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[33]

Importance of Strategic Human Resource Practices on Organisational Performance during Lean Production Situations

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Abstract

In the last century Lean Production practices have revolutionised the mass production sector. Globally embraced, many of the leading organisations celebrate contributions Lean Production has made to their success through improved quality and reduced cost and human resources. With contradicting resources and abundant levels of literature on the subject, an organisation may struggle to find a starting point when looking to implement Lean Production practices on their own. In the first part, this paper seeks to define just what Lean Production is, how exactly it may be implemented and what benefits and challenges it can bring to an organisation, if properly implemented. However, the second purpose of this paper is to identify the strategic human resource management practices suitable for the period of transition process to Lean Production and afterwards. Using a case study research in a New Zealand industry, the results show certain important factors. Four main factors are found in the various stages of the adoption and implementation process: staff training, amicable communication, just rewards, and appropriate job design. It has been identified that strategic human resource management is important not only at every stage of the transition process to Lean Production but throughout in order to obtain firm performance.

Keywords: Lean Production, Strategic Human Resource Practices, Transition Process, Waste, Performance

Background

In the last century Lean Production practices have revolutionised the mass production sector. Globally embraced, many of the leading organisations celebrate contributions Lean Production have made to their success through improved quality and reduced cost. With contradicting resources and abundant levels of literature on the subject, an organisation may struggle to find a starting point when looking to implement Lean Production practices on their own.

Lean Production practices originate from the automobile industry, which in the 20th century evolved from expensive specialist craft production to affordable mass production systems. Mass production required investments in single-purpose machines that standardised products and lowered the skill level required of an average worker. With manufacturing needing to be maintained at a pace that matched the machine, and increased demand of these low cost vehicles, organisations turned to buffers such as increased inventory, labour and floor space, to maintain continuous operations (Womack, Jones & Roos 2007).

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With globalisation came competition where price and quality, or the value of the product, defined market success. To sustain market competitiveness, more and more manufacturers looked to streamline operations. One of the most successful at this was Toyota Motor Corporation (formally known as Toyoda). Taiichi Ohno together with a very talented team developed the Toyota Production System which is now the benchmark in Lean Production models (Toyota Motor Corporation 2013).

Modern-day Lean Production literature notes an eighth waste that must be eliminated. This is the waste of human potential or worker skills and abilities (Womack & Jones 1996). In a lean environment, the aim is to yield the most value from all processes and practices. Employees are no different and a cross skilled, talented worker can be an asset to any organisation. Here is where Human Resource Management plays a major role. There is no doubt that the most important sector of an organisation are the human resources. The phrase 'Lean Production' bring fears to all employees and that has to be overcome by educating them about the strategies to be taken place. Addressing the changes that take place in HR management during the Lean Production adoption process is therefore a major issue.

Research Problem

Lean Production is gaining momentum all over the world and it is important for managers to understand how the human resources react to this sudden change. In order for an organisation to flourish, human resources are to be managed in the most strategic way possible.

Employee resistance is a major constraint in introducing lean production. An attitude of 'change is unnecessary' is all too common in most organisations. Workers that are familiar with current procedures become comfortable in their roles over time. Change is therefore seen as a step outside the comfort zone. Employees that have served longer in the organisation and those that benefit from any hierarchy within the company culture are the toughest to convert. Often responses of 'we've seen these fads before', 'no time – too busy', 'things are fine as they are' or 'it's already is too lean' signify their resistance. As workers directly control the success of Lean Production implementation, as well as the level and swiftness of benefits gained, getting employees to accept the project is crucial. Transparency is key; people must be informed of the project scope, why it is in place. Based on a New Zealand Industry, author managed to research how Lean Production practices can be supported and incorporated by the human resources.

Objectives of Study

The main objectives of the research are;

1. To demonstrate the methodology of Lean Production including benefits and implementation challenges.
2. To eliminate this root cause and other non-value adding activities from the organisation's processes.
3. To provide recommendations for improvements in Human Resource Practices before and during Lean Production practices.

