



A framework to support customer–company interaction in mass customization environments

Juan Diego Frutos^{*}, Denis Borenstein

*Escola de Administração, Universidade Federal do Rio Grande do Sul, Rua Washington Luis, 855,
90010-460, Porto Alegre, RS, Brazil*

Received 11 March 2003; accepted 13 September 2003

Abstract

In the new and emerging mass customization (MC) strategy, where companies and clients cooperate either to design or to assemble a customized product or service, there exists a great need for a mechanism to manage and control information flow among the collaborative business units. The aim of this paper is to present the design and implementation of an information system framework for agile interactions between companies and customers in an MC environment. The underlying philosophy of this framework is to combine Internet-based technology and object-oriented programming (OOP), and offer smart tools that allow customers to interact rapidly and responsively with MC production systems.

© 2003 Elsevier B.V. All rights reserved.

Keywords: Mass customization; Object-oriented modeling; Information systems; User involvement; Agile interaction

1. Introduction

Facing competitive markets, manufacturers are hard-pressed to reevaluate their basic manufacturing strategies in order to regain a position of competitive advantage. Mass customization (MC) is an emergent concept in industry intended to provide customized products or services through flexible processes in high volumes and at reasonably low costs. On the basis of flexible manufacturing and modern information technology (IT), MC focuses on providing individually-designed products and services to every customer through high process flexibility and integration [1].

The concept emerged in 1970 in the Toffler's book "Future Shock" [2] and was coined by Davis in his 1987 book, "Future Perfect" [3], and may be viewed as a natural follow-up to the processes that have become increasingly flexible and optimized regarding quality and costs. As MC expertise grows it recognizes that a great number of product varieties can be produced at the same cost. Product and service customization and collaborative design between companies and customers represent now a competitive advantage for a large number of companies [4]. This business strategy, once considered a dream to be implemented in the future, has become an everyday reality for many companies [5].

As defined by Duray et al. [1], the boundaries of MC can be delineated by two issues: (i) the basic nature of customization; and (ii) the means for achieving customization at or near mass production cost. The first

^{*} Corresponding author Tel.: +55-51-33164053;

fax: +55-51-33163991.

E-mail address: juanfrutos@yahoo.com (J.D. Frutos).

issue concerns the customer involvement in determining the degree of customization. The second issue is related to modularity. Customer involvement provides the customization while the modularity provides the basis for repetitiveness in production or the “mass” in MC. As a result, the peculiarity of the concept “mass customization” is the dichotomy between the two terms.

The success of MC systems depends on a series of external and internal factors, as follows [6]:

- Products should be customizable. Successful MC products must be modularized, versatile, and constantly renewed.
- Customer demand for variety and customization must exist.
- The willingness and readiness of suppliers, distributors, and retailers to attend to the system demands. Manufacturers, retailers, and other value chain entities must be part of an efficiently linked information network [7,8].
- Technology must be available.
- Knowledge must be shared. MC is a dynamic strategy and depends on the ability to translate new customer demands into new products and services.

To achieve that, companies must pursue a culture that emphasizes knowledge creation and distribution across the value chain. However, it is the efficiency in information transfer from customers to companies that really determines to a great extent the success of an MC program [9]. In MC environments, the information transfer capabilities offered by companies define the catalogue of options offered to the customer, determining the degree of customization of a product, as well as the ability of the company to process the customization with efficiency and efficacy. To implement MC strategy, manufacturers have to distribute intelligence and decision-making authority as close to their point of delivery, sale and even after-sale service as possible. An MC system is highly dependent on well designed information systems that provide direct links among the main agents involved in the customization process, namely customer, company, and suppliers. However, there is a void in the literature on how to design, develop, and implement the information management process required in MC systems [6]. The literature does not describe any framework

developed for the implementation of a successful MC information system that integrates customers and companies.

The main contribution of this paper is to merge the fields of operation management (MC) and concepts and techniques originated in computer sciences to describe an MC information system framework, filling the above mentioned gap in the literature. In this paper, we focus on the requirements, design, and implementation issues of an Internet-based information system developed through object-oriented programming (OOP) to meet the field of operations management called MC production system. The information system uses the Internet to quickly and effectively provide an interface between customers and companies. It establishes a cooperative environment in which the customer gets an individualized product or service, and the company provides design and manufacturing expertise developed to meet the individual requirements of a customer. Our aim is to develop a framework that establishes the basic needs of an MC information system in a manner that close contact between clients and companies is installed. The framework is based on the integration of Internet-based technology and OOP. Internet is a technology which enables companies to create quick and effective collaborative systems with customers and suppliers in national/global competition. OOP is an intelligent way of representing the world and dynamic changes in the world. The framework has the following objectives:

- to explore the information requirements for customers and companies in order to develop products and services cooperatively;
- to provide a conceptual MC information framework, composed of an object-oriented (OO) model and an information system architecture, that manages information in a reliable and consistent way; and
- to provide a general procedure for MC production systems to build customized MC information systems.

In order to illustrate the effectiveness of the developed approach, a prototype system was developed and aimed at construction and real estate companies to interact with customers in accordance with the MC concept.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات