Preface

The Internet of Things (IoT), also called the Internet of Everything or the Industrial Internet, is a new technology paradigm envisioned as a global network of machines and devices capable of interacting with each other. The true value of the IoT for firms can be fully realized when connected devices are able to communicate with each other and integrate with enterprise systems, cloud computing, and business analytics. IDC (2014) predicts that the IoT base will grow at a 17.5% compound annual growth rate (CAGR), reaching 28.1 billion installed units by 2020, up from 9.1 billion in 2013 and the value of the market will reach $7.1 trillion by 2020, up from $1.9 trillion in 2013. The adoption of this technology is rapidly gaining momentum as technological, societal, and competitive pressures push firms to innovate and transform themselves. Many firms such as GE, Amazon, and Google are developing numerous IoT applications to capture real-time operational data and offer better services to clients.

Over the last decade, the IoT industry has experienced rapid transformation. Many factors, such as digital convergence, smart phone, wireless network technologies, sensor technologies, and RFID, have contributed to this transformation. Connected cars, smart metering, and smart farming are examples of transforming traditional products and services into digital ones equipped with real-time data captured with IoT devices and sensor networks. However, as with any disruptive innovation, the IoT will present multiple challenges to adopting enterprises. For example, due to the explosion of the data generated by IoT machines, Gartner (2014) identified that data centers will face challenges in security, the enterprise, consumer privacy, data, storage management, server technologies, and data center networking. The IoT developers must build the ability to mitigate these challenges to accelerate the diffusion speed.

Because of the potential yet uncertain benefits and high investment costs of the IoT, firms need to carefully assess every IoT-induced opportunity and challenge to ensure that their resources are spent judiciously. They need to understand the impact of the IoT on business operations, business models, and competitiveness, and address managerial challenges that firms have faced.

However, there is still a paucity of studies on the social, behavioral, economic, and managerial aspects of the IoT. This makes it very challenging for firms to make informed decisions on IoT adoption, development, and management.

The Internet of Things in the Modern Business Environment provides a repository for researchers and industry practitioners to exchange their research ideas, industries, technologies, and practical experiences, and discuss challenges and opportunities. This book is composed of fourteen chapters in three sections: Section 1, "IoT Adoption and Implementation," which presents literature review on its use in supply chain management, behavioral models, and privacy issues: (1) A Literature Review of the Emerging Field of IoT Using RFID and Its Applications in Supply Chain Management, (2) User Acceptance of IoT Applications in Retail Industry, (3) Technopsychology of IoT Optimization in the Business World, (4) The

Internet of Things (IoT): Capabilities and Applications for Smart Supply Chain, and (5) Privacy in the Internet of Things; Section 2, "IoT Management," which discusses various enablers, issues, opportunities, guidelines in IoT management: (1) The Internet of Things: Assessing its Potential and Identifying the Enablers Needed to Capture the Opportunity, (2) The Internet of Things: From Things to Valuable Outcomes, (3) Industrial Guidelines for Stimulating Entrepreneurship: the Internet of Things, and (4) The Internet of Things: Opportunities, Issues, and Challenges; Section 3, "IoT Technologies and Applications," which discusses various technologies, techniques, and standards for IoT services and presents state of the art IoT applications: (1) IoT Objects Driven New Product Innovation and Prototyping Using 3D Printers, (2) Towards Autonomous IoT Logistics Objects, (3) The Human-IoT Ecosystem: An Approach to Functional Situation Context Classification, (4) Computational Business Intelligence, Big Data, and Their Role in Business Decisions in the Age of the Internet of Things, and (5) IoT for Hospitality Industry: Paperless Buffet Management. A brief introduction of each chapter follows:

Section 1, "IoT Adoption and Implementation," consists of five articles. "A Literature Review of the Emerging Field of IoT Using RFID and Its Applications in Supply Chain Management" by Suvendu Naskar, Preetam Basu, and Anup K. Sen attempts to understand extant literature studying applications of RFID in implementing IoT in the context of supply chain management.

