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## Implementation of Lean Production in small sized Enterprises

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### Abstract

The introduction and implementation of Lean Production Principles over the last twenty years has had a notable impact on many manufacturing enterprises. The practice shows that lean production methods and instruments are not equally applicable to large and small companies. After the implementation in large enterprises belonging to the automotive sector the concept of lean thinking was introduced successfully in medium sized enterprises. Small enterprises have been ignored for a long time and special investigations about this topic are rarely. Considering statistical data and analysis about the economic importance of small enterprises we can see, that they are numerous and create a notable part of the total value added in the non-financial business economy. This paper analysis in a first step the role and potential of small enterprises – especially in Italy – and shows then a preliminary study of the suitability of existing lean methods for the application in this type of organization. The research was combined with an industrial case study in a small enterprise to analyse the difficulties in the implementation stage and to identify the critical success factors. The results of this preliminary study should illustrate the existing hidden potential in small enterprises as well as a selection of suitable methods for productivity improvements. This research will be the base for a further and more detailed research project.

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### 1. Introduction

In the last years so called SME, small and medium sized enterprises, moved into the focus of many authors in their scientific work. The reason for this trend is based on the fact, that micro, small, and medium-sized enterprises are numerous and usually the backbone of the economy [1]. SMEs are defined by the European Commission as having less than 250 persons employed. SME make up 99,8% of all enterprises in the EU27, representing about 20 million companies employing almost 65% of total employees. In Italy, these percentages are even higher! A closer inspection reveals that 91,8% of the total are micro enterprises (employing fewer than 10 persons), while 6,9% were small enterprises (with 10 to 49 persons employed), 1,1% were medium sized enterprises (with 50 to 249 persons employed) and the remaining 0,2% were large enterprises (with 250 or more persons employed) [2]. Due to their flexibility, the entrepreneurial spirit and the innovation capabilities SMEs proved to be more robust

than large and multi-national enterprises, as the actual financial and economic crisis shows [3].

In Figure 1 we can see the industry turnover (manufacturing enterprises without construction) broken down by enterprise size classes of different European countries. The graphic illustrates that the Italian industry turnover is structured very different as compared to other European countries like Germany or France. While the German and French industry turnover is based predominantly on large enterprises, in Italy only about 40% of the total turnover are created by this type of organizations. The medium sized Italian industry enterprises produce about 26% and small enterprises about 24% of the total turnover.

Only in Cyprus the share of small enterprises shown in Fig. 1 is higher than in Italy. The fact, that in Italy small industrial enterprises produce nearly 25% of the total turnover demonstrates the enormous potential of this size class for the Italian Economy, being more productive and efficient through the implementation of Lean Production.

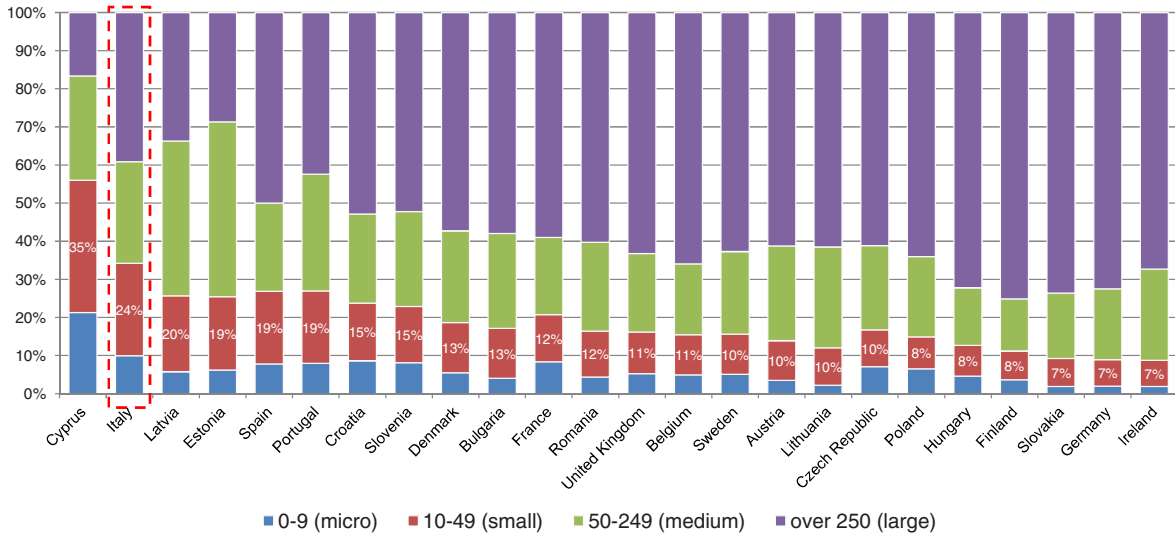


Fig. 1. Industry turnover broken down by enterprise size classes of different European countries [4].

Knowing the potential in the introduction of Lean Principles, we have to think about how to realize it in every single production unit. To quantify the number of small enterprises we analysed the structure of the Italian Industry (see Fig. 2). We can observe, that in Italy exist a lot of micro enterprises with up to 9 employees (81,34%), only 2,12% medium sized and 0,30% large sized enterprises. About 75.000 enterprises fall in the category of small sized organizations (16,24% of all enterprises).

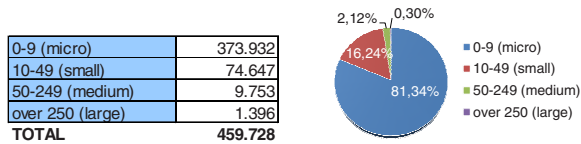


Fig. 2. Italian Industry – Enterprises broken down by employment size classes [4].

Therefore special research and investigations are needed to create simple and practically guidelines for the implementation of Lean Production in this size class of enterprises as well as we need the work of universities, the local chambers of industry and commerce and the responsible associations to put it into practice through Know-how transfer and training.

2. Literature Review

In the literature we can find many examples for the implementation of Lean Production in large and medium sized enterprises. Considering the size classes we can observe, that Lean Manufacturing concepts are basically

realizable by large, medium and small enterprises. An implementation of Lean Production concepts in micro enterprises with less than 10 persons employed wouldn't make sense. However, for many small enterprises between 10 and 49 employees the application of Lean Manufacturing could be one important step to increase the productivity and to be more competitive on the market.

Typically SMEs and especially small enterprises are not only adaptive and innovative in terms of the products but also their manufacturing practices. Recognizing the continuing competitive pressures, small organizations are becoming increasingly proactive in improving their business operations [5], which is a good starting point for introducing lean methods.

Different authors believe that lean manufacturing or productivity improvement methods in general harbour enormous difficulties [6, 7, 8, 9]. Hayes [10] discussed that a successful implementation of Lean Production programs in SMEs requires properly planning before realization to avoid such difficulties and problems.

Lean Manufacturing has been discussed extensively in the past decade [11]. Only few authors like White, Conner or Achanga discussed the implementation of Lean Manufacturing in SMEs and especially in small enterprises [11, 12, 13]. SMEs are still not confident of the cost of its implementation and the tangibility of the results and benefits they may achieve. Most of these companies fear that implementing lean manufacturing is costly and time consuming [11]. Compared to larger firms, small firms have fewer resources and often less access to capital [14], resulting in lower levels of adoption of cost intensive packages. It is argued that SMEs who adopt Lean Manufacturing can benefit by

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