implementation stage where you need to sort out all the things that you feel like, "I need this, I'll be using this. So eventually not going to discard the things". Do you have this type of problems that prevent you from processing with 5S

Mr Koay: No, is more on time matter.

Yeap: Which mean you are given a timeline to complete this?

Mr Koay: No, because I spent like maybe one day to clean up my cube. Because my cubical is very messy.

Yeap: So you only spent one day in cleaning up your cubical?

Mr Koay: One or two days.

Yeap: Is this sustainable?

Mr Koay: No

Yeap: So back to square one?

Mr Koay: In one month time *laugh*

Yeap: Why? Do you find difficulties in sustaining?

Mr Koay: Because sometimes, maybe is user problem. When I take my things out then I didn't put it back.

Yeap: So is all about attitude. Human's attitude.

Mr Koay: Yes

Yeap: Is it because you're not aware of?

Mr Koay: I'm aware but lazy to do it.

Yeap: Human problem I should say.

Mr Koay: Because when I keep all my things inside. I mean I organize those things then when I want to take it, I take it of course. After I use it then I just put it as it.

Yeap: This only happens to you or is the same for other colleagues?

Mr Koay: I don't know.

Yeap: Ok. Alright now I think some of the questions I have already ask. Have you ever think of any initiative from your side that you can improve on the current practice besides 5S that you have be implemented? Any new LEAN idea? Like what we have one LEAN idea right. Do you have any idea on supporting that you can see in your area? Not necessary in your production. It can be from the canteen or whatever you can see. Your CM, your transportation.

Mr Koay: My CM is lean enough.

Yeap: Is even leaner than us right.

Mr Koay: Yes

Yeap: Yea, this one I know. Most of the CM is very lean and we are pretty new to LEAN I should say. Is only less than one year we have been implemented LEAN. Ok. You don’t have anything you could add-on right. OK thank you.

Interview transcribe with Quality & Customer Experience Operation Manager of K Technologies

Name of Interviewee: Mr Oon
Date: 21 Sept 2015
Time: 2.00pm – 2.30pm
Location: CET area, HTC Lab

Content

Yeap: Who is the key person in deciding on the implementation of LEAN in K Technologies?

Mr Oon: Lean in K is run by a department called Lean Office. Each division will have a Lean Champion and there will be a few people that is going to be dedicated to Lean Projects.

Yeap: How will LEAN benefits K Technologies?

Mr Oon: Lean projects will definitely benefits K in terms of process improvement and cost savings.

Yeap: Is implementation of LEAN one of the preparation for K Technologies on-going expansion project?

Mr Oon: Lean projects is implemented in current process, cost savings and definitely will be implement when there is expansion.

Yeap: When is the kick-off date of LEAN implementation in K Technologies?

Mr Oon: Lean Started in K from 2015(K Calendar which is November onwards)

Yeap: What preparation has been done before the implementation of lean in K Technologies?

Mr Oon: Awareness, class room trainings for managers and lean champion.

Yeap: What is the main consideration when choosing the Project Manager and the team members?

Mr Oon: This will need to be based on the area of expertise.

Yeap: What resources has been allocated in this stage?

Mr Oon: Division Lean champion will focus on bigger project. Everyone can participate in daily lean projects.

Yeap: What is the most difficult problem faced in this stage?

Mr Oon: Participation is low.

Yeap: What is the unforeseen problems happened before the implementation?

Mr Oon: Need to educate everyone on lean idea.

Yeap: What is the problem faced during the implementation of lean in K Technologies?

Mr Oon: KT will be the correct person to answer.

Yeap: What resources has been allocated in this stage Technologies?

Mr Oon: Lean project owner will need to assure that everyone is aware of this implementation.

Yeap: What is the most difficult problem faced in this stage?

Mr Oon: Implementation

Yeap: What is the unforeseen problems happened during implementation?

Mr Oon: Trainings not done and people not aware of the changes.

Yeap: What issue has been identified in this stage?

Mr Oon: Lean Project lead/owner will need to assure that issues are rectify.

Yeap: What is the corrective and preventive action taken during this stage?

Mr Oon: for process improvement, this will need to rectify on the spot and training will be given.

Yeap: What is the current issue faced by K Technologies in influencing the implementation of lean?

Mr Oon: Lean is new in K. We still have a long way to go.

Yeap: What resources has been allocated in this stage?

Mr Oon: None.

Yeap: What is the most difficult problem faced in this stage?

Mr Oon: Follow up to assure that the project is continuously on going.

Yeap: What is the unforeseen problems happened after implementation?

Mr Oon: People not following the new process.

Yeap: Has the issues from the previous stage being resolved?

Mr Oon: As mentioned ealier. Lean is new.

Interview transcribe with Quality & Reliability Engineer of K Technologies

Name of Interviewee: Miss Teh
Date: 18 Sept 2015
Time: 2.00pm – 2.30pm
Location: CET area, HTC Lab

Content

Yeap: In general I'll ask you a few questions about LEAN. So what do you know about LEAN? Anything about LEAN that's your own perception

Miss Teh: LEAN is about reduce waste to improve productivity.

Yeap: Ok. So that's your initial knowledge about LEAN right?

Miss Teh: Yea

Yeap: So before that did your leader brief you on the implementation of LEAN in HTC in KEysight?

Miss Teh: Yes, roughly.

Yeap: During your weekly staffs meeting?

Miss Teh: Not during weekly staffs meeting but I think we had a meeting to talk about that last time.

Yeap: Ok, a meeting just to mention about LEAN. So from that meeting do you know the main purpose of implementation of LEAN? Basically the answer will be

significantly same as the question one that I asked you. So this is mainly after the meeting from your leader, do you know LEAN better?

Miss Teh: Yea

Yeap: Alright, then I'll proceed to the second step during implementation. So which LEAN principles is in your work station or in your whole process line. Because mainly we are service provider right. So what's the LEAN principles that has been implemented?

Miss Teh: I think in our lab there are few ergonomic implementation during our test.

Yeap: So in terms of the, I should say similar to VSM when they try to reduce the cycle time?

Miss Teh: Reduce test time and also ergonomic like the stool that we just implemented for altitude chamber. Because chamber is too high to reach that's why we have a stool.

Yeap: Yes that's to reduce the movement and so on. It's part of the TIMWOOD LEAN principles. So besides that, any other principles that you know is being implemented?

Miss Teh: 5S.

Yeap: Yes, alright. Did you know that our senior manager did in Gemba walk actually part of LEAN as well?

Miss Teh: Yes

Yeap: Ok. So you are aware of that right.

Miss Teh: Yes. Of course I'm aware of that.

Yeap: In your opinion, is the implementation of LEAN makes your works flow easier? Perhaps 5S.

Miss Teh: Yea

Yeap: Easier to organize your things?

Miss Teh: Definitely

Yeap: But to some of them is not. It's a problem.

Miss Teh: Example?

Yeap: They won't be able to find their things in the organize arrangement and intend to lost their things. This is one of the feedback that I got from them.

Miss Teh: Depends on, you know the proper storage place, you know the flow. If you know all that, it shouldn't be any problem.

Yeap: But to them is a problem from what I perceived from interviews.

Miss Teh: I see.

Yeap: In this case, is there any issue face during the implementation?

Miss Teh: Sometimes.

Yeap: Are you actually directly involved in any LEAN implementation in the lab?

Miss Teh: Some of the test calculator that we use.

Yeap: Is there any issue?

Miss Teh: Still got room for improvement

Yeap: Ok, in that case I think corrective actions have been done on the PQT calculator. I think your leader did brief you on how to input all the data as well.

Miss Teh: Yea.

Yeap: So next will be the last question. Do you have anything in mind that you can eventually think of that LEAN can be implemented? For example your HALT testing and so on. Your process flow as of now.

Miss Teh: As of now, couldn't think of any right now.

Yeap: But you are aware that we have in one LEAN idea, where we can eventually submit and being rewarded.

Miss Teh: Yea.

Yeap: Alright. Thank you very much.

Interview transcribe with Process Engineer of K Technologies

Name of Interviewee: Thomas
Date: 15 Sept 2015
Time: 10.00am – 10.30pm
Location: Control Room, HTC Lab

Content

Yeap: What do you know about LEAN?

Thomas: Basically I know LEAN is to cut cost and to simplify the process. To elimate the waste, the extra waste.

Yeap: Mainly I think you got the point of what LEAN is and the main purpose. Is that all you know about LEAN?

Thomas: I know some of the LEAN that got project Kaizen, project LEAN or the waste. Kaizen's things or daily Kaizen.

Yeap: Yes. This is being shared during the communication, right. You also know about LEAN from the communication?

Thomas: Yes

Yeap: Ok, from what other sources do you know about LEAN besides the communication?

Thomas: Honestly, no.

YEap: Not even from our website?

Thomas: No. I think I got this idea from the communication.

Yeap: So only from the communication?

Thomas: Yes. From the last time my ex manager shared to me about this LEAN idea. Then only I know about what is this.

Yeap: Basically, your leader, which means your ex-manager brief you about LEAN?