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Literature Review

In mid to late 20th century, the concept of Lean Production (Womack, Jones & Roos 2007, Shingo 1989) was often believed to be a 'counter-intuitive substitute model' by the manufacturing sector (Hayes 1981, Krafjick 1988). However over time, the tried and proven results from Lean Production have made it the go-to model (Katayama & Bennett 1996) in improving both manufacturing and service operations (Womack & Jones 1996).

The benchmark for Lean Production is the Toyota Production System, the architect of which is Taiichi Ohno (Wilson 2009). Ohno specified a complete philosophy, combining a multitude of concepts, tools and techniques, which has seen Toyota Motor Corporation become the global leader in lean practices and a household name resounding quality and value (Womack, Jones & Roos 2007). Today, most leading organisations have embraced Lean Production at some level to create more efficient and profitable business models and as such it can be argued that the contribution Lean Manufacturing has made to society is immense.

The Seven Muda (Waste)

Even though Lean Production is often referred to as 'Just In Time', at the core of it is the concept of *Muda* or waste reduction. Wilson (2009) defines Lean Production as 'a comprehensive set of techniques that, when combined and matured, will allow you to reduce and then eliminate the seven wastes, namely Transportation, waiting, defective parts, inventory, movement, excess processing and overproduction. This system not only will make your company Leaner, but subsequently more flexible and more responsive by reducing waste'.

According to Ohino (1988), *Waiting* is wasted labour where workers are awaiting tasks. This can be due to poor load balancing or production lines, awaiting previous steps to be completed (Especially noticeable in a 'Push' driven manufacturing environment), waiting for machine or tooling breakdowns, or unscheduled downtime due to inadequate stock and material management.

Why Use Lean?

With an understanding of what Lean Production is and just how to implement it, an organisation now needs to know just what benefits and challenges are to be expected. By investing in Lean Production practices, an organisation benefits in two stages (Wilson 2010).
First is a reduction of resources (Figure 6), where it needn't be, lowering operational cost and required investment levels. Second is the newfound flexibility to reinvest - for example, space made available from leaner inventory practices can now be used to house an additional production unit funded with the freed up capital and manned by labour saved from leaner operational practices.

The following sections summarise the benefits and challenges that can be expected by organisations who embrace Lean Production practices.

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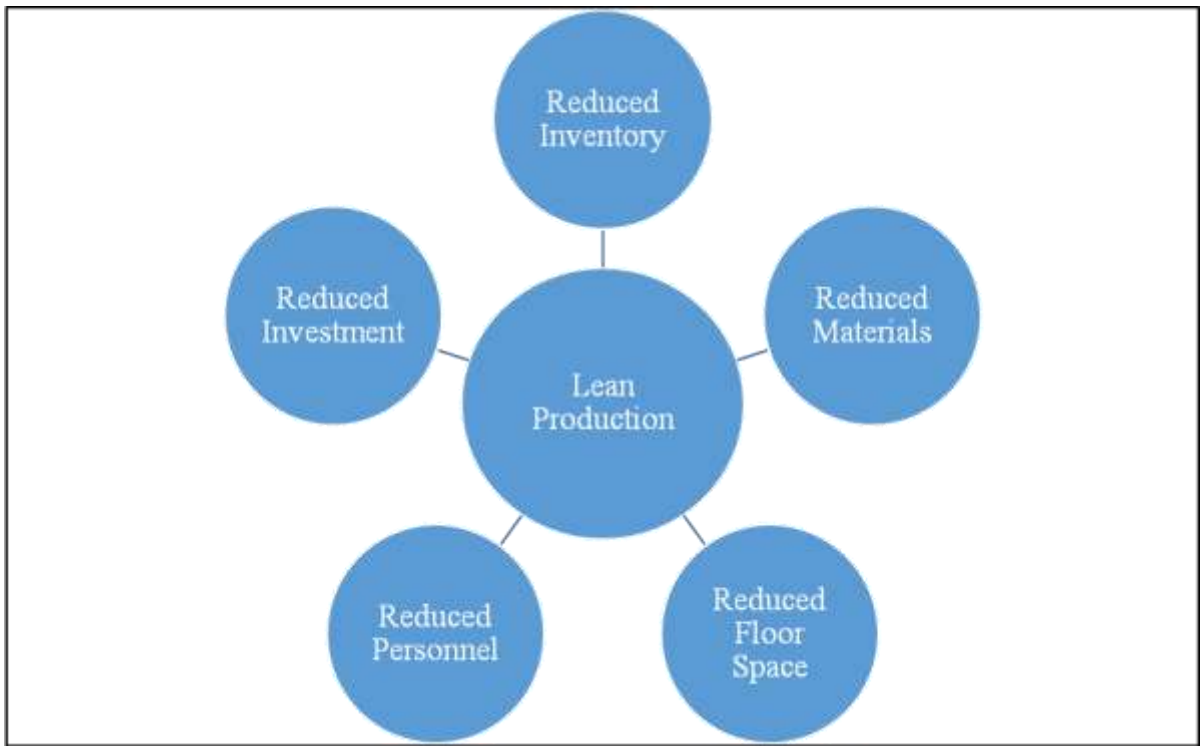
Figure 1: Reduction in Key Resources through Lean Production



