

# Foreword

In recent years, the practice of product design and development has faced numerous challenges, undergone significant changes, and seen many process improvements. In the near future, as always, firms will continue to face new competitive threats and the need to further improve their own capability to develop innovative products. Some of the most striking current trends include the following:

- **Development speed:** We are learning that many design processes are in fact procedural and amenable to lean principles and continuous improvement, yielding much faster product development cycle times.
- **Digital processes:** We are adopting new digital design, analysis, and collaboration tools to create better products with less time and effort.
- **Platform flexibility:** We are using modular product architectures to provide more product variety to customers.
- **Complexity management:** We are better able to engineer complex systems through analysis of interaction networks.
- **Outsourcing and offshoring:** We can take advantage of supplier skills and capacity, international operations, and new markets.
- **Customer involvement:** We are using the Internet to bring customers' ideas into the product development process much more quickly and easily than ever before.
- **Sustainability:** We are learning how to reduce the environmental impact of the industrial world in order to protect and sustain the natural world.

Recognizing these trends, researchers in many technical and social science fields study the associated challenges of product development and help to create improved methods and practices.

This handbook is a compilation of articles on a wide variety of the current trends, emerging technologies, important research, notable achievements, and key challenges in the field of product design and development. The range of topics covered here is as broad as the field itself: from product development methods and technologies, to process and project management, to some of the latest ideas about creativity, design for environment, and complex system development. Researchers, instructors, and practitioners alike will benefit from the insights and examples presented in this important handbook.

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