Thomas: Yes.

Yeap. Ok. So they did brief you about LEAN. By the way we did received some of this calendar and all these. Did you eventually go through what is being stated in the calendar about LEAN? Do you know everything inside is about LEAN?

Thomas: I thought inside got sharing about how to make you more valuable, how to make more profit like K emphasis.

Yeap. Ok, I think basically the last sharing is all about LEAN, our calendar for last quarters. I mean for 2015 and beginning of 2016 is all about LEAN.

Thomas: Ok.

Yeap: Basically even if they distribute but you are not aware of it?

Thomas: Yes.

Yeap: Alright, by the way since you know about LEAN. Do you know the main purpose of the implementation of the LEAN in K?

Thomas: Not aware about it.

Yeap: Ok, nevermind. Then now we go to part 2 where is during implementation. I think we all should know about when it is being implemented is about last year, in November.

Thomas: Yea, during the speed of the K to Agilent I think LEAN idea is being introduce.

Yeap: Do you know LEAN better during that time?

Thomas: No.

Yeap: Not at all?

Thomas: No

Yeap: Ok, which LEAN principle is implemented in your production? Which means you are now supporting service support and facilities I should say. What is being used? Did you implement any LEAN principle? For example 5S is the most basic one. Kaizen? Which one did you eventually use until now during implementation and is it sustainable?

Thomas: If I say cut costing, to cut the calibration cost cutting.

Yeap: Cost cutting on the calibration?

Thomas: Yes

Yeap: Ok from what I see 5S hasn't be implemented right? Implemented but is it sustainable?

Thomas: Not sustainable.

Yeap: Yes, I can see.

Thomas: Because we used to have that manager coming to our lab to see or how the process and all these things is. Yes it is quite effective on that day, but after a week later it is going back to the normal.

Yeap: So basically you are talking about Gemba walk. Where managers come for the Gemba walk, so we will ensure everything is a good condition but after that you are not going to sustain right.

Thomas: I would say 80% of the work is not going to sustain.

Yeap: Ok, but why? Why did you think? What did you not to ensure the sustainability is there? Do you feel there is very burden like I have to put the things back to where I take from? Or what is the reason?

Thomas: I think this is a good practice but I not sure about why the people… like the folder things. During the Gemba walk the manager suggested to us that the managers should be sort accordingly. After quite some time I still seeing some people like drawing out this file and simply put, not accordingly.

Yeap: Ok, like what I said it is implemented but not being followed or is not sustainable. So do you think this has been a problem? Since you have implemented, so is one of the problem right, sustainability right. Has any corrective or preventive actions has been done? For example, if you see someone doing that, will you eventually go and tell them, “We have to eventually follow back what have been implemented because this is part of LEAN.”?

Thomas: No.

Yeap: No? So there is no initiative being done from your side or from this department side into ensure that the sustainability is there right?

Thomas: Yea that is a quite few people initiative to do this, I think as a one of my colleague, Wooi Ping. Because he's the LEAN master of the whole entire LEAN project.

Yeap: But if you are aware about it. One person is not able to ensure everything will run as the way as it is. So as his colleagues should be able to help to support and assist him, right.

Thomas: Yes.

Yeap: Ok, now I think I know the problem that you are facing during the implementation and now I go to the last part, where is a current. As of now, do you think your workflow will become better, if you implement LEAN? For example, 5S after the GEMBA or after the VSM? VSM means Value Stream Mapping where you eliminate all the unnecessary process where will lead to cost cutting. Do you feel is more beneficial to you?

Thomas: I would say definitely because cost cutting on the calibrations will definitely eliminate some of the unwanted. Let's say we got ten equipment for calibration but we only, in the whole year we got only use 5 of them. Actually if eliminate 5 of them that unused equipment, then out of the calibration cost.

Yeap: Which means you scrap it as you said?

Thomas: No, just withdraw from the calibration. Yes it will save the cost but it also will be leaner that we only use this 5. Have a clear list for the user or the APTE to know we

only got this 5 things to use. Don't like mess up with a lot of equipment but don't know which one to use.

Yeap: Alright, I think basically is that or because since in the current stage I already know your issue and in general do you find LEAN benefits to you?

Thomas: Yes

Yeap: Yes but still the same problem not sustainable, right. So by the way another last question. Will you by initiative submit any ideas for the LEAN project? Do you have any idea in mind now that things you can improve in your line?

Thomas: Actually me and my colleague got submit one of the project before which is the calibration cut cost thing by the help of the LEAN master, Wooi Ping.

Yeap: So that's the one of the project you have submitted and being recognize into the LEAN already?

