

DEVELOPMENT OF TACIT KNOWLEDGE IN LEAN MANAGEMENT IN AN ORGANIZATION: THE CASE OF AUTOMOTIVE INDUSTRY IN MALAYSIA

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ABSTRACT

Nowadays, the implementation of lean management has been on the rise globally especially in the automotive industry. However, there are several organizations still fail to apply lean management effectively and continuously. Each failure can be attributed in two different causes, which are lack of understanding of the concept of waste, and the fundamental issues of lean culture. To be successful in the implementation of lean management may not be easy. In order to create the foundation for lean to take hold, a significant organizational change must occur within the organization. The organization must fully understand the knowledge of lean management system and the lean management tools as well. Therefore, the purpose of this paper is to investigate development of tacit knowledge during the lean implementation. This study applied a qualitative method. A single case study was conducted in a Malaysian based automotive company. Based on the interview and observation conducted, the sources of development of tacit knowledge in lean management were developed from the training, database sharing, factory visit, previous case studies and internet(video) resources. Therefore, lean tacit knowledge is essential to the development of a successful organization.

Keywords: *Lean management; tacit knowledge; case study*

INTRODUCTION

Lean management has two fundamental elements which are a systematic approach to process improvement by removing waste in order to maximize value for the end user, and to create a culture of continuous improvement within the organization (Clark et al., 2013). This study discusses some failures in lean management implementation specifically on the misunderstanding of acquiring lean management (Ballé, 2005; Liker & Hoseus, 2008). Besides, lack of understanding and knowledge are important factors why companies fail to implement lean in their organization (Kumar & Kumar, 2014; Nordin et al., 2010). Previous studies have discussed on the implementation of lean management system in an organization, but yet to be applied successfully by organizations (Liker & Hoseus, 2008; Taleghani, 2010; Worley & Doolen, 2006).

The problem addressed in this study is the lack of insight into the development of tacit knowledge, which leads to lean culture in an organization. The change to lean management is a thorough process and it is not easy to implement (Herron & Hicks, 2007). Previous research indicates that a prerequisite for success when implementing lean is to address the problem at the process level that begins with a single process (Portioli-Staudacher, 2009). The successful lean implementation could be obtained through the process of tacit knowledge transfer in an organization. Successful companies are characterized by exploiting their intellectual knowledge in an efficient manner (Tohidinia & Mosakhani, 2010). Due to the importance of having tacit knowledge in lean, this study aims to examine how lean tacit knowledge is developed during lean implementation in an organization.

For companies that plan to implement lean management, they must have knowledge about lean management prior implementation. In order to gain knowledge, everyone must have the willingness to learn and ready to accept change. Thus, new information can be obtained through knowledge transfer that will assist in the implementation of lean management in the organization. The power of knowledge transfer is important in the consolidation and establishment of the competitiveness of business (Mei et al., 2011). However, knowledge transfer is not easy to understand or practice (Liyanage et al. 2009). It is because due to the lack of clear concept of lean or proven best practice for the knowledge transfer. An extensive cultural reform in lean implementation is vital (Lixia & Bo, 2008), and a clear understanding about implementation of lean management system is essential to be successful in an organization. Although previous studies have discussed the obstacles of implementing lean management in few organizations, the development of lean tacit knowledge in an organization is not discussed.

This paper presents information on the development of tacit knowledge during the lean implementation in an organization based on a case study of the automotive industry in Malaysia. The paper commences with literature review focusing on lean management implementation and the lean tacit knowledge. The research methodology section describes the data collection process. The results of lean tacit knowledge development are presented in the results and discussion section. Finally, this paper concludes the overall result based on the objective presented.

LITERATURE REVIEW

Lean management implementation

The implementation of lean concepts is widely accepted in many sectors such as health, construction and others to improve their business capabilities. Based on the analysis from Hines et al. (2004) and Jørgensen et al. (2007), lean management concept is believed to have greater opportunities to mature and progress. The evolution can be equated with organizational learning that takes place through a phased process. According to Shah and Ward (2007), lean management is a multi-face system. It is also involved as an internal component and client and supplier are regarded as external components.

However, many studies believe that the main factor of unsuccessful to lean management implementation is lack of knowledge (Nordin et al. 2010; Rose et al. 2013; Roslin et al. 2014). They also argue that lack of understanding about lean in the organization can contribute to the failure of lean implementation. Based on Nordin et al. (2016), the main barriers of lean implementation is misunderstanding of the real concept and purpose of lean management. Besides, Herron and Braiden (2007) and James (2006) suggest that the cultural differences that occur during the process of transition and translation of lean concept can cause misunderstandings. Another reason of the misunderstanding on the concept leads to various major issues such as misapplication of lean tools (Herron & Braiden 2007; Pavnaskar et al. 2003), lack of lean culture development that support the lean management in the organization piecemeal (Jørgensen et al., 2007), and adoption of lean tools and techniques (James, 2006).

