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Lean Assessment in Selected Electric and Electronics(E&E) Companies in Ipoh, Perak Using SLAT

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Abstract: Lean strategy is very important to the manufacturing industry particularly, electric and electronics because it provides concepts, procedures and tools to eliminate wastes from the manufacturing systems. The E&E industry nowadays is facing two big challenges which are lack of proper standardization and stick to the conventional approach. The purpose of this research is to evaluate lean performance (actual vs target) from nine key areas of manufacturing in selected E&E companies in Ipoh, Perak. Besides, this study also looked for companies that achieve the best lean in every nine areas of manufacturing. The assessment tool used in this study is developed by Quarterman Lee from Strategos Incorporation which known as Strategos Lean Assessment Tool (SLAT). A questionnaire that contains lean assessment questions adopted from SLAT was given to participated companies. There were five E&E companies located in Ipoh, Perak participated in this research. SLAT measures nine important aspects of the production process which are inventory, team approach, processes, maintenance, layout and material handling, suppliers, setups, quality, and scheduling and production control. Data from the questionnaire were keyed in and calculated in the SLAT score worksheet in Microsoft Excel and the result of the assessment is in the form of a radar chart. The five E&E companies in this research achieved their lean performance in different key areas. The results of this research can help the participated companies to find out the gap between actual performance and the target performance of their lean achievement.

Keywords: Lean manufacturing, Lean assessment, Strategos lean assessment tool, Electric and electronics manufacturing

1. Introduction

Lean manufacturing concept is an approach for high efficiency and fast-growing in order to achieve substantial continuous performance in the competitive world. The lean idea was founded by

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Eji Toyoda, Taichi Ohno and Shigeo Shingo from Toyota Motor Company. The idea came out after their visit to the Ford Company plant in America. The business strategy in the time of economic recession was known as Toyota Production System (TPS), or well-known as "Lean Manufacturing" nowadays (Durakovic *et al*., 2018). The concept of lean manufacturing was derived from TPS in order to reduce cost and improve quality by removing wastes or non-value-added activities (Iranmanesh *et al*., 2019). Taiichi Ohno, the founder of TPS has classified waste into seven types which are defects, waiting, overproduction, over-processing, motion, inventory and transportation (Pereira *et al*., 2019). Besides that, lean manufacturing can also be a comprehensive method that will bring various types of benefit to the industry such as minimizing resources for production by eliminating wastes especially the activity that will incrementally costs, requirements of inventory and lead time but non-value-added. Other than that, it also emphasizes the use of preventive maintenance, the quality improvement scheme, the flexibility of workforce and production. So, the implementation of the lean manufacturing concept in industries is a pertinent strategy in order to stay competitive in today's business atmosphere.

1.1 Research Background

In 2019, the Electrical and electronics (E&E) industry was the largest contributor to the manufacturing sector in Malaysia which have total export of RM372.67 billion or equivalent to 44.70% of all exported manufacturing goods. Meanwhile, the E&E industry was also the largest export earner in Malaysia. Singapore, Hong Kong, Japan, the United States of America (USA) and China are the major export destinations of Malaysia's E&E products. In addition, the E&E industry also accounted for a remarkable 6.3% of GDP in Malaysia and create 560,000 job opportunities (MIDA Report, 2019). The approved investments of the E&E industry for the year 2019 is RM25.66 billion. There are 15.1% which equivalent to RM3.87 billion comes from domestic investments while 84.9% which equivalent to RM21.79 billion comes from foreign investments. According to MIDA Report (2019), Malaysia is a major country of electronics producer and exporter and the E&E industry was the leading sector in Malaysia's manufacturing sector. The E&E industry in Malaysia can be categorized into four sub-sectors which are electronic components, consumer electronics, industrial electronics, and electrical products. To make the Malaysian E&E industry has the ability to operate at a low cost, the lean manufacturing concept is very crucial to be employed in the industry.