Source: Author Created

Benefits of Lean Production

In any major project, potential benefits must always justify the investments needed. Though Lean Production has been proven in case studies, models and simulations (Womack, Jones, & Roos 2007; Abdulmalek & Rajgopal 2007; Womack & Jones 1996), it cannot be assumed to suit all organisations. Therefore it is important to understand what Lean Production offers the organisations who embrace it. Some of the more common benefits of Lean Manufacturing seen by organisations who have implemented it are as follows (Dahlgaard & Dahlgaard-Park 2006; Ahrens 2006; Womack, Jones & Roos 2007; Melton 2005; Goetsch & Davis 2010; Lean Manufacturing Junction 2013);

1. Improved Quality – Due to standardising and error proofing, as well as problem solving and continuous improvement practices.
2. Reduced Rejects and Rework – Direct correlation to Improved Quality.
3. Reduction in Setup Time and Costs.
4. Durable Standardised Processes.
5. Improved Efficiencies – Both in machines and workers; through line balancing, process optimisation, cross skilling and standardising practices.
6. Reduction in Labour Costs – Elimination of unnecessary material handling, increased work efficiency, increased product quality and reduced Setup times, all contribute. This does not always mean job cuts; staff can be better utilised to match production demands or trained for other roles.

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Challenges

To get these benefits an organisation must overcome some challenges. A tactful and thorough approach is needed at the planning stage to ensure Lean Production is successfully accepted at any organisation. A high team moral and effective company culture (Dahlgaard & Dahlgaard-Park 2006) is needed, as processes and plans are only as effective as the people that follow it, therefore project transparency and workforce engagement is crucial.

Human Resource Management and Lean Production

Communication has been widely recognized in the literature as a vital component of Lean Production (Womack et al. 1990; Spear & Bowen 1999). Although mass and flexible (or "lean") production systems implicitly require different approaches to managing human resources, Womack et al. (1990) did not explain how HR practices are integrated into these different production systems, nor did they test the relationship between HR practices and performance. Indeed, the term "Lean Production" used by Womack et al. appropriately captures the minimization of buffers but neglects the expansion of work force skill and conceptual knowledge required for problem solving under this approach. These "enriched" human resource capabilities are better described in terms of flexibility.

Many researchers links Lean Production and HR Management that focus on describing the HR policies and practices associated with Lean Production (e.g., Forza 1996; Niepce & Molleman, 1996; Pil & MacDuffie 1996; Biazzo & Panizzolo 2000; Olivella et al. 2008), the impact that Lean Production implementation has on people (e.g., Forrester 1995; Niepce & Molleman 1996; Conti et al. 2006; de Treville & Antonakis 2006) and the influence that Lean Production -associated HR practices have on performance (e.g., Shah & Ward 2003; Bonavía & Marín-García 2011).

