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Improving manufacturing SMEs' competitiveness through systematic IT efficiency evaluation and advancement

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**Abstract**  
Efficiently exploiting the opportunities opened up by modern IT to support the order fulfillment process is one of the most important activities of production plants in manufacturing SMEs. However, the extent to which these efficiency-enabling IT systems are used and how well they actually perform – or at least if it is really evaluated and developed in a systematic way. The current research has largely been restricted to the field of methodology, and only to roughly and occasionally measuring, analyzing, benchmarking, and reporting the IT efficiency in SMEs, while keeping effort and cost data. This paper proposes a methodology implemented as software tool for analyzing, evaluating, measuring, and improving the IT efficiency of manufacturing SMEs.

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**1. Introduction**  
Improving competitiveness is a big challenge for manufacturing SMEs and requires tremendous efforts in many ways. Such potential savings are often because small- and medium-sized companies (SMEs) use information technology (IT) in an inefficient way [1]. While IT was formerly regarded as a cost factor, it now ranks as strategic success factor [2]. Companies [3, 4], like their strategic target as "Efficiency is the central goal" [5]. In 2011, which led to ICT<sup>2</sup> leading European scientists call for the full exploitation of IT to strengthen the competitiveness and innovation of manufacturing companies as a driver of European growth. The efficiency use of IT in the manufacturing environment is considered a serious challenge [1].

So far, the question cannot be answered whether companies use information technology efficiently, or to what extent, which benefits is derived from the use of IT as compared to the required effort [5]. The aim of the proposed approach is to provide a standardized methodology for SMEs to analyze, evaluate and improve the performance of the applied IT in a structured way. The two main questions to be answered by this approach are: "what" needs to be measured and "how" this measuring can be done.

In the proposed methodology, the approach to IT efficiency measurement and advancement occurs through structured phases of efficiency analysis, efficiency measurement and advancement across three major fulfillment process, preparing an extensive set of novel key performance indicators (KPIs) for efficiency measurement and for identifying potential weaknesses.

These KPIs are used to form an innovative IT performance measurement system which analyzes how efficient the IT and the related processes are. The KPIs are designed to be strategic, each measuring the IT efficiency of a particular strategic target area in an SME.

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