1.2 Problem Statements

In a globally integrated and highly competitive world economy, the survival of the E&E industry is determined by their ability to meet and adapt to a dynamic business environment in order to produce and provide their products with high quality at a reasonable price to the customers. For this reason, lean manufacturing is one of the most effective methods that many industries have applied in order to sustain their competitiveness in the international market. Lean manufacturing was used in the industry to increase efficiency and productivity with incessant waste elimination. The key focus of lean manufacturing was to meet high quality and low-price customer demands (Gupta, 2017). One of the purposes that implementing the lean manufacturing system in an industry is to assess and identify seven common wastes in the process of production. Waste in lean manufacturing can be defined as the resources that used in any activities but did not generate any value for the products or customers (Zhang *et al*., 2020). There are seven common wastes in lean manufacturing which are inventory, overproduction, defects, waiting, motion, transportation and over-processing. In this context, reducing and eliminating wastes because is one of the important issues that will affect the production process in an industry. Besides that, electronic manufacturing industries nowadays are facing two critical challenges i.e. lack of proper standardization, and stick to conventional approach (Foo *et al*., 2015). The first challenge face by the E&E industry is the lack of proper standardization. Standardization is one of the necessary conditions to successfully attend in lean implementation application. It provides interoperability between business interaction and production process but most of the electronic

manufacturing industries did not fully implement it. The second challenge faced by the E&E industry is to stick to the conventional approach. These challenges occur in E&E industries because they had been nurturing the conventional strategies of development for a long time and unwilling to change and accept lean manufacturing. This will jeopardize the E&E industry's survival in this dynamic business world. Applying lean principles can dampen the effect of critical challenges in the industry because lean principles have timeless application and a great impact on business performance.

1.3 Research Questions

(i) What is the lean status (actual vs target) of selected E&E companies measured from nine key areas of manufacturing based on Strategos Lean Assessment Tool (SLAT)?

1.4 Research Objectives

(i) To evaluate the lean status (actual vs target) of selected E&E companies from nine key areas of manufacturing based on Strategos Lean Assessment Tool (SLAT).

2. Literature Review

2.1 Lean Principles

Lean manufacturing can be described as a multi-aspect concept. It can be classified together with different types of organizational practices. The organizational practices of lean manufacturing include TQM, TPM, JIT, HRM, pull, flow, setup reduction, control procedures, maintenance efficiency, and employees implicate. As a set of practices, lean manufacturing concentrated on reduce non-value-added activities and wastes from the manufacturing operations in a company (Moura & Botter, 2017). Lean manufacturing was regarded as the inheritor of the Toyota Production System (TPS) (Tang *et al*., 2016). The main goal of TPS was reducing cost and increasing productivity by eradicating waste or non-value-added activities (Hasan *et al*., 2017). The reduction of waste was based on the philosophy of Taiichi Ohno that any activities must produce added value and that wasteful activities must be eliminated (Fritze, 2016).

Lean manufacturing was a structured process to eliminate waste within a manufacturing system. TPS has developed its own production system to eliminate three lean enemies which are Muri, Mura and Muda (3M) (Jayswal *et al*., 2017). Muri (unevenness), Mura (overburden) and Muda (waste) were Japanese words that TPS frequently used during their lean development. Minimizing the losses of 3M is the logical approach that restricts the tasks producing costs for the entire production system (Zwolińska, 2016). 3M should not be viewed separately because they are interrelated and interdependent. Therefore, they should be looked at in accordance with a wider and integrated view. Mura creates Muri in many organizations which undercut earlier efforts to remove Muda. In general, the root causes of Muda are mostly Mura and Muri (Järvenpää & Lanz, 2019).

2.2 Lean Assessment

In the era of 1990s, many manufacturing companies started to transform from traditional to lean manufacturing techniques. To facilitate lean implementation and to make better manufacturing operations, the condition of operations at the manufacturing facilities need to be assessed. Assessment is a prerequisite and a method of gathering information regarding the current state. Lee (2004) an internationally renowned expert in lean manufacturing has also developed a lean assessment tool. This assessment tool helps to investigate, evaluate, and measure key areas of manufacturing. The tool is very user-friendly and the result is a deeper understanding of key issues, problem areas, and potential solutions. This study was employed this assessment tool which is known as Strategoes Lean Assessment Tool (SLAT).

According to Sofianti *et al*. (2016), there are three lean assessment tools that have been widely used in lean manufacturing which were LAI Enterprise Self-Assessment Tools (LESAT), SLAT and Shingo Prize Model which was developed by Shigeo Shingo.

