Preface

The constantly changing landscape of Transportation Systems and Engineering makes it challenging for experts and practitioners to stay informed of the field’s most up-to-date research. That is why Engineering Science Reference is pleased to offer this three-volume reference collection that will empower students, researchers, and academicians with a strong understanding of critical issues within Transportation Systems and Engineering by providing both broad and detailed perspectives on cutting-edge theories and developments. This reference is designed to act as a single reference source on conceptual, methodological, technical, and managerial issues, as well as provide insight into emerging trends and future opportunities within the discipline.

Transportation Systems and Engineering: Concepts, Methodologies, Tools and Applications is organized into six distinct sections that provide comprehensive coverage of important topics. The sections are: (1) Fundamental Concepts and Theories, (2) Frameworks and Methodologies, (3) Tools and Technologies, (4) Cases and Applications, (5) Issues and Challenges, and (6) Emerging Trends. The following paragraphs provide a summary of what to expect from this invaluable reference tool.

Section 1, Fundamental Concepts and Theories, serves as a foundation for this extensive reference tool by addressing crucial theories essential to the understanding of Transportation Systems and Engineering. Introducing the book is “Transportation Risk Analysis” written by Dragan Crnčević, a great foundation laying the groundwork for the basic concepts and theories that will be discussed throughout the rest of the book. Other chapters to note in Section 1 are: “Oil and Gas Storage Tank Risk Analysis” by Katarina Simon and “Pareto Evolutionary Optimization of Joint Network Design and Pricing Strategies Related to Emissions in Urban Networks” by Loukas Dimitriou, Antonios Kaltsonis, and Antony Stathopoulos. Section 1 concludes, and leads into the following portion of the book with a nice segue chapter, “Simulation-Based Scheduling of Waterway Projects Using a Parallel Genetic Algorithm” by Ning Yang, Shiaaulir Wang, and Paul Schonfeld. Where Section 1 leaves off with fundamental concepts, Section 2 discusses frameworks and methodologies in place for Transportation Systems and Engineering.

Section 2, Frameworks and Methodologies, presents in-depth coverage of the conceptual design and architecture of Transportation Systems and Engineering. Opening the section is “Methodology for Risk Assessment and Costs Associated with Risk Occurrence in E-Government Projects” by Neven Vrcek, Petra Peharda, and Dušan Mundar. This section is vital for developers and practitioners who want to measure and track the progress of Transportation Systems and Engineering through the multiple lens of parametric design. Through case studies, this section lays excellent groundwork for later sections that will get into present and future applications for Transportation Systems and Engineering, including, of note: “Meta-Modeling Based Secure Software Development Processes” by Mehrz Essafi and Henda Ben Ghezala, “Dynamic FCFS ACM Model for Risk Assessment on Real Time Unix File System” by Prashant Kumar Patra and Padma Lochan Pradhan, and “An Effective Methodology for Road Accident
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Data Collection in Developing Countries” by Muhammad Adnan and Mir Shabbar Ali. The section concludes with another excellent work on sequence design, titled “On-Board Unit Hardware and Software Design for Vehicular Ad-Hoc Networks” written by Matteo Petraccia, Paolo Pagano, Riccardo Pelliccia, Marco Ghibaudi, Claudio Salvadori, and Christian Nastasi.

Section 3, Tools and Technologies, presents extensive coverage of the various tools and technologies used in the implementation of Transportation Systems and Engineering. Section 3 begins where Section 2 left off, though this section describes more concrete tools at place in the modeling, planning, and applications of Transportation Systems and Engineering. The first chapter, “Enhancing DotProject to Support Risk Management Aligned with PMBOK in the Context of SMEs” by Rafael Queiroz Gonçalves, Elisa de Freitas Kühlkamp, and Christiane Gresse von Wangenheim, lays a framework for the types of works that can be found in this section, a perfect resource for practitioners looking for the types of technologies currently in practice in Transportation Systems and Engineering. Section 2 is full of excellent chapters like this one, including such titles as “Threatening the Cloud: Securing Services and Data by Continuous, Model-Driven Negative Security Testing” by Philipp Zech, Philipp Kalb, Michael Felderer, and Ruth Breu, and “Cloud Computing for Global Software Development: Opportunities and Challenges” by Thamer Al-Rousan. The section closes with “ti-System Integration Scheme for Intelligence Transportation System Applications” by Chih-Chiang Kuo, Jyun-Naih Lin, Syue-Hua, Cheng-Hsuan Cho, Yi-Hong Chu, and Frank Chee Da Tsai.

Section 4, Cases and Applications, describes how the broad range of Transportation Systems and Engineering efforts has been utilized and offers insight on and important lessons for their applications and impact. The first chapter in the section is titled “A Case Study for Business Integration as a Service” by Victor Chang. Section 4 includes the widest range of topics because it describes case studies, research, architectures, theory, analysis, and guides for implementation. A few chapters to note in this section are “A Survey of Visual Traffic Surveillance Using Spatio-Temporal Analysis and Mining” by Chengcui Zhang, and “Assessing Human Reliability Behaviour from Use of Technology for Ships Navigating within Coastal Water” by Oladokun Sulaiman Olanrewaju. The breadth of topics covered in the chapter is also reflected in the diversity of its authors, from countries all over the globe. Section 4 concludes with an excellent view of a case study in a new program, “Applying the Safety and Environmental Risk and Reliability Model (SERM) for Malaysian Langat River Collision Aversion” written by Oladokun Sulaiman Olanrewaju and Ab Saman Ab Kader.

Section 5, Issues and Challenges, presents coverage of academic and research perspectives on Transportation Systems and Engineering tools and applications. The section begins with “General Approach to Risk Analysis” by Davorin Matanovic. Chapters in this section also explain theoretical approaches and challenges within the subject Transportation Systems and Engineering. The section concludes with “Workover Impact on Accidental Risk” by Bojan Moslavac.

Section 6, Emerging Trends, highlights areas for future research within the field of Transportation Systems and Engineering, opening with “Evolution of Security Engineering Artifacts: A State of the Art Survey” written by Michael Felderer, et al. This section contains chapters that look at what might happen in the coming years that can extend the already staggering amount of applications for Transportation Systems and Engineering. The final chapter of the book looks at an emerging field within Transportation Systems and Engineering, in the excellent contribution, “A New Design of Intelligent Traffic Signal Control” by Fatemeh Daneshfar and Javad RavanJamJah.
Although the primary organization of the contents in this multi-volume work is based on its six sections, offering a progression of coverage of the important concepts, methodologies, technologies, applications, social issues, and emerging trends, the reader can also identify specific contents by utilizing the extensive indexing system listed at the end of each volume.

As a comprehensive collection of research on the latest findings related to using technology to providing various services, *Transportation Systems and Engineering: Concepts, Methodologies, Tools and Applications*, provides researchers, administrators, and all audiences with a complete understanding of the development of applications and concepts in Transportation Systems and Engineering. Given the vast number of issues concerning usage, failure, success, policies, strategies, and applications of Transportation Systems and Engineering in countries around the world, *Transportation Systems and Engineering: Concepts, Methodologies, Tools and Applications* addresses the demand for a resource that encompasses the most pertinent research in technologies being employed to globally bolster the knowledge and applications of Transportation Systems and Engineering.