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Organisational learning to sustain lean implementation in New Zealand manufacturing companies

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Abstract. In New Zealand, lean manufacturing is slowly becoming popular, and its adoption by manufacturing companies has been particularly encouraged and supported. However, efforts to sustain lean implementation have been difficult, and met with many obstacles. One of the factors in sustaining lean is the ability of the workforce as a whole to learn and change continuously within the framework of organisational learning. This paper highlights the theoretical linkages between organisational learning and lean sustainability. It identifies points of intersection where organisational learning connects with the basic principles of lean, and where organisational learning contributes to sustainability of lean implementation. However, there has not been much research on organisational learning in New Zealand. Therefore, there is a need to empirically confirm the linkage between organisational learning and lean sustainability within the context of New Zealand manufacturing companies. This paper concludes by explaining research methodology to empirically investigate the linkage.

Keywords: lean sustainability, organisational learning, learning organisation, New Zealand, structural equation modelling

1. Introduction

While there is no consensus definition of what lean is, there is a general agreement that lean is about creating products or services exactly as requested by customer with less work and waste [1]. Lean originates from the Toyota Production System (TPS) in the automotive industry. However, it is no longer confined to the automotive industry, and can be applied in other manufacturing sectors as well as services industries [2]. The popularity of lean, being one of the most influential new paradigms in manufacturing [3], is still strong with some success stories reported from different parts of the world.

2. Lean sustainability

2.1. Lean failures

While lean continues to be aggressively promoted and adopted by many industries, the fact remains that there are more failures than successes. Many companies worldwide have tried to implement lean but the majority of them only achieved modest levels of success [1]. In many cases, companies enjoyed drastic improvements in the beginning of their lean implementation, where obvious types of waste were quickly discovered and removed. However, they later found that improvement activities began to slow down and no more meaningful improvements could be made. Reasons that are often cited as main factors for lean failures include, among other things, poor leadership, lack of concrete process or mechanisms, lack of clear targets or direction, lack of conducive environment, poor communication, staff resistance to change, and lack of learning that lead to poor understanding of lean [4]

2.2. Sustaining lean

What can be done to improve sustainability? Different companies have different issues and need different approaches to implement and sustain lean. In the case of New Zealand manufacturing companies, Murti [5] indicates that people development was not given enough attention. The lack of concerted efforts to

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develop people into continuous learners makes it difficult to embed a culture of continuous improvement. Murti [5] suggests to look into organisational learning as a means to sustain lean implementation.

The suggestion is not without merit. Takahiro Fujimoto, an expert on Toyota, as cited in Balle et al [2], has attributed the phenomenal success of Toyota, as a lean exemplar company, to its highly advanced organisational learning capability. This is quite expected since many disciplines of organisational learning are compatible with lean principles [2]. Some leading researchers such as Liker, Spear and Brown have also indicated the role of organisational learning in Toyota's success [6, 7].

3. Organisational learning

Organisational learning has been researched from various perspectives and angles, giving rise to various models, concepts and theories of learning. Easterby-Smith [8] states that organisational learning can be looked from six different disciplines – psychology, management science, sociology and organisational theory, strategy, production management, and cultural anthropology – with each discipline has different contributions and conceptions of problems.

All organisations are bound to learn something anyway to a certain degree, so learning in organisations is a relative matter [9]. What makes a good learning organisation is the management intervention that prescribes specific recommendations about the correct way for organisations to learn. This approach is known by a different yet closely related term, learning organisation. Tsang [10] explains that "organisational learning is a concept used to describe certain types of activity that take place in an organisation while the learning organisation refers to a particular type of organisation in and of itself". It is simply the difference between ``becoming'' and ``being'' [10]. Research on organisational learning is more descriptive, analytical and usually backed up by empirical evidence with the main objective of understanding how an organisation learns. A learning organisation, on the other hand, is a more prescriptive approach that deals with "how should an organisation learn". There is an active intervention on the part of the management to create an organisation that continuously learns. In short, a learning organisation is one that has excellent organisational learning capabilities [10].

3.1. How does an organization learn?

An organisation does not learn. It is the individuals that make up the organisation that act as learning agents. While individual learning is a prerequisite for organisational learning, it does not always contribute to organisational learning. As a result, sum of learning acquired at the organisational level is often not as much as the sum of learning by individual members of the organisation [11]. What is needed for individual learning to be translated into organisational learning is an organisational memory system where all individual learning (in the form of newly obtained information, theories or models etc) can be stored and later shared with everyone else in the organisation [11]. Organisational memory refers to such things as routines, standard operating procedure (SOP), documents, or job instructions that can be used to control behaviours of the organisation or members of the organisation.