2.3 Strategos Lean Assessment Tool (SLAT)

The Strategos Lean Assessment Tool (SLAT) was established by Quarterman Lee from Strategos Inc. SLAT was mainly used in identifying, appraising, and evaluating nine significant key areas of lean manufacturing (Pradnya, 2015). Besides that, it can also be used to examine the problems from different area and their possible solutions. The nine significant key areas of SLAT are inventory, team approach, process, maintenance, layout and material handling, supplier, setups, quality and production control and scheduling.

(a) Inventory

In the inventory key area of SLAT, respondents will be required to identify the portion of middle and upper managers can state from the memory of current turnover and the purpose of finished goods, Work-In-Process (WIP), purchased items and raw materials. Besides that, this key area also involves the overall inventory turnover and the inventory turnover ratio of the industry (Sofianti *et al*., 2016).

(b) Team Approach

In the team approach key area of SLAT, the respondents will be required to identify their organization type. There are five organization types involved in SLAT which are exploitative, bureaucratic, consultative, participative and highly participative. Besides that, the team approach section also involved other questions such as remuneration for workers on the factory floor, job security, annual employee turnover rate, team building training and active participation in the team of all personal (Sofianti *et al*., 2016).

(c) Processes

The processes key area in SLAT requires respondents to assess the manufacturing processes and designs in their industry. This key area involves the evaluation of the machines or single process areas that the products need to pass through, overall deviation scale of plant's process selection, shift output, changes of total production rate, management's target operating capacity, and the overall deviation of plant's process selection with respect to technology level (Sofianti *et al*., 2016).

(d) Maintenance

For the maintenance key area, the respondents will be required to assess the maintenance of their lean manufacturing systems such as equipment records and data, percentage of unplanned, unexpected, or emergency maintenance of the lean manufacturing system, defined preventive schedule, breakdown limit or interrupt the production of equipment, and overall average availability of plant equipment (Sofianti *et al*., 2016).

(e) Layout and Material Handling

In SLAT, layout and material handling key area evaluate the total space for storage and material handling usage in an industry, plant space that is organized by function or process type, movement of material, housekeeping and plant's appearance, and how well could an outlander or visitor pass through and identify the manufacturing processes and their sequences (Sofianti *et al*., 2016).

(f) Suppliers

The lean supply chain of an industry will be evaluated in suppliers key area. In this key area, the number of suppliers for each raw material or purchased items, raw materials or purchased items

comes from qualified suppliers or directly delivered without any incoming inspection required, and how often the raw materials and purchased items delivered (Sofianti *et al*., 2016).

(g) Setups

In the setups key area of SLAT, the overall setup time for major equipment, the percentage of machine operators that have received formal training in rapid setup techniques and the extent of managers and workers measured and determined on setup performance (Sofianti *et al*., 2016).

(h) Quality

The Statistical Process Control (SPC) questions will be emphasized in the quality key area. The respondents will be required to answer the questions that related to the percentage of total employees that have had received basic SPC training, the operation parts that controlled by SPC, the operators that accomplished SPC and the overall defect rate in the organization (Sofianti *et al*., 2016).

(i) Scheduling and Production Control

In the key area of scheduling and production control, the respondents will be required to determine the design of the manufacturing system which involves the WIP flows that directly operate from one to another without any intermediate storage, the 'Kanban' or Broadcast Control that use in WIP, and the on-time delivery performance of the organization (Sofianti *et al*., 2016).

3. Research Methodology

3.1 Research Design

Lean assessment approach in this study is similar to that used by Taj (2005) and Ihezie and Hargrove (2011). Both studies used SLAT to evaluate the manufacturing plants in nine key areas of manufacturing: inventory, team approach, processes, maintenance, layout/handling, suppliers, setups, quality and scheduling and control. This study was intended to evaluate and perform an assessment of the lean status of the E&E industry in Malaysia, particularly in Ipoh, Perak. This study selected many E&E companies in Ipoh, Perak to participate in this research but only 5 companies were willing to participate. The researcher selected E&E companies based on their own judgement and the companies have chosen were due to readily accessible. Respondents for this research were from the managerial level due to knowledge about lean implementation in the companies is better understood by people at the management level. In addition, this assessment needed respondents who have control or at least have knowledge about various departments in the company such as production, maintenance, purchasing, and human resources.

3.2 Data Collection

Data regarding the lean status of the studied companies were collected through a questionnaire comprised of three sections. Section 1 was about the information of the respondent and the background of the company. Section 2 related to the Strategic Impact Factor (SIF), in which the company set their preference for the nine key areas of manufacturing. This is a very important factor that is set by the user that reflects the relative importance of the area in relation to other areas. SIF is in percentage. The total of all sections must equal 100 percent. Section 3 is questions adopted from SLAT and divided into nine parts which represent nine key areas of manufacturing. Each part has three to six multiple-choice questions related to nine key areas of SLAT i.e. inventory, team approach, processes, maintenance, layout and material handling, suppliers, setups, quality and production control and scheduling.

3.3 Data Analysis

Specific After getting feedback from the respondents, the data from Section 2 and Section 3 of the questionnaire was keyed in to excel spreadsheet template as a part of SLAT by Strategos Incorporation. The Excel template as in Table 1 is programmed to calculate score results. The results will be displayed as a lean profile chart that shows the current status of the plant and the gap from their specific lean targets. The first column in Table 1 is the list of nine key areas of SLAT. The second column is section points which represents the total score of each area calculated from the answer provided in the questionnaire. For each answer in each section of the questionnaire, a score between zero and four marks is given. The third column is regarded to the number of questions in each section. In the fourth column, the section average (Section AVG) was calculated by dividing the section points in the second column by the number of questions in the third column. The fifth column in the SLAT score worksheet is section percentage. The section percentage was calculated by dividing the Section AVG by four to find the maximum probable score. The sixth column is related to Strategic Impact Factor (SIF). SIF is an important factor that was set by the respondent. It represents the relative significance of a specific section compare to others. The respondent can fill various SIF based on their preference and precedence. The total score of SIF should be equal to 100 percent. The last column in the SLAT score worksheet is section target, which was calculated by dividing the SIF in the sixth column by the maximum number in that column.

Table 1: Example of SLAT Score Worksheet

Section	Section Points	# of Quest.	Section Avg.	Section %	Strategic Impact Factor	Sect. Target
Inventory	1	3	0.33	8	12.0	80.0%
Teams	11	6	1.83	46	10.0	66.7%
Process	7	6	1.17	29	11.0	73.3%
Maintenance	16	5	3.20	80	9.0	60.0%
Layout	18	5	3.60	90	9.0	60.0%
Supplier	15	5	3.60	75	10.0	66.7%
Setup	2	3	0.67	17	11.0	73.3%
Quality	5	4	1.25	31	15.0	100.0%
Scheduling	7	3	2.33	58	13.0	86.7%
				SUM	100	
				MAX	15.0	

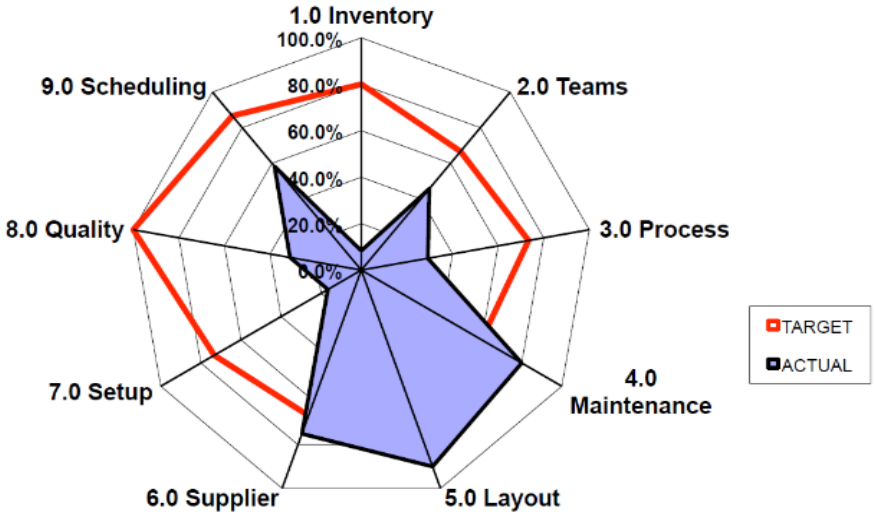

Figure 1: Example of SLAT Profile Chart

4. Results and Discussion

4.1 Respondents and Company Information Analysis

(a) Job Position

Figure 2 shows the job position of that received questionnaire. The pie chart above shows that there is 1 respondent or equivalent to 20% hold a job position as a general manager. Meanwhile. There is also 1 respondent or equivalent to 20% hold another job position which is the director of industry. In addition, there are 3 respondents or equivalent to 60% who hold a job position as a manufacturing department manager.