However, despite the importance of managing HR for Lean Production, a greater emphasis has been detected in the literature on technical aspects than on the roles of people and cultural change in the transition process to Lean Production. There are only a few that analyse the success factors of HR management in detail.

Olivella et al. (2008) identify Lean Production - oriented work organization strategies, including standardization, ongoing training, teamwork, participation and empowerment, versatility, commitment to company values, and contingent rewards. Bonavía and Marín-García (2011) point to Lean Production - oriented companies promoting flexibility and versatility, investing in training and committing to variable compensation. Huselid (1995), MacDuffie (1995), Pil and MacDuffie (1996) identify HR factors that have a good fit with Lean Production, including teamwork, job rotation, ongoing training, contingent rewards, job security, versatility and participation. Lean Production adoption entails significant organizational change, which means that companies should manage people at the beginning of a Lean transformation (Sawhney & Chason 2005; de Treville & Antonakis 2006). According to Sawhney and Chason (2005), Beauvallet and Houy (2010) cultural change and the commitment and support of company management are some of the greatest challenges to Lean being accepted by people. There is no consensus with regard to the way that Lean

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Production could affect personnel (Conti et al. 2006; de Treville & Antonakis 2006) or to the role that HR practices and policies play during the Lean Production implementation process (Liker & Hoseus 2010; Bonavía & Marín-García 2011).

Methodology

The case study provides the depth required for exploring why and how companies have successfully managed HR during the Lean Production adoption and implementation processes. I study several cases to explore these questions and build theory, as this method is suitable for observing and describing a complex research phenomenon and improving its understanding (Meredith 1998; Eisenhardt & Graebner 2007). This method also helps to reinforce internal validity and enables the findings to be replicated, thus increasing the external validity of the research (Eisenhardt 1989).

Lean adoption and implementation in several factories of manufacturing and packaging industry in North Island, New Zealand were investigated. It was considered appropriate to explain the cultural change that is inherent in the transition process to Lean Production. On the other hand, it also enables Lean Production adoption and implementation to be investigated as a sequential process in factories where both have taken place. There were altogether 7 companies that manufactured electrical and mechanical equipment and tools and three companies that produced packaging. For confidentiality reasons the names of companies cannot be disclosed. The number of questionnaires ranged from 50 to 200 per factory or plant depending on the number of employees.

There were two sets of questionnaires.

Set 1. The questionnaire provided to the employees was longer and consisted of 10 themes:

1. Trust in lean management
2. Attitude
3. Support received from management
4. Whether any Training was received
5. Communication at the beginning, throughout and end
6. Job Satisfaction
7. Incentives awarded
8. Appreciation by management
9. Constraints
10. Whether job design was appropriate

Set 1. The questionnaires provided to the management consisted of 7 themes:

1. Were the employees given enough prior notice of change?
2. Were sufficient training was provided to the employees?
3. Were adequate communication was carried out with the employees?
4. Rewards, if any to the employees affected
5. Were new staff were recruited?
6. Were any staff were laid out?
7. Whether Job designs, if any, were successful?

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Validity & Reliability

The data were collected from employees as well as the CEOs. Questionnaires were given to them. Production figures were obtained and there was a genuine interest and transparency in giving out information. The results were validated using software and statistical analyses. They have a very high reliability level. Reliability was established using a pilot test by collecting data from 20-30 subjects not included in the sample. Data collected from pilot test is analysed using software obtaining "correlation matrix" and "view alpha if item deleted" column. Items were deleted that substantially improve reliability. A reliability coefficient (alpha) of .70 or higher was considered acceptable reliability.

Results

Transparency is key; people must be informed of the project scope, why it is in place, the benefits it will bring the organisation and what role each and every one must play for it to be successful. One of the most important steps that get overlooked here is communication the benefits brought by the project to employees. Workers should be made aware of advantages like job standardisation, training and up skilling, additions of machines i.e. more operator roles, job security brought on through better company performance, and safer work environments. Poor planning for this challenge will most likely bring on hindering resistance that will be harder to resolve as the project goes on. The findings enabled us to find various success: staff training, good communication, just rewards, and appropriate job design.

