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ScienceDirect

Procedia - Social and Behavioral Sciences 238 (2018) 492 – 500

Procedia Social and Behavioral Sciences

SIM 2017 / 14th International Symposium in Management

Lean manufacturing in SMEs in Romania

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Abstract

This paper aims to bring to the forefront a concept that has put its mark on the manufacturing process development over the past two decades, namely lean manufacturing.

The objective of the theoretical part of the article is, by summarizing the information existing in the literature, to present the meanings given to the concept of lean manufacturing and how it can be implemented in organizations (steps to be followed, success factors, barriers), the term evolution and the emergence of a new concept - Lean Six Sigma.

The second part is an investigative approach to the interest of Romanian bloggers in studying the lean manufacturing phenomenon, especially a well-known instrument of it, just-in-time production method.

The information obtained has shown that although the concept is an intensely studied international literature, in the autochthonous approach is in the early stages.

Peer-review under responsibility of SIM 2017 / 14th International Symposium in Management.

Keywords: lean manufacturing; lean six sigma; just-in-time

1. The emergence of lean manufacturing

Rose, Deros, et. al. (2011) argue that the last two decades were dedicated for research aimed at improving the manufacturing process. They bring into question the lean manufacturing, total quality management, total productive maintenance and their application within various manufacturing companies.

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Peer-review under responsibility of SIM 2017 / 14th International Symposium in Management.
doi:10.1016/j.sbspro.2018.04.028

In their opinion, "it was proven that lean manufacturing was considered as the best manufacturing system in the 21st century". (Rose, Deros, et. al., 2011, pp. 872)

In the same idea, Kodali (2009) believe that lean manufacturing came to the attention of companies worldwide, irrespective of the sector they belong. According to him, implementation of lean manufacturing has become a necessity among organizations wishing to operate on a global market. Although its implementation benefits are undeniable, in his opinion, not many companies have resorted to implementing its principles and philosophies.

We believe it is essential to know where it started interest in what today is called lean manufacturing.

Toyota is generally recognized as the birthplace of lean. (Worlev, 2004, pp. 11)

Pepper and Spedding (2010) assigned the starting point of what is now known as lean thinking to Toyota company. According to them, the lean current comes from The Toyota Production System and "the development of this approach to manufacturing began shortly after the Second World War". They mentioned that "forced by shortages in both capital and resources, Eiji Toyoda instructed his workers to eliminate all waste". (Pepper and Spedding, 2010, pp.138)

Lean is "a set of principles, philosophies and business processes to enable the implementation of it, which is widely known and implemented since 1960". (Rose, Deros, et. al, 2011, pp. 872)

Manotas Duque and Riviera Cadavid (2007, pp. 71) have similar opinions. They affirm that "Lean Manufacturing was developed by Toyota Motor company to address their specific needs in a restricted market in times of economic trouble".

So we can observe that the above authors have de same approach and place the lean current appearance around the same period.

However, the above authors come yet with a distinctive note. They state that this trend begins with Henry Ford, somewhere in 1913, in the Highland Park manufacturing plant. "There, a set of practices and tools (interchangeable parts, standard work and the assembly flow line) was put in place in such an integrated way that allowed them to turn out products at incredible speeds, with very short flow times and high consistency. This system was not very flexible, though." (Manotas Duque and Riviera Cadavid, 2007, pp. 71)

According to them, the Toyota would take over the practice after a visit to Ford by Kiichiro Toyoda (member of the founding family of Toyota) and Taiichi Ohno (Toyota's leading manufacturing engineer), after World War II. They noted that some elements observed in the trial of the Ford can be adopted successfully in their company.

Some of the items taken and processing carried out in this respect: "they changed the emphasis from machine and workstation optimization to product flow through the total process, implementing some clever and "simple" ideas like dimensioning the manufacturing resources according to actual demand (rightsizing), improving the self-monitoring capabilities of equipment to ensure quality (Jidoka), designing the process layout to facilitate the sequence of the operations (Group Technology), studying and improving quick setups to enable rapid changeovers (SMED) and the use of kanbans to coordinate the production pull from and link one workstation to its predecessors and successors, and also to link the company with its suppliers and enable JIT supply". (Manotas Duque and Riviera Cadavid, 2007, pp. 71)

"The first step in a lean transition is to identify value-added and non-value adding processes". (Pepper and Spedding, 2010, pp. 138)

"In the literature, value is simply defined as what the customer is willing to pay for. Non-value added activities are generally understood to be either waste, or incidental activities that are necessary but add no value to the product". (Rogstad, 2010, pp. 15)

"Lean Manufacturing is a collective term for production practices aimed at increasing value creation and reducing waste in all forms. Lean Manufacturing focus on shortening the timeline between customer order and shipment, as well as cutting costs and improving quality, by identifying and eliminating waste in the value stream". (Bakås, Govaert, Van Landeghem, 2011, pp. 2)

Seven forms of waste have been identified in these sense (Pepper and Spedding, 2010, pp.139):

- *over-production;*
- *defects;*
- *unnecessary inventory;*
- *inappropriate processing;*