(b) Working Experience

Figure 3 shows the working experience of the respondent. There is 1 respondent or equivalent to 20% has 5 to 10 years of working experience in their industry. Besides that, there are 4 respondents or equivalent to 80% have more than 15 years of working experience in their industry.

(c) Number of Employees

Figure 4 shows the number of employees of the participated companies. 2 companies or equivalent to 40% have less than 100 employees and 3 companies or equivalent to 60% have 101 to 500 employees.

(d) Results 2

Figure 5 shows the years of operation of the studied companies. There is 1 company or equivalent to 20% had operated 10 to 15 years. Besides that, there are 4 companies or equivalent to 80% had operated for more than 15 years.

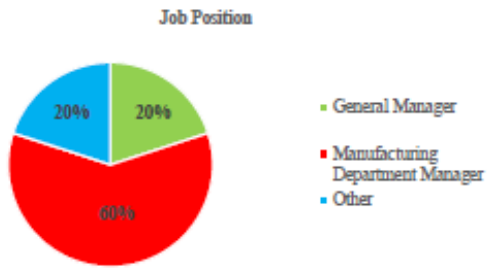

Figure 2: Respondents' job position

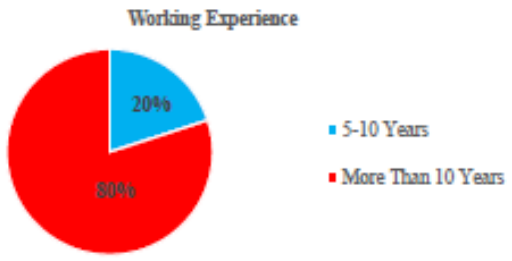

Figure 3: Respondents' working experience

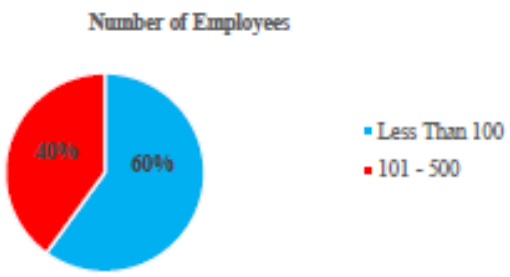

Figure 4: Number of employees

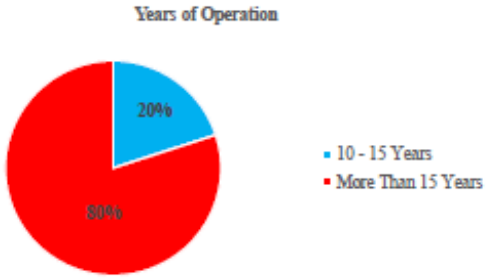

Figure 5: Companies' years of operation

4.2 Lean Assessment Analysis

(a) Company A

Table 2 and Figure 6 show the lean assessment result for Company A. Company A operation is mainly the design, manufacturing and sales of control boards for automatic electronic gate system, electronic sensors controllers and all kind of electronic and electrical products. There are five key areas that have achieved the target performance which are team approach, processes, layout and material handling, setups, quality and scheduling and production control. Among these five key areas, the team approach, maintenance, and layout and material handling have got the highest score which is 75%. There are three key areas that have not achieved the target performance and need to be focused on and addressed by the industry which are inventory, maintenance and suppliers. The suppliers get the lowest score among these four key areas which is 30% and has a big gap between actual performance and target performance. From the perspective of suppliers, the result shows that the average number of suppliers for each raw material or purchased items in this industry was 1.2 to 1.4. Besides that, there are only 11 to 30% of raw materials and purchased items come from qualified suppliers with no incoming inspection required and directly delivered to the point of use without any incoming inspection or storage. Furthermore, the average months of items put up for resourcing were 1 to 11 months. This shows the industry needs to find reliable and stable suppliers to ensure a stable supply of raw materials and purchased items. In addition, 31 to 70% of raw materials and purchased items were delivered more than one time per week and this will cause the industry to spend a lot of cost on delivery services.

