

MILAN KRATOCHVÍL  
CHARLES CARSON

# Growing Modular

Mass Customization of Complex Products,  
Services and Software

 Springer

 CINCOM  
AN INTELLECTUAL PROPERTY SOFTWARE COMPANY

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The World's Most Experienced Software Company<sup>®</sup>

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of Complex Products, Services  
and Software

With 31 Figures

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### **Dedications**

To my father Jiří for several interesting talks on composers who practiced configurability centuries before it was invented and named ...

*Milan Kratochvíl*

# Foreword

## The Time for Mass Customization Has Arrived

*Opportunity is missed by most people because it is dressed in overalls and looks like work.*

Thomas Edison

There's an allegory that many inventors have used to define their moment of inspiration when diligence, a strong work ethic and imagination met at the intersection of unmet needs – and a paradigm shift in technology happened. Thomas Edison once said that opportunity is missed by most people because it is dressed in overalls and looks like work. That's the case with mass customization, make-to-order, configure-to-order and engineer-to-order product strategies globally, across manufacturers and service organizations today. In the work of mass customization are significant rewards to customer responsiveness, service, and financial performance of any organization. Aiming at the goal of driving lean manufacturing, companies are finding that the *strategies that looked like the hardest work*, dressed in overalls as Edison would say, are *delivering the biggest impact* on the financial statements of the companies that boldly take on serving customers in entirely new ways. Driving costs of organizations through more accuracy in orders, assuring that highly configured products are actually what a customer has ordered, and making the many product attributes in complex products accessible for the creation of entirely new production workflows and products, *is real and is delivering* costs savings while driving up margins.

It's important to realize that mass customization is a business strategy first and a technology direction second. Attacking the process problem areas first is best, overlaying technology where the problems being solved require attribute modeling, streamlined order capture and management, and ultimately fulfillment to customers. There's more to the concept of mass customization than just technology, but it is meeting the unmet customer needs for products, the company's ability to scale and meet rising customer expectations over time. More than any other factor, the rising expectations customers have for getting products *that align with their own* business proc-

esses and *fit seamlessly* into their operations are driving mass customization more than ever before. Finally there is also the issue of counterbalancing production workflows in factories and assuring a relatively stable level of production volume. Companies are using mass customization to imaginatively create *new customized products* that continue to *fill excess capacity* in factories.

Many look at the future and see uncertainty across all aspects of their businesses, yet when a company takes the path of lean manufacturing coupled with mass customization and makes it a core strength, their customers win and the company invests in a solid future. There's always the need for synchronizing supply chain systems with the demand being generated by mass customization, and once that is achieved by a company another core strength of execution is added. The future belongs to companies bold enough to be critical of their internal processes that face outward to serving customers and take the necessary steps to build *mass customization systems that capture unique requirements and drive manufacturing to deliver superior products*. Companies need to quit worrying about the future and take on *strategies to exceed their customers' expectations* for mass customized products. Exceeding customer expectations with mass customization is *the best investment* in a solid future.

Louis Columbus  
Senior Analyst, AMR Research, USA  
2003



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# Preface

The fast lane to Mass Customization of *complex* offerings is the definition of modular product packages and their subsequent configuration on demand, to fit customer-specific needs. This approach is usually called Configure-to-Order.

For many organizations, configuring modularized products is a vital missing link in their capability to take full advantage of the new global economy and e-commerce. In the new “experience economy” characterized by a global competitive business environment, customers must be met at a *higher* level of intelligence, customization and flexibility in creating a total experience that satisfies or exceeds their expectations. For many complex products and services, this is not yet the case. Many industry-specific approaches to Mass Customization are now migrating across industries however, so it is wise to expand horizons beyond one's own business sector. Mass Customization simply puts *the “C”* at *the heart* of CRM (Customer Relationship Management), practicing the premise ‘*treat different customers differently*’ and using *technology to keep customization costs low*. The concepts apply equally well to configuring complex products, services and software, and are relevant in industries ranging from industrial machinery to life insurance. From our personal engagements with customers and contacts, both of us have been repeatedly reminded of the need for a slim-line book on Mass Customization and ‘Configure-to-Order’ concepts, to address a broad audience including engineering, production, sales and marketing. So we wrote it, *for all industries and from all industries* where these concepts have been proven to deliver.

Primarily, we’re addressing all roles interested in management or process improvement within areas such as customer service, sales, marketing, exports, new product development, or production – particularly in businesses selling complex ‘system products’, be it goods, software or services. Specific software requirements to support *sales and service effectiveness* through Configure-to-Order are briefly discussed and a generic software-evaluation checklist is provided. The lightweight approach makes this book suitable both for team leaders and for team members (i.e., ‘doers’). This

broad range of audiences is due to Mass Customization requiring teamwork, cross-departmental commitment and cross-functional vision in repeatedly creating a unique (one-of-a-kind) customer experience that results in a long-term partnership of the enterprise and its customers.

Milan Kratochvíl

Charles Carson

January 2005

# How to Customize this Book

Readers aren't advised to read a chapter or two in complete isolation. Mass Customization spans the entire enterprise; in making it smooth, it's good to have a general idea of how others must become involved in this teamwork, too.

Those who are 'just interested' in Mass Customization, Configure-to-Order or Knowledge Management at a *thematic*, 'mass-media' *level* are advised to browse through the Introduction and chapters 1, 2, 6, 7, 8, 9.

*Sales and marketing* people are advised to read most of the book, possibly skipping some of the paragraphs irrelevant to their particular sector of industry; please remember however, that some of the most novel approaches to any particular industry sector might come from a completely different one.

*Managers* are advised to browse all chapters, taking it a little easy in chapters 2, 3, 4, 5.

If there's just a negligible proportion of software and services in your company's product package, then you can probably *skip* those chapters (chapter 3 and 4), until things have started changing.

Reengineers, process owners, product developers and other *doers* are advised to read all chapters and to concentrate on relevant parts of chapters 2, 3, 4, 5, 6.

*Software* buyers, architects, developers etc. are advised to read all chapters and to concentrate on relevant parts of chapters 2, 3, 4, 5, 6, 7. Please note that although a 'high-tech' business, the software industry itself was rather late to enter into Configure-to-Order.

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