"User Acceptance of IoT Applications in Retail Industry" by M S Balaji, Sanjit Kumar Roy, Aditi Sengupta, and Alain Chong examines the customer adoption of IoT applications in retail setting. The model drew on the technology acceptance model, trust perspective, task-technology fit, and organizational reputation perspective. "Technopsychology of IoT Optimization in the Business World" by Tommy Prayoga and Juneman Abraham argues that technology, however improved and innovative, will not fulfil its full potential if users do not adopt and accept it as part of their lives. They suggest that acceptance and appropriation are the two of the most important areas to explore in the field of IoT optimization in the business world. "The Internet of Things (IoT): Capabilities and Applications for Smart Supply Chain" by In Lee presents a conceptual framework of the IoT applications essential for smart supply chain. This chapter also discusses technical and managerial challenges faced by supply chain managers in implementing the IoT. "Privacy in the Internet of Things" by Jayashree Kanniappan and Babu Rajendira presents the IoT technology, the various applications, and privacy issues. Various other issues such as security and performance are also addressed.

Section 2, "IoT Management," consists of four articles. "The Internet of Things: Assessing Its Potential and Identifying the Enablers Needed to Capture the Opportunity" by Jacques Bughin and Michael Chui highlights some of the fundamental enablers that will be necessary for economic value to be realized, including industrial adoption, interoperability standards, cybersecurity, and regulatory certainty regarding issues such as data sharing and liability. "The Internet of Things: From Things to Valuable Outcomes" by Thomas Ochs and Ute Riemann outlines the key enabling technologies, drivers and business value as well as benefits and challenges. "Industrial Guidelines for Stimulating Entrepreneurship: the Internet of Things" by Mohammad Zarei, Ahmad Jamalian, and Rohollah Ghasemi ranks the importance of 13 industries for corporate, social, SME IoT-based entrepreneurs, and makes recommendations to promote entrepreneurial activities. "The Internet of Things: Opportunities, Issues, and Challenges" by Edward T. Chen presents a list of IoT devices and application examples as well as descriptions of the benefits and limitations alongside an assessment of each respective technology's potential for success in the future. This chapter addresses potentials, issues, and challenges for managers to be prepared for the new wave brought forth by the IoT.

Section 3, "IoT Technologies and Applications," consists of five articles. "IoT Objects Driven New Product Innovation and Prototyping Using 3D Printers" by Ravi Ramakrishnan and Loveleen Gaur provides an integrated framework for IoT enabled devices to integrate with remote 3D printers capturing customer insights. "Towards Autonomous IoT Logistics Objects" by Bill Karakostas illustrates the concept of smart autonomous logistic objects with a proof of concept prototype built using an embedded version of the Prolog language, running on a Raspberry Pi credit-card-sized single-board computer to which an RFID reader is attached. "The Human-IoT Ecosystem: An Approach to Functional Situation Context Classification" by Vaughan Michell and James Olweny shows how we can model the context information of both IoT devices and humans in a way that may help progress Human-IoT ecosystem design using situation theory. "Computational Business Intelligence, Big Data, and Their Role in Business Decisions in the Age of the Internet of Things" by Javier Vidal-García, Marta Vidal, and Rafael Hernandez Barros examines the possibilities of big data and the IoT to improve the services offered by companies and the customer experience and increase the efficiency of these companies. "IoT for Hospitality Industry: Paperless Buffet Management" by Asim Sinan Yuksel, Ibrahim Arda Cankaya, and Sadi Fuat Cankaya develops a flexible, cost effective, easy-to-use, customer-friendly and staff oriented paperless buffet management system for the restaurants that have all-you-can-eat buffet.

The Internet of Things in the Modern Business Environment is an excellent collection of the latest research and practices associated with the IoT economy, evolution, technologies, new applications, and trends. This book is one of the first comprehensive books that present aspects from the economics, engineering, research and development, and management sides of the IoT. As leading experts in the IoT area, the contributors did an outstanding job of providing our readers with extensive coverage of the most important research topics - new applications, economic aspects, business models, privacy, and emerging technologies. The projected audience includes researchers, managers, application developers, services providers, engineers, corporate managers, professors, and undergraduate/graduate students in various academic disciplines.

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