Table 2: Company A's lean score sheet

Section	Section Points	# of Quest.	Section Avg.	Section %	Strategic Impact Factor	Section Target (%)
Inventory	8	3	2.67	67	20	100
Team approach	18	6	3.00	75	5	25
Processes	13	6	2.17	54	10	50
Maintenance	15	5	3.00	75	10	50
Layout and material handling	15	5	3.00	75	10	50
Supplier	6	5	1.20	30	20	100
Setup	8	3	2.67	67	5	25
Quality	8	4	2.00	50	10	50
Scheduling and production control	7	3	2.33	58	10	50

	SUM	100
	MAX	20

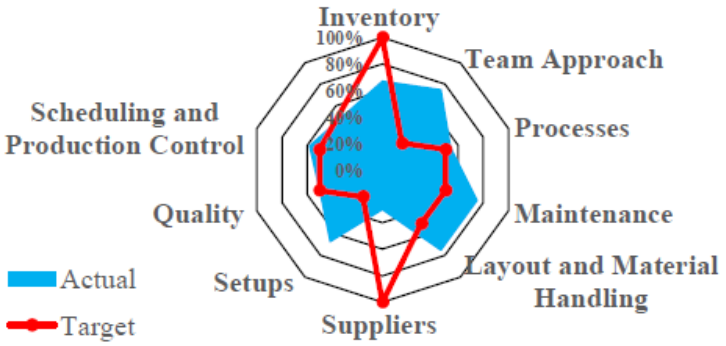

Figure 6: Company A's lean profile chart

(b) Company B

Table 3 and Figure 7 show the lean assessment result for Company B. Company B is a manufacturer that produced printed circuit board assembly (PCBA). There are five key areas that have achieved the target performance which are team approach, maintenance, layout and material handling, suppliers and setups. The maintenance gets the highest score which is 75% among these five key areas. Meanwhile, there are four key areas that have not achieved target performance and need to be focused on and addressed which are inventory, processes, quality and scheduling and production control. From the perspective of processes of this industry, the result shows that there are 3 large-scale machines or single process areas are in the plant that must pass 50% or more of different products and this will slow down the manufacturing processes. Besides that, the total production rate was moderately difficult to change in this industry. The overall deviation of the plant's process in this industry was in medium or mixed scale. In addition, the shift output is moderately difficult when the product mix changes. Furthermore, the technology that applied in this industry was moderate and mixed. The management's target operating capacity for individual departments or machines is 91 to 95% and this will bring a lot of burden to them.

Table 3: Company B's lean score sheet

Section	Section Points	# of Quest.	Section Avg.	Section %	Strategic Impact Factor	Section Target (%)
Inventory	7	3	2.33	58	20	100
Team approach	16	6	2.67	67	10	50
Processes	10	6	1.67	42	10	50
Maintenance	15	5	3.00	75	5	25
Layout and material handling	11	5	2.20	55	10	50
Supplier	12	5	2.40	60	10	50
Setup	7	3	2.33	58	5	25
Quality	11	4	2.75	69	15	75
Scheduling and production control	7	3	2.33	58	15	75
				SUM	100	
				MAX	20	

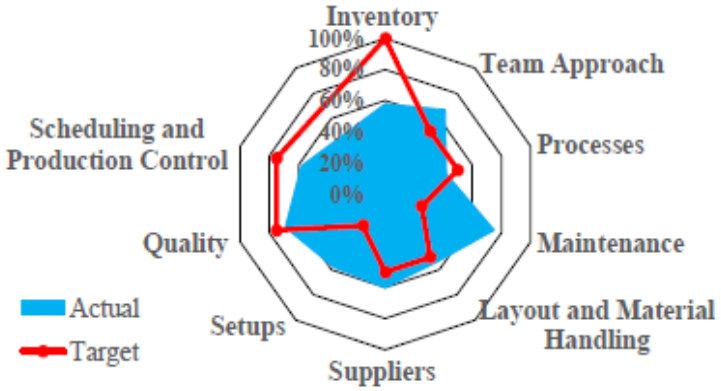

Figure 7: Company B's lean profile chart

(c) Company C

Table 4 and Figure 8 show the lean assessment result for Company B. Company B the manufacturer of quartz crystal unit and resistor. There are only the inventory and team approach have achieved the target performance. The inventory and team approach have got the same score which is 58%. Besides that, there are seven key areas that have not achieved target performance and need to be focused on and addressed which are processes, maintenance, layout and material handling, suppliers, setups, quality and scheduling and production control. The processes get the lowest score which is 46% among these seven key areas. The production rate in this industry will be slow because there are 3 large-scale machines or single process area are in the plant which must pass 50% or more of different products. The overall deviation of the plant's process in this industry was in medium or mixed scale. In addition, shift output was moderately difficult when occurring changes of product mix. Meanwhile, the total production rate in this industry was also moderately difficult to change. The management of this industry has set the target operating capacity of 86 to 90% for individual departments or machines. Furthermore, moderate or mixed technologies will be used in this industry.