3.2. Organisational learning and lean

The linkage between organisational learning and lean can be explained via continuous improvement. Lean is sustainable when there is an embedded culture of continuous improvement [1, 6]. Whatever contributes toward continuous improvement plays a role in sustaining lean. Organisational learning has been noted to have direct linkages with continuous improvement [12, 13], thus it follows logically that organisational learning contributes toward lean sustainability.

Garvin [14] states that continuous improvement requires commitment to learning. According to Garvin [14], an organisation cannot improve without new ideas, and new ideas generally come from learning. In order to contemplate a meaningful solution to a problem, sometimes it is necessary to look at it from a different perspective. In the absence of learning, it is very difficult to even think of the new perspective. Consequently, the old practices will prevail and solution to the problem may just be cosmetic and short-lived [14]. In a learning organisation environment, employees are supposed to give feedback to evaluate performance, making it possible for the results of continuous improvement activities to be deposited into the

organisational knowledge memory [15]. Consequently, organisational learning can generate more improvements by building on past accomplishment, information of which comes from the knowledge base [15].

The nature of relationship between organisational learning and continuous improvement is not a one-direction process. Both organisational learning and continuous improvement enhance one another [13]. Initially, learning will contribute toward continuous improvement, and later whatever outcomes from continuous improvement is channelled back to the learning process, effectively creating a continuous cycle of improvement and learning.

Continuous improvement is normally associated with problem solving. This is indicated by Bessant's model of continuous improvement capability. The more systematic problem solving, the higher level of continuous improvement capability [12]. It is here within the process of problem solving - identifying and resolving problems that occur in the daily work routines - that learning can occur [16]. The nature of learning that takes place during the problem solving process is a topic of interest because it can have a direct impact on the continuity of the improvement programme. If there is systematic problem solving in place, there is a possibility that for every problem solved, more learning (with more knowledge and skill) can be generated, which in turn can create more opportunities for continuous improvement in future. However, in some cases, there is a tendency to engage in the wrong problem solving behaviour, where problem solving becomes a mere fixing of problem temporarily instead of an analysis and modification of the underlying causes to prevent the same problem from happening again [17]. Such type of problem solving (first-order solution) prevents continuous organisational learning [17], and in the long run, a continuous improvement programme will not be able to go beyond fixing the obvious 'low hanging fruit' problems.

In contrast, a learning organisation, with a correct approach to problem solving, can continue to make significant improvements. Problem solving in the form of experimentation is an excellent mechanism through which double-loop learning can take place. It is here that potential solutions to problem are tested or verified against the anticipated results. In short, this is the familiar learning cycle of Plan-Do-Check-Act (PDCA). Many organizations, with no proper organisational learning system in place, rarely make use of this fundamental concept.

Figure 1 briefly explains the relationship between lean sustainability, continuous improvement, and organisational learning. At the bottom of the figure is a learning organisation where there is a conducive environment for organisational learning to develop. Organisational learning in turn works in combination with continuos improvement. The continuing cycle of organisational learning and continuous improvement eventually contributes toward lean sustainability. At the same time, the presence of second-order problem solving behaviour will contribute toward both organisational learning and continuous improvement in reciprocal manner.

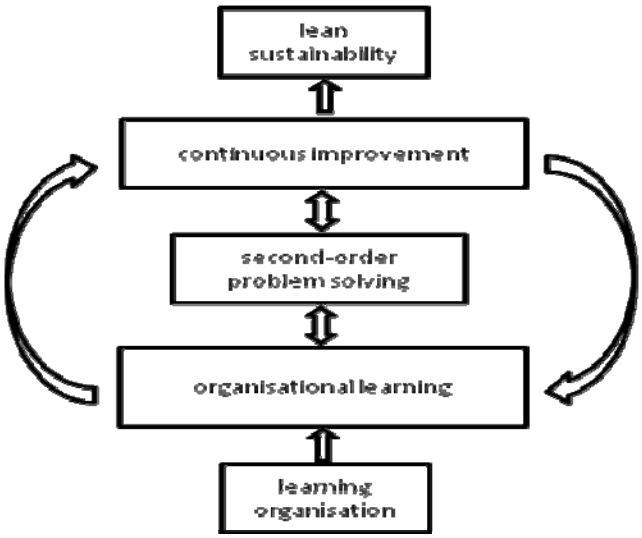

Fig. 1: Relationship between lean sustainability, continuous improvement and organisational learning.