Thomas: I am not sure how the progress is be but we just submit last month I think.

Yeap: Alright means it's ongoing. So any other project that you have in mind that you going to submit in future. Or maybe your colleague's plans to submit in future. In terms of, because I see there are many manuals updating, not only in your department even in our department. So will you think you wanted to do something to invalidate all these unnecessary manual human updating? I mean you have the intention or perhaps nothing yet, will stick to the initial current practice.

Thomas: I think will stick to the current practice.

Yeap: Alright. Thank you for your time .Thank you very much.

Interview transcribe with Technician of K Technologies

Name of Interviewee: Solhie
Date: 15 Sept 2015
Time: 4.00pm – 4.30pm
Location: Safety Lab

Content

Yeap: Hi Solhie. Basically I'll ask about LEAN in general. So what do you know about LEAN?

Solhie: Basically LEAN is one of the way to improve of the cost, time and interval.

Yeap: Anything else that you know about LEAN?

Solhie: To is a workload.

Yeap: Ok, reduce our workload, ease our workload. Alright, before knowing about LEAN, did your leader or your manager CH brief you before hand on the implementation of LEAN?

Solhie: Yes.

Yeap: So in general he brief you that, we are going to implement LEAN in production or did he mentioned what is LEAN all about?

Solhie: Yes, he did mentioned.

Yeap: So do you know about the main purpose of implementation of LEAN in your production area? I mean in this area.

Solhie: Main purpose as what I said as to reduce cost, time and interval.

Yeap: Alright, so it will be the same answer as the one you mentioned earlier right?

Solhie: Correct. Yes.

Yeap: Alright. So now I'll go to the second part where during the implementation. Which means previously I asked is before, what is LEAN in general. So now after you implement LEAN, do you know LEAN better during the implementation? Do you know who is the colleague that involved directly in LEAN in your department?

Solhie: Yes.

Yeap: Ok. Do you know them better?

Solhie: One of them is Nancy and KT.

Yeap: Alright, KT is actually the champion of LEAN and Wooi Ping is the master. So thus, Wooi Ping is the one that eventually initiate all the LEAN in our department. So basically you are not so sure about who is the initiator of LEAN in HTC right?

Solhie: Not really know.

Yeap: Alright. So which of the LEAN principle is being implemented in your operation area. Anything related to LEAN 5S, GEMBA walk and VSM. Did you know anything about that?

Solhie: Not really.

Yeap: Ok, so basically not much. So if I will to ask you the next question. Is the implementation of LEAN make your workflow easier?

Solhie: Yes, for sure.

Yeap: For sure? For example? 5S is being implemented here, right. So do you think the 5S thing is making your work more easier?

Solhie: Yes, easier because we already know where is the place, where is the equipment put on.

Yeap: Which means previously is not being organize like this right. Is everywhere, so you need more time to source for the parts that you need but did your team sustain it? Is the sustainability there?

Solhie:  Yes.

Yeap: Yes, for your team yes. Alright, I assume that there is no issue face after implementation of 5S in safety lab?

Solhie: No issue.

Yeap: No issue at all. So I assume no issue then there will be no corrective action and preventive action, alright. So is there any initiative from your side that you can further improvise on the current status in this lab?

Solhie: In this lab? You mean practically in safety lab?

Yeap: Yes, from your area. I would like to know from your side. Or if you can't think anything in your lab then in general, in the whole HTC. Maybe the pile off process or maybe any other things you can think of.

Solhie: Ok. We go specifically on safety lab first. We segregate incoming equipment at one place and also outgoing UT at one place.

Yeap: So you are thinking of to implement this? To segregate incoming and outgoing which we don't have it now, right? Everything is in one parking area.

Solhie: Correct. Yes.

Yeap: Ok, this one is in safety lab itself. How about in general? Did you see anywhere that we can improve in general? Perhaps not only HTC, maybe in canteen or you can see HR. I mean in general, really. This one is the input to our company.

Solhie: One of thing is the signboard for ETM, because for what I can see the signboard ETM is placed at the safety lab. So if the visitors coming, they stand in front of this safety lab, but the present about ETM, so it is misleading.

Yeap: Alright, perhaps this one we can actually highlight to the management. Soon TB should aware about this right because he's the one that brief the visitors. Alright, ok. Good at least we didn't know about it, so any other thing that you can think of, that you can help to improve on the LEAN or anything that you will like to know about LEAN or you want to give me feedback about LEAN?

Solhie: For this time not yet.

Yeap: Ok, let me know if you have any additional input on that. Alright thank you for your cooperation. Thank you.