Chapter III
Product Configuration in ETO Companies

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ABSTRACT

This chapter reviews how mass customisation and product configuration can benefit engineer-to-order companies. The relevant main literature in the area is reviewed to identify the benefits and, subsequently, the challenges in implementing product configuration in an engineer-to-order company are described. Finally, a number of suggestions for meeting these challenges are presented, and a case description is introduced, which supports that product configuration can benefit engineer-to-order companies, even though there are a number of challenges to be met. The chapter concludes that engineer-to-order companies can certainly benefit from product configuration by improving business process efficiency as well as information quality and ultimately improving the company’s competitive advantage.

INTRODUCTION

"The customer may have any colour car he wishes, as long as it is black" is the famous quotation by Henry Ford from 1908 on the launch of his new Ford T model. This quote has often been used for illustrating the development in product variety that the consumers have experienced through the 20th century and continuing in the 21st century. This development is a result of many factors; however, one of the single factors that have contributed the most to this development is the introduction of the mass customisation (MC) paradigm. This has been used by various industries for presenting the consumers with an ever larger variety of goods. Much research has been performed on developing methods and techniques as well as new strategies for MC. However, mass customisation has typically been described as companies which have been mass producers moving towards mass customisation, that is, increasing variety.
Product Configuration in ETO Companies

During the recent years, attention has also been brought to the possibilities in utilising the methods from MC in other industrial environments than what is known as mass customisers. Some engineer-to-order companies have successfully utilised some of these methods, achieving increased competitive advantages. However, the advantages which engineer-to-order companies can achieve are different from traditional MC, as are the applicability of the methods.

This chapter seeks to describe which advantages engineer-to-order companies can achieve through utilising elements from traditional MC, what challenges these companies could be facing in doing that, and finally recommendations to face these challenges.

BACKGROUND

Engineer-to-Order Companies

Since this chapter primarily concerns engineer-to-order (ETO) companies, it is relevant to define precisely what characterises an ETO company. One definition is that ETO companies are companies which, for each order, reengineer the product after getting the order and before starting production (Caron & Fiore, 1995). Furthermore, ETO companies are characterised by time-limited projects related to the supply of complex equipment to third parties, and this process often includes the phases: design, manufacturing, installation, and commissioning (Caron & Fiore, 1995). Also, ETO products are usually physical products, that is, custom-made software is not commonly referred to as an ETO product. Naturally ETO products can contain custom-made software; however, they will always contain custom engineered physical elements. Another characteristic of ETO products is that the number of manufactured products of a given design is very low, in many cases only one. ETO companies may very well (and do in most cases) also manufacture and sell other products which are not engineer-to-order products apart from the ETO products.

Because the topic of this chapter is product configuration, which is implemented in a product configuration system that should support or improve the business processes in a company, it is relevant to review the business processes in ETO companies. In this context, focus is on the business processes related to the processes from sale to delivery of the product.

According to Hicks, McGovern, and Earl (2000), ETO business processes can be considered as three distinct sequential processes: (i) marketing, or developing a potential customer’s awareness of the company’s products; (ii) response to an invitation to tender for a particular contract, involving some development of a preliminary concept; and (iii) detailed design, procurement, manufacturing, construction, and commissioning.

Forza and Salvador (2002) describe the case of a voltage transformer producer which has implemented product configuration and which benefits this company had gained from the implementation. Here the business processes are also described briefly: (i) definition of the product variant requested by the customer, including sale and order acquisition; (ii) product variant design and engineering; and (iii) production. Forza and Salvador (2002) describe the business processes somewhat more narrowly than Hicks et al. (2000) by not including marketing and commissioning activities. The case described in Forza and Salvador (2002) can be designated as an ETO case, even though it is one of the lesser complex cases regarding product as well as business process complexity. However, from the two descriptions a number of conclusions can be drawn regarding the characteristics of business processes in ETO companies. In Figure 1, it is illustrated how mass producing, mass customising, and ETO companies differ in their value chain, to show that the business processes in ETO companies are somewhat