

Development of Lean Tacit Knowledge during Lean Implementation in a Manufacturing Company

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ABSTRACT

The increase in competition worldwide had driven organizations, including the manufacturing industry in Malaysia to face with new challenges. The situation had prompted the companies to perform a variety of effective strategies such as the implementation of lean management system. Although there were many studies done on the implementation of lean management system, but there was only few studies done on the development of lean tacit knowledge transfer within the organization to address the challenges in the rapid business environment. In this paper, the main purpose is to identify the approach to develop the lean tacit knowledge within the organization. Data was collected through qualitative methods using a single case study in an automotive manufacturing plant in Malaysia. The results of the study found that the development of lean tacit knowledge were through a number of key approaches such as lean training, case studies, simulation method, industrial visits and sharing of databases and internet resources (videos). The implementation of lean management will be more effective if every organization had a good lean knowledge and understand how to properly implement lean in the production process.

Keywords: Lean management system, tacit knowledge, aututomotive company, knowledge transfer.

I INTRODUCTION

Lean management has two fundamental elements, which are a systematic approach to process improvement by removing waste in order to maximise value for the end user, and the respect, challenge and develop the people who work within the service to create a culture of continuous improvement (Clark et. al, 2013). The concern that becomes the foundation for this study is that there are many failures in lean management implementation. Each failure can be attributed in two difference causes, which include lack of understanding the concept of waste, and the fundamental issues of lean culture (Nordin et.al, 2012). The problem addressed in this study is the lack of insight into the development and conveyance

of tacit knowledge which lead to lean culture in an organisation.

The change to lean management is a radical process and not an easy task (Herron & Hicks, 2007). In order to create the foundation for lean to take hold, a significant organisational change must occur within the organisation. According to Narang et al. (2008), the process of lean transition requires significant changes in the functions of the company. There must be a form of sharable knowledge at an organisational level to ease the transition. In the comprehensive review of the literature by Lahteenmaki et al. (2001), they have identified two gaps that required an understanding of sharable knowledge development processes. Both of these concerns dealt with the individual and the methods of how an organisation developed sharable knowledge. These gaps are over-emphasis on individual knowledge development and not enough on other levels of organisational knowledge development, and clear understanding of how individual knowledge became sharable as organisational knowledge.

Three domains that are the foundation of this study are: knowledge development, knowledge management driven by knowledge development and conveyance, and strategic change implementation (change management), primarily process innovation. To have a level of organisational knowledge is to say that knowledge was held at the organisational level rather than individual level. At an organisational level, organisational norms, behaviours, and viewpoints or worldview change because of the process of developing knowledge (Rahman et al., 2013). Therefore, the purpose of this paper is to investigate the development of lean tacit knowledge during lean implementation in an organisation.

II LITERATURE REVIEW

A. Lean manufacturing

From the year 2000, the lean concept has been involved to a greater degree of contingency and the scope has been enlarged to include the organisational learning perspective. Some analysts such as Hines et al. (2004) and Jorgensen et al. (2007) believed that lean concept has a greater chance to progress and mature in future. The evolution can be likened to organisational learning

which take place through a phased process. Shah and Ward (2007) believe lean management is a multi-facet system. The integrated nature of lean system includes both people and process components. It is also related with the firm (i.e. internal), and supplier and customer components (i.e. external). Liker et al. (2004) in his analysis on Toyota, identifies that lean operates on two main principles: “continuous improvement” and “respect for people”. Many senior managers outside Toyota has ignored and misunderstood the “respect for people” compared to “continuous improvement”. According to Farris (2009), lean management is rooted from kaizen or continuous improvement mindset which requires the skills and a shared way of thinking to systematically eliminating waste and improving activities’ value. Therefore, the lean concept has progressed to a stage that includes the knowledge-creation management, which aim to create a learning organisation where people are the soul of lean process (Bhasin, 2013; Kumar & Kumar, 2014).

Misunderstanding of the real concept and purpose of lean management is one of the main barriers of its implementation. Herron and Braiden (2007) suggest that the reason of this misunderstanding is due to cultural differences that occur during transition or translation of lean concept during the implementation. The misunderstanding on the concept leads to various major issues such as piecemeal adoption of lean tools and techniques (Dora et al., 2013), misapplication of lean tools (Herron & Braiden, 2007), and lack of lean culture development that support the lean management in the organization (Jorgensen, et al., 2007).

