Chapter XII

Mass Customization and Product Models

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Abstract

When dealing with complex product models, efficient knowledge distribution is essential to obtain success. This chapter describes how product models can be applied to support the knowledge distribution.

The change toward individualization will radically affect the knowledge application in relation to the product. Through the application of a mass customization strategy, companies have a unique opportunity to create increased customer satisfaction. In a customized production, knowledge and information have to be easily accessible since every product is a unique combination of information. If the dream of a customized alternative instead of a uniform mass-produced product shall become a reality, then the cross-organizational efficiency must be kept at a competitive level. This is the real challenge for mass customization.

A radical restructuring of both the internal and the external knowledge management systems is needed. Management of variety and closer integration with suppliers is necessary when the companies are working in a network.
Introduction

Small and medium-sized manufacturing companies have been offered a unique opportunity by e-commerce. New markets will open, cumbersome administrative processes can be eliminated, and the exchange of knowledge can be executed instantly and effortlessly. At the same time SMEs are realizing that e-commerce is becoming a qualifying attribute. In the future, customers will expect suppliers to be able to integrate business processes and automate transactions. The shift towards increased integration in the supply chain has radically affected the knowledge distribution in relation to “build to order” manufacturing in companies with less than 500 employees—also called small to medium-sized enterprises (SMEs). By use of a mass customization strategy, companies have a unique opportunity to create valuable differentiation. However, mass customization has some industrial preconditions that most SMEs do not meet at present. In mass production, the specifications were made once for each product series; consequently, there were a large amount of products over which to distribute the cost. With increased customization, every product must be individually documented. For this reason, knowledge and information have to be easily accessible.

Because the products of SMEs are often created in networks, the cross-organizational efficiency is critical. A radical restructuring of both the internal and the external knowledge management systems is needed. As a means to respond to this challenge, the application of a product model is introduced in this chapter. By focusing on complex products, the structure of the knowledge needed to generate the product specifications is analyzed.

A product model (short term for product and product-related models) is used to support sales, design of product variants, and production preparation. Product-related models contain knowledge and information regarding the systems related to the product’s lifecycle, while the product model itself contains knowledge and information of the product’s structure and functional properties (Krause, 1988). The product model is accessed with a configurator, which is the part of the product model that the user can access.

The objective of this text is to illustrate how inter-organizational product models can be applied to support the knowledge distribution within the supply chain, via a configurator. To reduce the total cost of a product, a supplier can apply automation in the specification process for the customized product, thereby enabling e-commerce in a “build to order” manufacturing context. Correctly applied, a product model will support the product through its entire lifecycle from customization to disposal, by maintaining an electronic record of the product structure.

Method

The findings presented here are based on the four-year research program called Centre for Industrialization of Engineering at the Technical University of Denmark. The center is based on a grant from the Danish Ministry of Business and Industry, and is established
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