Table 4: Company C's lean score sheet

Section	Section Points	# of Quest.	Section Avg.	Section %	Strategic Impact Factor	Section Target (%)
Inventory	7	3	2.33	58	9	56.3
Team approach	14	6	2.33	58	8	50.0
Processes	11	6	1.83	46	11	68.8
Maintenance	13	5	2.60	65	12	75.0
Layout and material handling	12	5	2.40	60	10	62.5
Supplier	10	5	2.00	50	10	62.5
Setup	8	3	2.67	67	11	68.8
Quality	10	4	2.50	63	16	100.0
Scheduling and production control	7	3	2.33	58	13	81.3
				SUM	100	
				MAX	16	

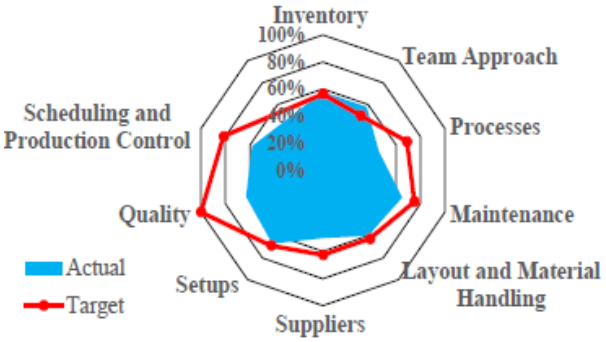

Figure 8: Company C's lean profile chart

(d) Company D

Table 5 and Figure 9 show the lean assessment result for Company D. This company is producing mainly semiconductors and other electronic components. There are five key areas that have achieved the target performance which are team approach, maintenance, suppliers, setups and scheduling and production control. Among these five key areas, setups have achieved the highest actual performance which is 67%. Besides that, there are four key areas that have not achieved target performance and need to be focused on and addressed which are inventory, processes, layout and material handling and quality. The processes get the lowest score among these four key areas which is 33%. The production rate in this industry will be slow because there are 3 large-scale machines or single process area are in the plant which must pass 50% or more of different products. The deviation of the plant's process in this industry was in medium or mixed scale. In addition, shift output was moderately difficult when occurring changes of product mix. Meanwhile, the total production rate by +/-15% was also moderately difficult to change. The management of this industry has set the target operating capacity of 91 to 95% for individual departments or machines. Furthermore, this industry has used complex technologies in their plant's process.

Table 5: Company D's lean score sheet

Section	Section Points	# of Quest.	Section Avg.	Section %	Strategic Impact Factor	Section Target (%)
Inventory	5	3	1.67	42	10	50
Team approach	15	6	2.50	63	12	60
Processes	8	6	1.33	33	15	75
Maintenance	13	5	2.60	65	8	40
Layout and material handling	12	5	2.40	60	15	75
Supplier	11	5	2.20	55	5	25
Setup	8	3	2.67	67	10	50
Quality	10	4	2.50	63	20	100
Scheduling and production control	6	3	2.00	50	5	25
				SUM	100	
				MAX	20	