Tacit knowledge in lean management

Generally, lean management consists of a large number of practices and techniques. The analysis of 100 lean tools and techniques done by Pavnaskar et al. (2003) shows 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 existing literature.

In contrast, tacit knowledge that includes continuous improvement or kaizen, Kanban, Total Productive Maintenance (TPM), standardized working, 5S, and Hoshin Kanri (policy deployment), are techniques difficult to be implemented without the right support. Transferring tacit knowledge takes a long time because it needs to gain the culture and substantial experience (Recht & Wilderom, 1998). However, it is difficult to be implemented without support (Herron & Hicks, 2007).

According to Spear and Bowen (1999), the tacit knowledge that underlies the Toyota production system (TPS) can be captured in four basic rules, which are to guide the design, operation, and improvement of every activity, connection, and pathway for every product and service. These rules show how people connect (connections), how the production line is constructed (pathways), how people work (activities), and how to move forward (continuous improvement). Tacit knowledge is personal knowledge, a deep understanding of context, know how, and it is usually difficult to communicate to others. It develops during extended periods, and is therefore highly personal and unique.

Based on Muniz et al. (2010), tacit knowledge can be very difficult, but the tools will increase the creation and operation of a favourable context for the use of the operator's knowledge. The best practices are not proprietary and available in the market. It is also easily imitated, and thus, is unlikely to give a sustainable competitive advantage. Based on Uriarte (2008), the knowledge inside organization is stored as much as 42% in human brain, 26% in paper documents, 20% in electronic documents and 12% in the

electronic based knowledge. This case shows that tacit knowledge is very important in the development of a successful implementation of lean management in the organization.

RESEARCH METHODOLOGY

This study uses a single case company of automotive industry in Malaysia. The reason of choosing a single case study is to determine whether the theory's propositions are correct or some alternative set of explanations might be more relevant and the single case can represent a significant contribution to knowledge and theory-building (Yin, 1994). According to Yin (2009), there are five reasons for a single case design, namely either the case is unique or typical, critical in theory testing, relevant to previously inaccessible to researchers or that the study is longitudinal and comparing the case at different points in time. The use of single case study can provide a more focus and detailed research in an organization.

Yin (2003) describes the research design as the journey of the study from the starting point (defined research question) to endpoint (research conclusion). This study identifies how lean tacit knowledge was developed during lean management implementation in an organization. The data obtained from in-depth interviews with selected companies is expected to clarify and reinforce the findings. The data collection was conducted for two months through industrial training in the selected organization.

During the data collection, two main steps were performed, which are interviews and direct observation. In-depth interviews were conducted to explore the development of knowledge about lean management within the organization. The second step is through observation. Observations were conducted to focus on how to manage the lean system and the people within the company. According to Yin (1994), a good case study should use multiple sources of evidence. As noted by Flick (2007), the main purpose of using multiple sources is to complement and confirm the results obtained from interviews with the respondents. If the entire evidences are used properly, they could assist in dealing with the problems of establishing the construct validity and reliability of the case study. In this way, the results obtained are more accurate and level of efficacy responses obtained can be improved.

In this study, the case company was selected based on the willingness to participate and the experience that they had in implementing lean initiatives. Besides, the participants selected in this study have experience and expertise in lean practices. Justification for the selection procedure is the best way to elicit the views of individuals who have specific expertise in the subject matter of the study. The details of participants' profile are shown in Table 1.

Table 1
Participants' profile

Name	Position	Number of years working in the company
Respondent 1	Deputy Manager	5 years
Respondent 2	Assistant Manager – Production Planning and Engineering	9 years

During the data collection, a semi-structured interview was conducted. Interview protocol was used as a guide to avoid any bias in the study. The same interview protocol was used for different interviewees in order to improve the research reliability and triangulation purposes. According to Creswell (2005), triangulation is a process to get data from a variety of methods and individual. In this study, two tactics were used to increase the construct validity. The first strategy is the use of multiple sources of evidence, where researchers have chosen in-depth interviews and direct observation for data collection. The second strategy is to provide a draft report for the case study evaluated by the respondents.