B. Tacit knowledge in Lean management

Lean management consists of a large number of practices and techniques. In an analysis of 100 lean tools and techniques done by Pavnaskar et al (2003), have shown that a large number of lean practices exist with multiple names, overlap with other tools and even have different methods of implementation proposed by different researchers. Herron & Hicks (2007) have classified lean practices based upon the types of knowledge embedded in the tools known as tacit and explicit knowledge. Explicit knowledge such as Statistical Process Control (SPC), failure mode and effect analysis (FMEA), single minute exchange of die (SMED), fool proofing or poka-yoke, and value stream mapping, are techniques that are well documented and relatively easy to learn from literatures. In contrast, tacit knowledge that include continuous improvement or kaizen, Total Productive Maintenance (TPM), Kanban, 5S, standardised working, and policy deployment (hoshin kanri), are techniques difficult to implement without the right support. Transferring tacit

knowledge takes a long time because it often requires a change in culture and substantial experience to be gained (Kumar & Kumar, 2014).

To create the foundation for lean management to take hold, a significant organisational change must occur within the organisation. According to Narang et al. (2008), the process of lean transition requires significant changes in the functions of the company. There must be a form of sharable knowledge at an organisational level to ease the transition. In the comprehensive review of the literature (Lahteenmaki et al, 2001) identified two gaps that required an understanding of sharable knowledge development processes. Both of these concerns dealt with the individual and the methods of how an organisation developed sharable knowledge: (a) over-emphasis on individual knowledge development and not enough on other levels of organisational knowledge development, and (b) clear understanding of how individual knowledge became sharable as organisational knowledge.

Tacit knowledge has been classified into two dimensions, the technical and the cognitive dimension. The technical dimension can be viewed as expertise “at ones fingertips” and it encompasses information and expertise in relation to “know-how”. The cognitive dimension consists of mental models, beliefs and values and it reflects the image of reality and vision of the future. (Nonaka and Takeuchi, 1995). This study focus on the technical dimension of tacit knowledge in lean management.

III RESEARCH METHOD

One Malaysian automotive manufacturing company, Company A, was chosen for the case study. The company is selected based on the criteria which has been set. The criteria are (1) the company must apply lean, (2) must have lean department or unit, and (3) included in Malaysian Automotive Institute (MAI) database. Company A is a company fully owned by Bumiputera, established since 1992 in Shah Alam. The company starts to grow their businesses with the establishment of three other branches namely in Gurun, Kedah (1996), Tanjung Malim, Perak (2007) and Bukit Beruntung (2012). The company expanded its operations in designing, producing and installing components, plastic and metal. In addition, Company A is also known as supplier to Proton and Perodua.

The authors prepared the data collection by first contacting the company to be studied to gain their cooperation, explained the purpose of the study, and recorded the key contact information. A semi-structured interview guide was developed upon a common case study protocol inferred from the

review of literature. The interview protocol was developed to probe the development of lean tacit knowledge during the lean implementation process. To improve the research reliability, the same interview protocol was used to different interviewees for triangulation purposes. The need for triangulation arises from the ethical need to confirm the validity of the data obtained. The interview subjects are questioned with regard to their actual experiences. The interviews were conducted for approximately two hours for each respondent. They involved key personnel in the company that are directly involved in the implementation of lean manufacturing. Table 1 shows a summary of background of the respondents selected in this study.

Table 1. Respondents' background

Respondent	Position	Working experience	No. of years working in Company A
A	Company Manager	5 years	5 years
B	Assistant Manager	21 years	9 years
C	Technical Assistant – Operations Department	20 years	9 years
D	Supervisor-Operations Management	17 years	8 years

IV RESULT AND DISCUSSION

To understand the lean management system know-how is an important element in implementing lean effectively in Company A. In an effort to ensure employee involvement and motivation, understanding of the thinking behind the implementation of lean is very important (Pettersson, 2010). Table 2 shows the understanding and interpretation of the respondents in lean management system.

Table 2. Respondents understanding and interpretation of lean management system

Respondent	Lean management system is
A	1. A systematic production system. 2. Activities which could reduce 7 wastes, reduce cost, facilitate task monitoring and handling. 3. An efficient operations.
B	1. A system for fixing the manufacturing operations. 2. A system to fix production processes from the material demand to customers' product delivery.
C	1. A system to reduce 7 wastes in production.
D	1. A way to reduce 7 wastes. 2. Reduce cost.

Lean management system has different dimensions and meanings in the context of each respondent. The knowledge and skills in lean management gained had prompted them to apply lean management system to increase the productivity in the company. The respondents' knowledge and expertise of lean were developed from the number of activities or

approaches such as lean training, case studies, simulations, industrial visits and database sharing.

A. Lean training

Lean training is one of the common activities to develop lean tacit knowledge. According to the respondents, they acquired the information and knowledge related to lean from training conducted by Malaysian Automotive Institute (MAI) and their customers. As mentioned by Respondent A;

"I started attending lean training in year 2010. At that time, the program was under the MAI and the facilitators were from Proton and MAI lean experts."