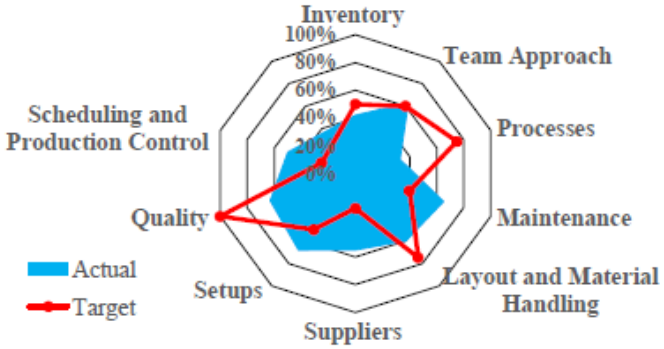

Figure 9: Company D's lean profile chart

(e) Company E

Table 6 and Figure 10 show the lean assessment result for Company E. This company is producing radio and television broadcasting and communications equipment. There are five key areas that have achieved the actual performance which are team approach, maintenance, suppliers, setups and scheduling and production control. Among these five key areas, the team approach and scheduling and production control have achieved the highest actual performance which is 67%. Besides that, there are four key areas that have not achieved target performance and need to be focused on and addressed which are inventory, processes, layout and material handling and quality. Layout and material handling get the lowest score among these four key areas which is 42%. The total space used for storage and material handling in this industry was 46 to 70%. Meanwhile, there are only 46 to 70% of plant space is organized by function or process and this is not enough for the manufacturing industry. In addition, the quality has a big gap between actual performance and the target performance which is 37%. There are only 56 to 80% of employees have received basic Statistical Process Control (SPC) training and the overall defect rate of the industry was 11 to 30%.

Table 6: Company E's lean score sheet

Section	Section Points	# of Quest.	Section Avg.	Section %	Strategic Impact Factor	Section Target (%)
Inventory	7	3	2.33	58	12	60
Team approach	16	6	2.67	67	10	50
Processes	10	6	1.67	42	10	50
Maintenance	12	5	2.40	60	8	40
Layout and material handling	10	5	2.00	50	12	60
Supplier	12	5	2.40	60	10	50
Setup	8	3	2.67	67	10	50
Quality	10	4	2.50	63	20	100
Scheduling and production control	8	3	2.67	67	8	40
				SUM	100	
				MAX	20	

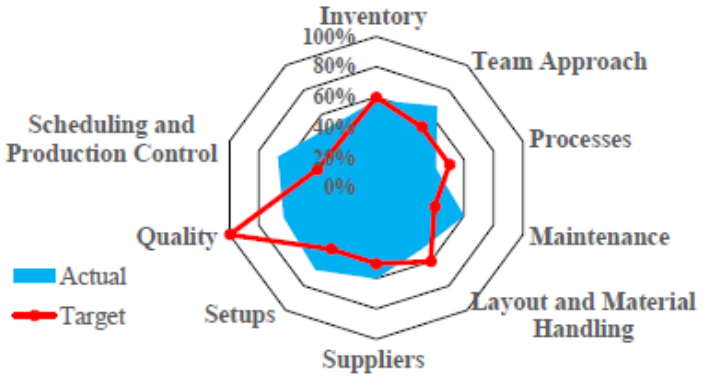

Figure 10: Company E's lean profile chart

5. Conclusion

In conclusion, this research has successfully achieved the research objectives and answer the research questions. This research was conducted in Ipoh and five electronic manufacturing industries have been selected which are AMT Electronics Sdn. Bhd, GBM Electronics (M) Sdn. Bhd, River Electronics (Ipoh) Sdn. Bhd, Janata Electronics (M) Sdn. Bhd and K-One Industry Sdn. Bhd. Strategos Lean Assessment Tool (SLAT) that established by Quarterman Lee from Strategos Inc was used in this research to identifying, appraising, and evaluating nine significant key areas of lean manufacturing which are inventory, team approach, processes, maintenance, layout and material handling, suppliers, setups, quality and scheduling and production control.

According to the results of this study, it is realized that the overwhelming majority of industry fail to reach the target performance that they set with the lower actual performance. The factors and the root cause of each key area will be distinguished through the SLAT score worksheet, SLAT lean profile. The comparison of key areas in lean implementation achievement among the electronic manufacturing industries has been made in order to find the optimum practices. The AMT Electronics Sdn. Bhd has achieved the highest score in key areas and actual performance compare to the other four industries in inventory, team approach, processes, maintenance, layout and material handling, setups and scheduling and production control. There are several key areas that did not achieve the target performance in Ipoh electronic manufacturing industries, and they should put right to their weaknesses in proficiently lean practices implementation to improve their business performance.

This research has provided some recommendations for other researchers in their future research. Furthermore, the researcher of this research has also provided some recommendation to assist with the resolution of problems that face by the industries through several techniques of lean manufacturing that appropriate with each key area.

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