

## Value Chains Simulator, a Tool for Value Analysis of Manufacturing Enterprise Processes

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### Abstract

This paper proposes the use of a value chain based approach to support the modelling and simulation of manufacturing enterprise processes in order to make relevant decisions during the design and industrialisation phases. The aim is to help experts to make relevant decisions on value chain modelling by considering the product requirements where there is a lack of decision support system. In order to evaluate several performance indicators, a simulation of various potential value chains adapted to market demand was conducted through a Value Chains Simulator. The value chain model is based on activities and uses the concepts of resource consumption. Therefore a discrete event simulator is used to perform the simulation of these scenarios (these activities). From its results, the value is evaluated as a global performance criterion (balancing cost, quality, delivery time, services, etc.). An AHP module supports the analysis process and this evaluation. A case study in the microelectronic field is carried out to corroborate the validity of the proposed Value Chains Simulator.

*Key words:* Decision support system, Value Chain, Analytic Hierarchy Process (AHP), performance indicator, discrete event simulation.

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### 1 Introduction

Competition between firms in a same market and field is increasing all the time. Therefore, all efforts need to concentrate on how to obtain a competitive advantage. Great efforts must be done to improve enterprise organisation in order to ensure the durability and prosperity of the enterprise. In terms of competitive advantage, the value chain approach developed by M. Porter proposes a vision by activities [1]. The adopted point of view concentrates on strategic decisions. Therefore, the weak point is that this position cannot be considered in the design phase. To be competitive, the industrial organisation needs to reconsider its own activity and to increase its activity result. The lack of decision support system must be change to insure continuity and growing challenges of industries. Different ways to reach these goals can be followed. In [2], Berrah et al. said that the concept of performance is aimed at durability but with different requirements. On the one hand, to achieve this aim the enterprise needs to be considered as a whole. On the other hand, it is necessary to make permanent and continuous improvements of the enterprise with regard to its structure and its means, as well as its organisation, management, flows, etc. Focusing on the design of a decision support tool, our research work concentrates on performance analysis in an industrial context, based on value concepts and models ([3], [4] and [5]). The