CASE STUDY ON COMPANY A

Background

Company A was established in 1992 in Shah Alam. The company has expanded their business with the establishment of three other branches in Gurun, Kedah (1996), Tanjung Malim, Perak (2007) and Bukit Beruntung (2012). This company designs, manufacture and assembles plastic and metal components for automations. It is also known as a supplier for Proton and Perodua, as well as for other suppliers such as Ingress Sdn. Bhd. Generally, company A is very concerned about the quality of the product manufactured in their factory. Therefore, the introduction of lean system was intended to improve the quality and efficiency in the production of the product in their company. In 2009, the implementation of lean in company A was introduced. The implementation of lean management is under the supervision of a team, which is known as Part Improvement Team (PIT). The establishment of this team is to move the implementation of lean system continuously in order to achieve a high level of effectiveness. Although the implementation of lean in company A is slow, they have been trying to improve the company's progress through the lean implementation with the support of the team. . The existence of the team has provided growth to company A, produce knowledgeable employees in lean, and ensure that lean implementation benefits to the company.

RESULT AND DISCUSSION

The data collection was conducted in an automotive company in Malaysia. The result from the study conducted found that the development of lean tacit knowledge in the case

organization was obtained through five sources, which are lean training, case study, factory visit, sharing lean database and internet sources as shown in Table 2.

Table 2
Sources of lean tacit knowledge development.

Sources	Explanations
Lean training	Training is essential to develop the required knowledge and skills for lean management implementation. The training conducted not only focussed on how to perform lean on the production site, but it is also stressed on the proper use of tools, methodologies and practices during lean management implementation in the organization.
Case study	Case study is used for the practical application of lean knowledge which was conducted after received the training. It is to gain precise knowledge of lean concept and techniques during lean management implementation. The best example of doing case studies begin with value stream mapping (VSM) where it shows the whole area before the implementation of lean management in the organization.
Factory visit	Factory visit is one of the best way to increase employees knowledge of lean management implementation from other organizations. The visits were held in the manufacturing floor or the warehouse to observe the actual lean implementation in the successful companies. Knowledge will be created when the employees saw how lean can be applied. Thus, skills and understanding of lean knowledge can be built slowly.
Sharing lean database	Sharing lean database with other lean practitioners that have successfully implemented lean is one of the ways to build lean thinking and skills. The respondent shared the lean database with their friends who are skilled and have an understanding on lean implementation such as on lean practices (Kaizen, Kanban, and etc.) and on how to eliminate waste in production line.
Internet (Video)	The internet is used as a medium of learning lean management. Internet resources such as the video have helped the respondents to get knowledge to implement lean. The lean knowledge that was uploaded on the Internet network makes it easier for the respondent to assess the information quickly. The information obtained not only involves the implementation of lean principles, but it includes the proper implementation methods. Therefore, they can take the ideas to be applied in their company.

Table 2 shows the sources of lean tacit knowledge development during lean implementation among the respondent in an organization. The respondents are the sender of the lean knowledge in the organization. Based on the results, lean training is important to build lean knowledge before applying lean in the production line. Employee training is important to maintain the employee's effectiveness which includes various problem-solving skills (Arnheiter & Maleyeff, 2005). It shows that training is important for employees to apply in the Lean implementation process. Besides, lean tacit knowledge also developed from the cases study that involves problems solving process with the help of consultant from Japan. Based on the case study, employees learn how to solve problems using the approach from the Toyota Production System. According to Gabriel (1997), through case study, the concept and philosophy of lean management are better understood by participants. Therefore, the knowledge and skills started to improve and continuously was implemented in the company.

Factory visit is one of sources to develop lean tacit knowledge among the sender or employees in an organization. Factory visit to successful lean company has provided new knowledge to the participant on how to implement lean effectively. Besides, sharing lean knowledge based on database from other practitioner is also the best way to build lean tacit knowledge. Lean knowledge sharing is critical to the successful knowledge development of a Lean management system (Charron et al., 2014). Lastly, lean tacit knowledge has developed through learning from internet network. The various ways and approaches in lean implementation, which were uploaded in the website, had allowed workers to access the knowledge. As a result, the existence of lean knowledge in the human mind can generate their ideas to increase productivity. Therefore, any company that intends to implement lean in their operation must have sufficient knowledge to obtain effective results in the future.

CONCLUSION

The aim of this study was to investigate the development of lean tacit knowledge during lean management implementation. Qualitative method with single case company was used to obtain detailed information about the development of tacit knowledge in lean management. Based on the interview and direct observation conducted, the main source of lean tacit knowledge was developed from training. During lean training, respondent were guided by an expert consultant from Japan. In addition, the development of lean tacit knowledge is also developed through database sharing, factory visit, case studies and internet (video) resources. Experience and skills were used to introduce lean management implementation to their employees in order to develop a lean culture and to increase efficiency in their work. The knowledge that exists will continue to grow and become proficient in each individual. The limitation found in this study was the small number of company. Future research should focus on a larger scope of this study in order to improve the research outcome.

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