Chapter 5

Developing Interoperability in Mass Customization
Information Systems

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ABSTRACT

This chapter proposes a standard-based framework to assist industrial organizations to develop interoperability in mass customization Information Systems. After identifying the major challenges for business and information systems in mass customization, the authors propose an innovative standard-based conceptual architecture for a combined model-driven and services-oriented platform. The chapter concludes by describing a global methodology for integration of models and applications, to enhance an enterprise’s interoperability in the support of mass customization practices, keeping the same organization’s technical and operational environment, but improving its methods of work and the usability of the installed technology through harmonization and integration of the enterprise models in use by customers, manufacturers, and suppliers. Its platform aims to stimulate the adoption of mass customization concepts and improve those practices through proper integration and harmonization of information system models, knowledge, and data.
INTRODUCTION

The advance of mass customization principles can only be sustainable if supported with changes in how value is created, namely in the way goods and services are defined, and how logistics, operations, and customer interaction are designed. These changes must occur both internally, within organizations value chain, and also in the network wherein companies are embedded, further exploiting relationships with suppliers, distributors, and consumers. Nevertheless, all these changes in business can only occur if enabled by adequate interoperable information systems.

Nowadays, many enterprises already have information technology that can fulfill their mass customization requirements in each activity and with external organizations, like, for example, suppliers and customers. Also, in an industrial environment, many applications are available to support operating the product life cycle (PLC) stages. However, organizations typically acquire their applications with an aim to solve focused needs, without an overall view of the global enterprise’s system integration. This essentially results from the way companies are organized, with internal departments usually adopting different frameworks. Even when enterprise models are interoperable, when information has to be exchanged, very often difficulties arise with respect to data semantics, since common reference models are not in place.

Mass customization and interoperability can be identified as key factors for enterprise success on a constantly-changing global customer-driven environment, enabling companies to act in networked partnership to strengthen their position facing the market. However, due to the difficulty of maintaining and integrating existing heterogeneous information systems, languages, and applications, the interoperable platforms are urging to emerge.

Applications developed using standard-based architectures present a systematic approach to enterprise integration and promotion of interoperability among different enterprises. Several reference models designed and developed using standard methodologies and techniques have already been developed for covering many industrial areas and related application activities, from design to production and sales, for example, ISO 10303 STEP, ebXML, EDI. Also, proposals for standardized architectures have been evolving, and they are expected to be shown as the standard way of handling middleware and infrastructure development for enterprise systems groups, like the model-driven architecture (MDA) and service-oriented architecture (SOA).

However, implementing new technology in organizations is a complex task that must be developed according to a suitable methodology supported by a proper and easy-to-implement platform. The advent of continuous technological evolution and business challenges makes companies unable to be constantly updated, and such dynamics have a recognized impact in organizations’ strategies and resources with costs that they cannot afford.

This chapter proposes a framework to enhance an enterprise’s interoperability in the support of mass customization practices, keeping the same organization’s technical and operational environment, but improving its methods of work and the usability of the installed technology through harmonization and integration of the enterprise models in use by customers, manufacturers, and suppliers. Its platform aims to stimulate the adoption of mass customization concepts and improve those practices through proper integration and harmonization of information system models, knowledge, and data.

CHALLENGES FOR BUSINESS IN MASS CUSTOMIZATION

Mass customization implementation in companies requires intervention at business processes,