Lean Production will require additional labour resources during the implementation and testing stages. The level of investment needed will greatly depend on the speed of implementation and the number of processes improved simultaneously. As the aim is to up skill existing personnel, an idea would be to hire temporary labour to cover current positions while permanent staff are trained and involved in implementing the project. As Lean Production encourages labour reductions, workers no longer needed for old processes can now be allocated to the next stage / area of implementation as well as the new continuous improvement roles.

Discussion

The factors that were identified in each of the phases and in all the cases analysed are discussed below and quotations are given to support the findings.

Management of the Labour Relations Framework prior to Lean Production Adoption

Joint committees between management and social representation were set up. This was done to modify some past social aspects that might later become obstacles to the adoption and implementation process. If negotiations on the Lean transformation are held with employee representatives at the beginning, it might pave the way and get rid of some of the obstacles to the organizational cultural change. This enables Lean Production to be implemented successfully.

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Staff Training

Training focused on changing the mindsets of the people in the area, both the workers and the managers. A number of authors state that a change in mentality is crucial for achieving success in Lean (Niepce & Molleman 1996; Sawhney et al. 2010).

Practical training in the use of basic and easily applied tools through what is known as on-the-job-training or learning-by-doing. This finding supports what is stated in the prior literature about how important applied training is for people to better assimilate and learn the first Lean tools (Barton & Delbridge 2001; Stewart et al. 2010).

Well-trained workers are likely to adapt to changes because they use their knowledge and experience to facilitate the process of new technology adoption (Lee et al. 2011). The use of internal expert personnel for training helped to speed up the Lean adaptation process.

Deploying different training programs, depending on the rank was the key to each member of the organization getting to know what role they had to play in the Lean environment (Turesky & Connell 2010). Thus, the appearance of Team Leaders in the work teams meant that these received the specific training that they required to carry out their functions. Similarly, the Lean Leaders received training in Lean leadership in order to get the plant personnel engaged and aligned with the initiative.

The findings demonstrate the strategic importance of ongoing training in the use of new Lean tools and practices for moving forward in the culture change and upgrading employees' skills and knowledge (Birdi et al. 2008). Another success factor was that the training focused on updating basic Lean tools and techniques in order to keep workers engaged with Lean Production as a key aspect for keeping up worker commitment to the Lean initiative.

Good Communication

This reinforces the importance that the literature places on the change in managers' roles and functions within the context of the adoption of Lean tools (e.g., Power & Sohal 2000). This was the very beginning of participatory management and the delegation of responsibilities to workers, as well as greater support being given to them (Beauvallet & Houy 2010; Turesky & Connell 2010).

Communication aimed at winning people over from the top down and focusing on the need for change and the benefits of Lean so as to overcome people's initial scepticism and resistance to Lean Production. Thus, a number of authors found that failing to create and communicate a sense of urgency in Lean transformations and a lack of information about the initiative and need for change might cause the Lean initiative to fail (Womack & Jones 1996; Lucey et al. 2005; Worley & Doolen 2006; Scherrer-Rathje et al. 2009). In this same respect, Gagnon et al. (2008) find that if workers are well-informed about the Lean strategy, this could be a prior step to them committing to it.

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Development of structured communication methodology based around daily meetings and key indicators of the results of LP implementation was vital. Implementing SQCDP (*Safety, Quality, Cost, Delivery, People*) visual display panels and a structured methodology with regular meetings among the different levels in the organization enabled communication to flow more easily throughout the plant and helped raise internal coordination and integration levels. A structured communication procedure can improve worker involvement, provide the workers with greater accountability and give them a greater feeling of ownership of Lean achievements (Lucey et al. 2005). Continuous information feedback can also give a rapid response to any departure from the objectives set (Mehta & Shah 2005) and the bases for continuous improvement (Spear & Bowen 1999).

Just Rewards

Rewards were initially linked to management considering and implementing workers' proposals. This was a key feature in getting workers to trust managers, to overcome the inertia of the past and align workers with the Lean initiative, and to boost motivation (MacDuffie 1995; Worley & Doolen 2006). In support of this idea, Boudreau et al. (2003) state that rewarding people's "good work" in a non-monetary way may contribute to improving results in production plants that are already making headway in a Lean initiative.

