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Strengths and weaknesses of small and medium sized enterprises regarding the implementation of lean manufacturing

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Abstract: The purpose of this article is to explore the difficulties experienced when implementing Lean Manufacturing in small and medium sized enterprises (SME). In this work, we draw up a dual evaluation focusing first on the key characteristics of SMEs and then on the management principles of Lean Manufacturing. Based on an analysis of the scientific literature, we observe a number of conflicts between the characteristics identified for SMEs and Lean Manufacturing. The absence of functional organization, lack of methodology and deficiency of formal procedures are often the cause of difficulties experienced by SMEs during the implementation of Lean practices. The analysis of the literature suggests that the notions of leadership, expertise and decision-making are crucial when implementing Lean Manufacturing. However, in the framework of SMEs, these elements tend to be concentrated under the responsibility of the head of the enterprise, leading to several strengths and weaknesses for such implementation.

Keywords: SME, Lean Manufacturing, Implementation, Cultural Anchorage, Change Management.

1. INTRODUCTION

The European Union defines a SME (Small and Medium Sized Enterprise) as an enterprise having a turnover lower than €50 M and fewer than 250 employees. In Europe, SMEs represent 99.8% of enterprises and 67.1% of jobs in the private sector, a figure that rises to more than 80% for industrial companies (Commission, 2008).

In 2013, France had 135,000 SMEs, representing an annual turnover of €616,000 M and 2,700,000 jobs (PME, 2013). However, the financial performance of French SMEs has deteriorated constantly since the 2000s. The number of bankruptcies affecting enterprises with more than 10 employees rose from 3,100 a year in 2007 to 4,600 a year in 2012, i.e. an increase of 48%.

In 2012, in Gallois report, authors observed that SMEs suffered from major weaknesses: lack of equity capital, difficulty in opening up capital, fear of investments (Gallois, 2012). These weaknesses were aggravated by the profit results of industry over the ten previous years.

SMEs need to restore their competitiveness, as they represent a large section of the French and European economy.

Lean Manufacturing (LM) is an approach that has been used by large corporations for several years. The source of LM can be found in the Toyota Production System (TPS) and it is based on the principle of eliminating all forms of wasted value within the enterprise (Ohno, 1998). This model has been tried and verified in large corporations (Drew et al., 2004; Panizzolo et al., 2012; Rose, et al., 2011), where productivity has been increased by more than 40%, overall defects reduced by 20% and lead times reduced by 50%.

Our partner is an enterprise that produces passive electronic components in France and elsewhere in the world. This enterprise is a conglomerate of SMEs acquired throughout the recent history of the parent company. At present, it is now a large enterprise from the administrative standpoint, but each entity still behaves like an independent SME. Our industrial partner experienced similar problems and the implementation of continuous improvement procedures had already been attempted. However, the results hoped for, were not forthcoming. Among other things, the enterprise observed:

- problems with employee commitment;
- major obstacles to change;
- difficulties in convincing the managers about the actions to take; and

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- over-present managers leading to a lack of delegation in the field.

The success rate of LEAN implementation in SMEs is low since it reaches only 10% according to Backer's study (Backer, 2002). Several LEAN implementation approaches have been developed (Åhlström, 1998; Hobbs, 2011, 2004; Mostafa et al., 2013), but these methods are designed for mass production companies (Deflorin and Scherrer-Rathje, 2012). The size of the company is however an influential factor in the LEAN implementation (Shah and Ward, 2003; Yang et al., 2011). Indeed, SME have distinctive characteristics when compared to big companies, and their pass criteria are specific (Achanga et al., 2006).

In order to refine this analysis, a literature review of the LEAN implementation in SME has been conducted. This review has allowed the identification of the SMEs specific characteristics which have then been compared to the LEAN MANUFACTURING management philosophy principles in order to list the strengths and weaknesses encountered by SMEs.

2. LEAN MANUFACTURING

2.1 Definition of Lean

The term Lean was used for the first time in 1988, during the International Motor Vehicule Program, which aimed at understanding the differences in productivity between Japanese and Western industries. The term was then popularised by Womack & al. in their book "The Machine That Changed the World" (Womack et al., 1990). The source of Lean Manufacturing came from the Toyota Production System (Ohno, 1988), it is based on the principle of eliminating all forms of wasted value within the enterprise.

2.2 Management principles of LM

For many authors, LM is a long-term corporate strategy and a philosophy of corporate management (Liker, 2004; Spear and Bowen, 1999).

Toyota succeeded in integrating LM in its organisation and has continued to do so for more than 40 years (Ohno, 1988). Liker proposed 14 management principles (Liker, 2007), that provide one of the most accepted characterisations of LM:

1. decisions founded on a long-term philosophy, even to the detriment of short term financial objectives;
2. the organisation of processes into single piece flows to identify problems;
3. use of pulled systems (flow triggered only by client orders) to avoid excess production;
4. production smoothing;
5. create a culture of immediate quality problem solving the first time;
6. standardise tasks as the basis of continuous improvement and empower employees;
7. use visual inspection so that no fault remains hidden;
8. use reliable technologies proven over a long time;
9. train managers with perfect knowledge of the work, live the philosophy and teach it to others;
10. train individuals and teams who apply the enterprise's philosophy;
11. respect the network of partners and suppliers by encouraging them and helping them to progress;
12. interact with the field to clearly understand the situation;
13. take decisions consensually, by taking the time necessary, examining in detail all the options and applying decisions quickly; and
14. reflect systematically and improve continuously.

In the rest of this article, we consider Liker's 14 management principles to cross them with the characteristics of SMEs.

3. SMALL AND MEDIUM SIZED ENTERPRISES

3.1 Literature review methodology

In this study, the following databases have been consulted:

- Emerald Insight;
- Elsevier;
- Taylor & Francis.

The articles consulted for the literature review have been selected according to the following keywords: "SME", "Small and Medium", "LEAN" and "Implementation". The initial total number of 513 documents that has been obtained has then been reduced to 223 through the reading of all article abstracts. Finally, only the 77 articles dealing with "SME" and "LEAN" simultaneously have been selected.

3.2 Characteristics of PME

In accordance with the Tranfield's method (Tranfield et al., 2003), the careful analysis of the articles allowed their classification according to different topics. Several authors already proposed characteristics lists for SMEs (Garengo et al., 2005), and Torres approach (Torres, 1999) has been selected, leading the following theme :

- local management;
- short-term strategy;
- lack of expertise;
- Non-functional organisation;
- limited resources; and
- lack of method and procedure.

On the 77 articles dealing with SMEs, only 23 point out (put forward) one or several characteristics of SMEs. The number of occurrences for each characteristic is presented in Table 1.