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Human resource management in Lean Production adoption and implementation processes: Success factors in the aeronautics industry

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Abstract The purpose of this paper is to identify success factors in human resource management during the transition process to Lean Production. Using case study research in the aeronautics industry, the results show a series of explanatory factors that are then grouped into main factors depending on the phase of the transition process. Thus, in the pre-adoption phase, the setting up of joint management-trade unions committees is the main factor. Five main factors are found in the other three phases of the adoption and implementation process: training, communication, rewards, job design, and work organization. Moreover, a variety of explanatory elements are identified in each of the main factors found in each phase of the transition process to Lean Production. Finally, a model is developed to understand the sequence that leads to the cultural change associated with Lean Production.

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1. Introduction

Lean Production (LP) has been adopted by companies in various service and industrial sectors in recent decades and these companies have subsequently moved forward in its implementation. In many cases this has enabled them to improve their results and competitiveness (Moyano-Fuentes and Sacristán-Díaz, 2012). However, empirical evidence

shows that the transition to LP is a complex task that generally has to contend with a large number of obstacles (Scherrer-Rathje et al., 2009).

LP adoption entails significant organizational change which requires companies to properly manage the key factors that might influence on the success of the adoption process. Although the literature highlights the crucial role of people (e.g., Sawhney and Chason, 2005; de Treville and Antonakis, 2006), there is a lack of studies that examine the changes that take place in Human Resource (HR) management during the adoption process (Needy et al., 2002).

As far as the implementation of LP is concerned, a number of recent studies state that not enough research has been conducted into the human aspects associated with this

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phase (Angelis et al., 2011; Bonavía and Marín-García, 2011). Despite LP involving significant changes in HR practices and policies (Biazzo and Panizzolo, 2000), there is no consensus in the literature on the way that LP might affect people (Conti et al., 2006; de Treville and Antonakis, 2006), or the role of HR policies and practices during the LP implementation process (Liker and Hoseus, 2010; Bonavía and Marín-García, 2011).

Consequently, it is important to address in depth the role that people play during the different phases of the transition process to LP, including both LP adoption and implementation. Therefore, our main research question is: *How do companies manage their human resources in such a way that they ease the transition process towards LP and move it forwards?* We intend to achieve the following operating aims:

- To identify the HR explanatory success factors during the different phases of the transition process to LP.
- To group the explanatory success factors associated with HR management into main factors linked to human resource management during each of the transition process phases to LP.
- To propose a model that includes these main factors and the relationships among them during the various phases of the transition process to LP in order to gain a better understanding of the cultural change associated with the transition to LP.

2. Literature review

2.1. Lean Production

LP is a management system focused on eliminating the types of waste identified by Ohno (1988) and other wastes related with internal variability and external variability produced by relationships in the supply chain (de Treville and Antonakis, 2006; Shah and Ward, 2007). As such, LP can be defined as ‘‘an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer, and internal variability’’ (Shah and Ward, 2007, p. 791). The main objective of this management system is, therefore, to achieve maximum efficiency, carrying out operations at a minimum cost and with zero waste.

LP is a management philosophy based on continuous improvement, which requires the involvement and commitment of everyone in the organization and provides an opportunity to improve the results in terms of quality, costs and lead times (Womack and Jones, 1996; Moyano-Fuentes et al., 2012). Since it was first disseminated, LP adoption has therefore spread to companies in a range of industrial and service sectors and has, in many cases, enabled these firms to improve their results (Moyano-Fuentes and Sacristán-Díaz, 2012). However, although numerous companies have implemented LP successfully, others have not achieved the results that they anticipated, and failed implementations are common (Staats et al., 2011), as is the inability to maintain results over the medium and long term (Lucey et al., 2005). This is a consequence of the LP implementation process’ inherent complexity (Scherrer-Rathje et al., 2009).

This has driven research interest in the factors that facilitate and inhibit the LP adoption and implementation processes. Prior research has identified a series of factors that facilitate these processes and there is a broad consensus that HR and cultural change are critical factors for the success of Lean initiatives (Emiliani, 2006) and their sustainability over time (Bateman, 2005).

There is also a broad consensus that the success of a Lean transformation not only depends on the application of tools and techniques (*hard side*), but that for the sustainable benefits of these to be achieved, it is necessary to pay attention to the human factor and the establishment of a culture that sustains the Lean transformation (*soft side*). In other words, as LP is an integrated socio-technical system, success comes from these two facets being applied simultaneously and systematically (Dibia and Onuh, 2010; Liker and Hoseus, 2010; Badurdeen et al., 2011).

2.2. Lean Production and Human Resource Management

There are various lines of research in the literature that links LP and HR management that focus on describing the HR policies and practices associated with LP (e.g., Forza, 1996; Niepce and Molleman, 1996; Pil and MacDuffie, 1996; Biazzo and Panizzolo, 2000; Olivella et al., 2008), the impact that LP implementation has on people (e.g., Forrester, 1995; Niepce and Molleman, 1996; Conti et al., 2006; de Treville and Antonakis, 2006) and the influence that LP-associated HR practices have on performance (e.g., Shah and Ward, 2003; Bonavía and Marín-García, 2011).

However, despite the importance of managing HR for LP, 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 LP. Thus, while a range of studies have analyzed the general success factors in LP adoption and implementation (e.g., Worley and Doolen, 2006; Turesky and Connell, 2010; Pedersen and Huniche, 2011), there are few that analyze the success factors of HR management in detail.

There is no consensus on what the main success factors are in these studies, although certain factors are suggested by different authors. Olivella et al. (2008), for example, identify LP-oriented work organization strategies, including standardization, ongoing training, teamwork, participation and empowerment, versatility, commitment to company values, and contingent rewards. Meanwhile, Bonavía and Marín-García (2011) point to LP-oriented companies promoting flexibility and versatility, investing in training and committing to variable compensation. The literature on advanced human resource practices (Huselid, 1995; MacDuffie, 1995; Pil and MacDuffie, 1996) identifies HR factors that have a good fit with LP, including teamwork, job rotation, ongoing training, contingent rewards, job security, versatility and participation.

LP adoption entails significant organizational change, which means that companies should manage people at the beginning of a Lean transformation (Sawhney and Chason, 2005; de Treville and Antonakis, 2006). LP can be especially complex in this respect due to the high degree of worker participation required to organize the work (Pil and MacDuffie,

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