It was observed that rewards in connection with the Lean objectives came in the form of both monetary incentives and non-monetary recognition The findings complement the findings of Karlsson and Åhlström (1996) who maintain that there is a trend for a monetary incentive system to act more as an inhibitor in the adoption phase, but that with time it tends to facilitate the implementation process. Both monetary incentive and non-monetary recognition systems were put in place in all factories. Lean-related rewards can acknowledge versatility and teamwork, and increase worker participation and commitment (Olivella et al. 2008).

Appropriate Job design

One first explanatory success factor was the physical changes that came from implementing basic, easy-to-understand Lean tools. The objective of starting with tools like Value Stream Mapping (VSM), 5S and Visual Management was to improve the work station and its ergonomics, which was of direct benefit to the workers. Work standardization was done by the workers themselves with the help of the support departments in order to enhance the feeling of ownership, tracking and continuous improvement. The literature highlights the role of standardization as a key tool for coordinating work in a Lean environment (e.g., Parker 2003; Olivella et al. 2008) as it facilitates the implementation of different techniques and task rotation (Niepce & Molleman 1996; Olivella et al. 2008). Continuous improvement-oriented work standardization was important.

Recommendations

This paper is also a qualitative and exploratory study undertaken in a specific industry, which means that the generalization of our findings is limited. It would be useful to do further research to overcome these limitations by testing the proposed model in other contexts. Bearing these limitations in mind we suggest some lines of future research. It would also be

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interesting to examine whether the proposed models could be applicable to or should be adapted to other levels of the manufacturing and packaging industry. We also propose further research be done to try to measure the intensity of the relationships that have been identified.

Conclusions and Implications

This study contributes to connecting the Lean Management and Human Resources areas which have traditionally been analysed individually but which, as Boudreau et al. (2003) state, have significant links. This connection is especially important for explaining the transition process to Lean Production as, despite the major role that people play in this management system, prior research has not looked in depth at the role of human resource management and the cultural change required for the process to be executed successfully. With respect to people, research has focused on the characteristics of work organization in Lean environments (Forza 1996; Biazzo & Panizzolo 2000), on analysing Lean Production - associated advanced HRM (Huselid 1995; Bonavía & Marín-García 2011) and on examining how Lean Production affects workers (Niepce & Molleman 1996; de Treville & Antonakis 2006). This paper addresses an important step regarding the role that people play during the Lean Production adoption process and tries to discover which aspects favour workers' adaptation to this management system. In order for the cultural change that is inevitable to take place smoothly, Lean Production needs to be properly understood.

This paper contributes towards simplifying the complex issues associated with the transition to Lean Production (Scherrer-Rathje et al. 2009) by focusing on the key role that people play in this process (Sawhney & Chason 2005; De Treville & Antonakis 2006), but shifting the focus by trying to understand the aspects of HRM that contribute to overcoming workers' negative attitudes and initial resistance to Lean Production and to successfully adapting to this management system.

As for the implications of these findings for management, it should be stated that they can be used as guidelines for companies proposing to adopt Lean Production and for managers responsible for the Lean Production implementation process, and act as an aid for defining aligned and sequenced action plans for attaining and maintaining the results that Lean Production affords.

It is necessary to stress that the factors identified should not be considered in an isolated way in each of these phases, but from a holistic focus, where each of the factors interacts with the others in each of the phases. This is the only way to understand the sequence that leads to the cultural change associated with Lean Production. By embracing the Lean Production philosophy and making changes towards best practice, any organisations can become the best performing organisation and operate much more sustainably within limited Human Resources.

Contributions to Literature

There are many academic publications and industrial reports written about Lean Production. However, only a few people have researched the relationship between Lean Production and

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Human Resource Management. Therefore this paper makes an important contribution to Literature.

Limitations

This study was limited to factories and plant in manufacturing and and packaging industry in North Island, New Zealand. It also did not research post Lean Production issues.

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