

A Systems View of the Design of Modern Manufacturing Systems

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Abstract

The design of modern manufacturing systems is often discussed under the viewpoint of short term effectiveness and efficiency. The demands for the production system are often mono-causal and directly derived from the goals of the production, marketing, and material management. Due to the objective setting processes of those sectors the impact of the manufacturing system to the other members of the supply chain and the long term consequences for the own firm are rarely taken into consideration. To look at production systems from the point of a system viewer includes the necessity not only to take into account the direct effects of a decision like quality, costs, etc. Also the issues to and from other parts of the system like the members of the supply chain and the long term effects should be taken into the decision process. Therefore information about the connections and the effects of these parts of the system are required. The structure of the production system and the connections to other parts in the firm and to the members of the supply chain are a good source for this information. The complexity of this system makes it necessary to design a simulation model, which can show the effects from the design of modern manufacturing systems to the firm and the supply chain. The presentation discusses the core structure and the basic results of a Vensim model, which is designed to inspect these aspects of modern manufacturing systems. After that a short view is taken on the possibilities and limits of modelling production systems in System Dynamics generally and on the problems to design a simulation model that shows short term consequences as well as long term loop-back results.