Abstract

The Lean Manufacturing (LM) philosophy is applied in different kinds of companies and their branches. LM uses many methods. Several enterprises, in order to minimize costs, use poor quality materials or overload workers with work. They do not realize other possibilities for the improvement of enterprise effectiveness. They are also troubled by the unknown. This problem is particular to many cases related to the LM concept. This paper shows the results of the study carried out in SMEs from different branches in the Podkarpackie Voivodeship (Poland). The way of the LM system application by the enterprises was studied. The results show that many SMEs are eager to implement the LM philosophy.

Keywords: Lean Manufacturing; SME enterprises; wastes elimination

1. Introduction

In the era of competition, companies are looking for methods and tools mainly in order to reduce costs. Several companies, so as to minimize costs, use poor quality materials or they overload personnel with work. They do not see other possibilities for increasing the effectiveness of the enterprise. However, more and more companies realize that one of the ways for costs reduction lies in improving production processes. Therefore, they are looking for different possibilities of improvement. Lean Management philosophy proposes a set of tools which can be used in companies development. The researches from Ohno [1] and Holweg [2] shows that for many years this concept has been known around the world. Nevertheless, in Poland it was first implemented in the 90s in the automotive industry, results from Horbal et al. [3]. Companies are anxious of the unknown and that is in many cases the problem with the LM concept. First, following Toyota Motor Company, the companies operating in an automotive industry researches from Wallace...
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[4], Lee et al. [5] and Berg and Ohlsson [6] and then other industries implemented the lean philosophy, Doolen and Hacker [7], Sahoo et al. [8]. Finally, Holden [9], Basl and Sąsiadek [10] show, that the lean concept was adapted in service organizations. In this paper the authors look for answers to the questions connected to the process implementation of LM and to its difficulties. They also try to find techniques and methods which have been or will be implemented by SME enterprises in the future. So far much research has been carried out to analyze the problems as well as the benefits concerning the Lean Manufacturing concept implementation in the different size enterprises in the works Gunasekaran et al. [11], Manoj et al. [12], different industries in the papers Dora et al. [13] and Perez and Sanchez [14] and different regions of the world in the literature Nordin et al. [15], Eswaramoorthi et al. [16] and Banhan [17]. The results from Stadnicka and Antosz [18], Piasecka-Głuszak [19], Bednarek and Buczacki show that similarly, investigations concerning Polish companies were performed. Authors of publications Anand and Kodali in works [21, 22], among others, tried to present principles and suggestions to facilitate the implementation of lean manufacturing systems. It is also possible to find indicators which can be used to assess the implementation of the lean concept e.g. in the papers Shah et al. [23] and Singh [24]. Based on the literature review, specially Olivier et al. [25] and Sanjay [26], positive effects of the lean implementation can be seen.

As we know from previous works, large companies are more willing to implement the lean concept. In this study the authors wanted to investigate the situation among SME in Poland in the region where automotive and aviation industries are well developed (podkarpackie voivodship). These SME are in many cases the suppliers for large companies, such as Pratt & Whitney, which have influence on SME by imposing on them high requirements concerning price, quality and lead time.

2. The methodology and subject of the study

This paper presents the implementation of the LM idea in SME. Different ways of this philosophy implementation by the enterprises were studied. The study researchers gathered the information from the manufacturing enterprises of different industry brands in the area of the podkarpackie voivodship (Poland). The detailed topic of the research and the ranges of LM implementation in companies were: (1) reasons for LM application, (2) main aims of LM implementation indicated by the analyzed companies, (3) typical wastes present in the companies, (4) whether the LM aims in the enterprises were determined, (5) whether the enterprises determined the measures of the LM assessment, (6) what are the determined measures of the LM assessment, (7) problems observed in LM, (8) LM methods and techniques implemented, (9) LM methods and techniques planned to be applied. Interviews were used for the study. The people from the top and medium management as well as the employees and appliances supervision workers in a company were the subjects of the study. The study used the questionnaire with a multiple choice format. This questionnaire includes a list of questions with answers. The respondents have to answer these questions with one or a multiple response. Moreover, they can also give other answers not included in the questionnaire. 49 companies were investigated.

3. The enterprises structure

In the study, the following criteria were adopted to categorize the enterprises: type of industry, type of production, size of the company, self-assessment of the situation of the company and ownership type (type of capital). The table 1 shows the structure of these enterprises.

Among the analyzed enterprises most are medium (53%) and least are micro (14%) ones. Most of the companies operate in metal processing (43%). There are companies which operate in two industries. Most of them are the companies with a piece production type (73%), small batch (29%) and medium batch (24%). There are also companies which have two types of production. 76% of the studied companies has Polish majority capital and only 6% has entirely Polish capital. 47% of the enterprises define their condition as developing and 45% as stable. 8% of the companies assess that they are in a difficult situation.
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