Whereas, Respondent B revealed that he developed the lean knowledge and skills from lean training conducted by the Company A's customer;

"My first exposure on lean management system was from Perodua. At that time, Perodua organised a lean training to ensure all its vendor able to improve quality products through the implementation of lean. Second, I also participated lean training organized by Proton. The company invited a number of representatives from all its vendors to join a lean training in Shah Alam. The training involved consultants and experts from outside. Through the training, made me know to some extent about lean management."

At the same time, the respondent C and D only gained knowledge lean through training conducted by the respondent A and B after their lean program organized. Such knowledge has led them to begin seeking about the implementation of an effective lean operations. From the exposure given, the respondent C and D began to move actively in looking for ways the implementation of lean effectively through discussions and meetings with the respondent A and B.

B. Case studies

Case studies is another approach to develop lean tacit knowledge. Respondent B revealed on how case studies were conducted;

"Case studies did appear to be tedious and difficult. We were taught to see the problems that arise and frequently occurred. If there are some problems, we were taught on how to solve them. In order for us to fully understand the concept of lean management system, we tried to solve the program again and again."

According to the respondents, case studies performed was also related to the Value Stream Mapping (VSM), where they were assigned to study their own factory. During the period of case studies, they were often monitored and assisted by the

consultants who were experts from Japan in solving the problems that arise.

After conducting case studies, respondents A and B confessed that their understanding and skills in lean management system improved tremendously. Then, they started to see the benefits of implementing lean system in the company. This was mainly due to the coaching done by the lean experts who taught them to solve problems according to lean approaches. When asked about how the lean experts trained them, Respondent A stated;

"They (Japanese experts) taught us and showed all the photos of what to do and what is not right. Everything which is not right, was corrected immediately."

Respondent B;

"The lean experts came every two weeks from morning until afternoon to help us solve problems that occurred in our factory. From there, they gave advice and showed us the right approach lean management system."

Understanding and learning directly in the operation helped them to better understand and knowledgeable in implementing lean management system in their company.

C. Simulation approach

Another method in developing lean tacit knowledge among employees in Company A is simulation. Respondents A and B mentioned that in lean trainings, one of the approach employed by the lean experts was game simulation. The main benefit of the simulation tools are the trainees would be able to experience different responses and actions to a real life situation. This could increase their understanding in the actual implementation of the lean.

D. Industrial visits and information sharing

In addition to lean training, case studies and simulation games, industrial visits to successfully implemented lean companies and sharing a database relating to the implementation of lean is also other ideas used in developing and obtaining knowledge of lean management system. It is revealed by respondents as below;

Respondents A;

"We went for gemba to watch new working situation and the way they work. During the gemba, we saw a different view. If a system is well organized, people could see it and able to understand the process. So we were able to see some good examples and try to implement it in our company."

Respondent B;

"I watched what other vendors did. For an example I went to Perodua. I received a database and

documents on the technical information on lean management implementation and kept them. I also watched how the operators (in other vendors) did the tasks. If I saw good approaches, I applied them in our factory."

Respondent C;

"I went to visit other factories and watched them performed Kaizen and Kanban. From there, I tried to search new ideas to implement in the factory".

E. Internet resources (videos)

Rapid technological developments led many individuals find information quickly and fast. Undoubtedly, internet resources is also a resource for sender to acquire knowledge and skills in applying lean management system in the company. A variety of lean techniques and practices available from Youtube make learning lean system are more easily attained and implemented by individuals within the company. This situation was disclosed by the respondent A, B and D on how they develop knowledge and skills in the implementation of lean;

Respondents A;

"I learned how to apply Kaizen through examples from the Internet by watching videos. I also watched how other factories did. Usually the videos described the process very details and step by step. Then, we applied the techniques and processes in our factory."

Respondent B;

"After we watched the videos on lean activities, we will do some benchmarking on our factory. Then, we will take some suitable approaches or techniques to put them into factory operations."

Respondent D;

"When the top management requested us to carry out Kaizen, I searched the internet and watched how other factories did Kaizen in their production. From there I got the idea. From the idea, I will add my own ideas and carried them out in the factory."

Learning through a variety of methods is the most effective action in developing lean thinking culture in the organization. Knowledge and skills of lean management are important to ensure that the company continues to be successful in implementing an effective lean management system. According to Rose et al. (2013), skills, knowledge and experience of the employees are necessary for effective lean management implementation across the company.

V CONCLUSION

Based on the findings, the effective transfer of lean tacit knowledge plays an important role in ensuring the level of successful implementation of lean

management system in an organization. The right approach of lean tacit knowledge transfer able to increase the ability of employees toward effective lean thinking. However, in order to be able to transfer the knowledge, the senders need acquire the lean knowledge to be competent. Therefore, this study has identified five approaches such as lean training, case studies, simulations, industrial visits and database sharing, and internet resources

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