



INTRODUCTION TO

# Service Engineering

Gavriel Salvendy and  
Waldemar Karwowski

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# INTRODUCTION TO SERVICE ENGINEERING

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Gavriel Salvendy and Waldemar Karwowski



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## PREFACE

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Today we are witnessing an extraordinary transformation of our economy into the system-of-systems that facilitates collaboration of customers and service providers in creating new value through globally interconnected service enterprises. In this context, the field of service engineering enables us to innovate, design, and manage simple and complex service operations and processes of the intelligent service-based economy.

This book aims to provide an introductory knowledge of service engineering for the benefit of undergraduate and graduate students and a variety of professionals in the fields of engineering, business, and government. The book includes 29 chapters organized into seven sections: introduction to theory and practice of service systems, characteristics of service enterprises, service design and operation issues, customer service and service quality, Web-based services, and innovation in service systems.

The first section contains three chapters describing the role of service science in developing a smarter planet, fundamentals of a unified services theory, and characteristics of work in the service economy. The second part focuses on the service enterprises, with chapters related to enterprise value creation, architecture of service organizations, the issues of competitive global business environment, service enterprise modeling, and application of methods of systems engineering to services. The five chapters in the third section discuss the human-centered approach to design of service systems, service-oriented architecture (SOA), collaborative e-service systems, new service development process, and methods for designing services. The chapters in the fourth section address enterprise service operations and management, marketing and value creation, knowledge-intensive services, and design and operation of call centers. The fifth section discusses the issues of lean service, an experience advantage, quality evaluations of service delivery, complaint management, and integration of service quality with human factors. The sixth section includes chapters focusing on enterprise service management, marketing operations, value creation, service processes, knowledge-intensive services, and design of service call centers. Finally, the seventh section discusses the evolution of service

engineering, managing service innovation, delivery of complex SOA solutions, and technology transfer streams.

Fifty-seven authors, representing academia (43) and industry (14), contributed to this book. The book contains 238 figures, nearly 40 tables, and provides citations to about 1200 references to published literature related to service engineering and management.

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# PART I

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## INTRODUCTION

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# SERVICE SCIENCE: TOWARD A SMARTER PLANET

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### Foundations

*Service science* is short for *service science, management, engineering, and design*, also known as SSMED. It began as a “call to action,” focusing academics, businesses, and governments on the need for research and education in areas related to service (Chesbrough, 2004; IBM, 2005). After all, the service sector (as traditionally measured) has grown to be the largest share of gross domestic product and employment for all major industrialized countries (Spohrer and Maglio, 2008). Service science has grown into a global initiative involving hundreds of organizations and thousands of people who have begun to create service innovation roadmaps and to invest in expanding the body of knowledge about service systems and networks (IfM and IBM, 2008).<sup>1</sup>

But exactly what counts as *service science*? Simply put, service science aims to explain and improve interactions in which multiple entities work together to achieve win-win outcomes or mutual benefits (Spohrer and Maglio, 2008). More precisely, we define service as *value cocreation*, value as change that people prefer, and value cocreation as a change or set of related changes that people prefer and realize as a result of their communication, planning, or other purposeful and knowledge-intensive interactions. Science is the agreed upon methods and standards of rigor used by a community to develop a body of knowledge that accounts for observable phenomenon with conceptual frameworks, theories, models, and laws that can be both empirically tested and applied (Kuhn, 1962). So service science seeks to create a body of knowledge that accounts for value cocreation between entities as they interact—to describe, explain, and (perhaps someday) better predict, control, and guide the evolution of value-cocreation phenomena.

Previously, we described many problems and concepts related to service science (e.g., Maglio et al., 2006; Chesbrough and Spohrer, 2006; Spohrer et al., 2007). Here, we start to put together a more comprehensive picture. Figure 1.1 illustrates the organization of this



FIGURE 1.1 ORGANIZATION OF THIS PAPER.