4. Research gap

Although existing literature supports the notion that organisational learning can contribute toward lean sustainability [6, 7], there has been very little research that looks into the empirical evidences that could link organisational learning to lean sustainability, particularly in the context of New Zealand manufacturing companies. As such, there is a need to carry out a quantitative testing to clarify the proposed linkages between organisational learning and lean sustainability.

5. Research Methodology

As mentioned previously, lean has a higher chance of sustaining if there are continuous efforts on improvement activities [1, 6]. For the purpose of this research, the linkage between organisational learning and lean sustainability is explained via problem solving behaviour and continuous improvement activities. Thus, the following hypothesis will be used.

H1: Organisational learning and continuous improvement enhance one another

H2: Organisational learning and problem solving behaviour enhance one another

H3: Problem solving behaviour and continuous improvement enhance one another

5.1. Conceptual model

The first task is to develop a conceptual structural equation model to show the relationship between organisational learning, problem solving behaviour and continuous improvement activities. In this research, Watkins and Marsick's model of organisational learning will be used to measure level of organisational learning within an organisation [18]. This model is based on seven dimensions of learning with observable actions that can be easily measured to build a learning organization. Problem solving behaviour is assessed by using 7-item instrument adapted from Carmeli's work [19] while measurement of continuous improvement is based on survey questionnaire used in Sun et. al.'s work [13].

The conceptual structural equation model is shown in Figure 2. The main body of the structural model contains three latent variables - learning organisation, problem solving behaviour and continuous improvement. Learning organisation in turn is made up of seven constructs as identified by seven dimensions of Watkins and Marsick's learning organisation model. Lines linking learning organisation, problem solving behaviours and continuous improvement represents the regression between the variables.

5.2. Survey and data analysis

This research will be done by conducting survey among employees of New Zealand manufacturing companies that are implementing lean, or have some experience with lean implementation in the past. The research will also cover individuals who are not currently attached to any company but have past working experience in lean manufacturing companies

The survey research instrument was developed based on Watkins and Marsick's Dimensions of Learning Questionnaire (DLOQ), problem solving behaviour scale developed by Carmeli [19] and continuous improvement scale previously used by Sun et. al.'s work [13].

Two analysis techniques will be used. First, a correlation analysis is used to assess the associations among the constructs of learning organization, problem solving behaviour and continuous improvement and the dimensions included in the three constructs. Then, the Structural Equation Modelling (SEM) approach will be used to identify relationships among the three constructs and to test a structural model.

6. Conclusion

This research is basically confirmatory in nature where the expected outcome is whether or not there is sufficient empirical evidence to support the theoretical linkages between organisational learning and lean sustainability via problem solving behaviour and continuous improvement especially in the context of New Zealand manufacturing companies. This research is expected to make a modest contribution to the knowledge and practice in the area of lean and organisational learning.

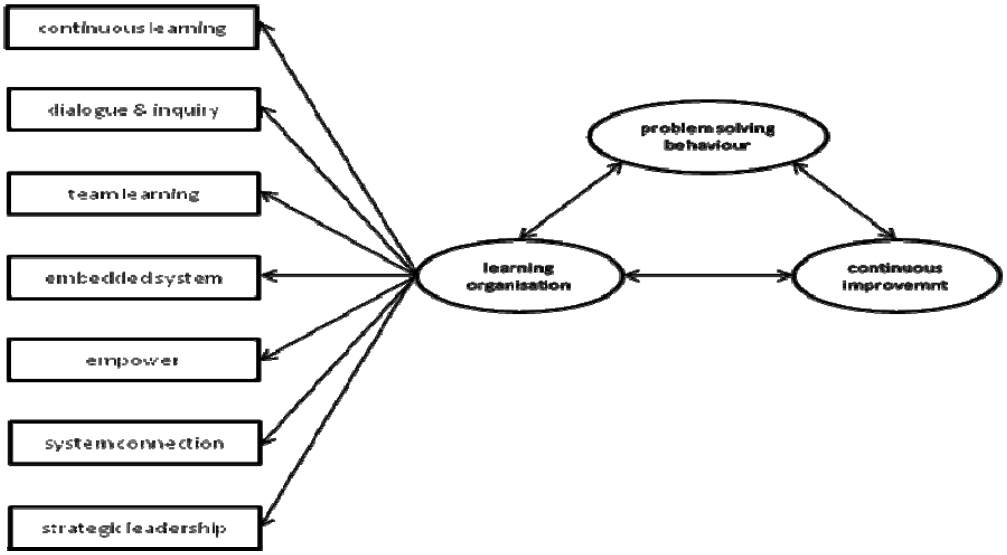

Fig. 2: Relationship between learning organisation, problem solving behaviour and continuous improvement.

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