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Lean Stress Sensitization in Learning Factories

U. Dombrowski, J. Wullbrandt*, A. Reimer

Abstract

Nowadays, challenges like increasing product varieties or the demographic change, force companies to reinvent their organizational structure frequently. By means of implementing Lean Production Systems (LPS) many firms were able to eliminate unnecessary waste and therefore gradually improve their production processes. However, due the fact that the abovementioned organizational changes can always have a direct impact on the stress level of individuals, knowledge regarding this potentially harmful interrelation is inevitable for a company’s overall productivity. Leaders are of particular importance in this construct, because their attention towards stressed employees represents the decisive lever in preventing productivity losses and costs caused by stress-related illness. However, a recent study revealed that future Engineering Managers do not understand the relationship between the implementation and execution of Lean initiatives and increased levels of employee stress. This paper proposes a concept for including harmful socio-technical interrelations like employee stress into learning factories. A learning environment that combines interdisciplinary training concepts provides an ideal basis for demonstrating and explaining potential employee stress. As a result, leaders will pay increased attention to include stress management in their daily leadership routines and become better in promoting a culture that focuses on adding value rather than generating illness-related costs.

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1. Introduction

Increased complexities on global markets make it necessary for organizations to constantly improve their competitiveness. In order to face the dynamic changes that are inherent in those fast changing systems, companies all over the world started to implement Lean Production and its tools and methods. The abovementioned optimization strategy has evolved to the state of the art in manufacturing industries. This can be derived from the results of an international survey. The statistics show that 80% of the participating companies claim to use the principles of Lean

* Corresponding author. Tel.: +49 531 391 2714; fax: +49 531 391 8237. E-mail address: j.wullbrandt@tu-bs.de
Production Systems (LPS). [1,2] However, numerous authors and practitioners state that in reality, the results of an implementation of selected Lean methods often do not meet the initial expectations or do not last very long. [3,4] One of the root causes for unsuccessful LPS implementations is leaders’ and employees’ lack of LPS knowledge. [5] Whereas technical elements, such as machines or processes, can be improved and reorganized easily, the formation of a Lean mindset among people in an organization is nontrivial. Several authors acknowledge that a so called “Lean Leadership” style is the most important aspect in implementing and running a LPS. It tends to be the missing link that is necessary to jointly optimize processual or technical aspects in a LPS and the self-improving social system that triggers the continuous improvement process. [3,4,6,7]. Consequently, there is a strong need that Lean Leaders not only know about the positive but also about the harmful socio-technical interrelations that might exist within the company. Promoting the valuable norms and mindsets, such as innovativeness, and mitigating the bad ones, such as stress, is necessary in order to create a true Lean Culture and to move one step closer towards the desired Lean Enterprise.

A study, which is described in chapter three, revealed that students in the fields of engineering and management do not know about stress to be a potential negative outcome of implementing Lean and its tools and methods. If one considers that a constructive Lean mindset among the workforce is essential for boosting overall company success, it becomes clear that future leaders need to be sensitized prospectively that the implementation as well as the work with Lean methods can cause higher stress levels among employees. Otherwise, future leaders will not be able to address work stress in their daily leadership routines and therefrom will not be able to reduce stress-related illness and costs and to effectively support the creation of a Lean philosophy.

2. Leadership in the Lean Enterprise

Since the first industrial revolution, the main objective of a manufacturing company is to fulfill customer demands by offering products that are characterized by the highest quality, lowest costs and delivered with minimal lead times. Therefore, every market participant is constantly trying to identify their competitors’ best practices, copy or adapt them and finally implement similar concepts. Countless benchmarks are still being conducted by consulting firms and scientific facilities in order to find the best possible ways of how to produce industrial goods with a minimum of resources. To a great extent these strategies focus on selected business units, primarily technical aspects and are short-term campaigns that help cutting-costs, boost efficiency and reduce cycle times. [8]

2.1. The Lean Enterprise

One promising optimization strategy that focuses on the bigger picture is the creation of a “Lean Enterprise”. The idea of the Lean Enterprise is to transfer and adapt the Lean principles to all business segments such as product development, production, sales and service, administrative processes and leadership. [8] The aim is to optimize the whole system by avoiding local improvements within individual business segments that might have a negative influence on other neighboring business areas. The general structure and organization of such a Lean Enterprise is presented in Fig. 1. It can be seen that in the Lean Enterprise all business areas are process orientated and operate by using different Lean principles that include specific Lean tools and methods. Moreover, all units are interacting with each other on horizontal as well as vertical levels. Since the Lean idea was born in the automobile production sector, it is still most widely known and applied in the manufacturing divisions. That is why in this paper further concentration is on the LPS. According to VDI 2870 guideline a LPS can be described as “an enterprise-specific, methodical system of rules for the continuous orientation of all enterprise processes to the customer in order to achieve the objectives set by the enterprise management” [2]. As shown on the right-hand side in Fig. 1, a LPS can be divided into a number of structural elements. From the bottom to the top, it consists of tools and methods, formal Lean principles, enterprise processes, and objectives.

2.2. Leadership and the role of people in Lean Production Systems

Despite companies started to realize that they have to adopt the principles, methods and tools to their specific needs, most LPS implementations are still not successful or don’t meet the initial expectations. Several authors found out that most companies focus on the visible elements when implementing a LPS, e.g. using methods and tools to change
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