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Book Review

Business Models for Industry 4.0: A Book Review

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Introduction

The book entitled "Business Models for Industry 4.0: Concepts and Challenges in SME Organizations" discusses the challenges and opportunities faced by small and medium enterprises (SMEs) in the Industry 4.0 era. The author explores concepts such as Economy 4.0, Society 5.0, sustainable consumption, digital technology integration, and the need for customer engagement. Based on this background, the author emphasizes the importance of new business models, interdisciplinary knowledge, and continuous learning in the context of Industry 4.0 to develop value from SMEs.

This book was written by Sandra Grabowska, assistant professor at the Department of Production Engineering Silesian University of Technology who is the author of approximately 80 scientific publications, and Professor Sebastian Saniuk from the University of Zielona Gora, Poland, who has written more than 270 scientific publications (Grabowska & Saniuk, 2023). The book cover is predominantly blue and white, which gives a futuristic and high-tech impression in accordance with the theme raised in the book published by Routledge in 2023. This book also contributes to achieving the Sustainable Development Goals (SDGs) by offering a framework for integrating digital technology and innovation in business models that support sustainable development goals. The ideas offered by the author focus on

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efficient resource management, sustainable consumption, and production, as well as developing scientific and technological capacity in the SME sector, which is in line with economic, ecological, and social principles that support the SDGs.

SMEs face several challenges in implementing Industry 4.0 technology, which include: first, SMEs often find it difficult to develop appropriate strategies for adopting Industry 4.0 technology, which is critical for successful transformation. Second, a thorough cost-benefit analysis of the technology to be adopted is needed because SMEs usually have limited capital capacity. Third, the lack of data security and uniform standards can be a significant obstacle, as SMEs need to protect their data and ensure compatibility with other systems. Fourth, many SMEs have a shallow level of automation and computerization, which can hinder the integration of advanced Industry 4.0 technologies. Fifth, there is a lack of qualified employees who are skilled in computerization and digitalization. Sixth, there are high investment costs and concerns about the length of the payback period ratio.

This book, written in English, consists of 1 introductory chapter and six main chapters. Even though each chapter in this book provides an important overview of the concept of Business 4.0 for SMEs, we will focus on chapters three, five, and six, which, in our opinion, are the "soul" of this book.

Socioeconomic challenges in business models

Small and medium enterprises (SMEs) are forced to adopt Industry 4.0 technology to remain competitive in the modern market. In Chapter 1, it was explained that this adoption requires the integration of information technology to manage customer-oriented production processes efficiently. Implementing Industry 4.0 technologies requires high-speed Internet and advanced data analysis tools for real-time operations. SMBs can leverage cloud computing solutions to access the software needed to handle large streams of real-time data without the need to maintain complex hardware. New business models for SMBs emphasize network collaboration, increased customer integration, and a trusted platform environment. This model focuses on close collaboration with clients during product design and production, network collaboration, product responsibility, and service provision throughout the product life cycle. Sustainable production and consumption are critical goals of the modern economy, which aims to increase resource efficiency and reduce environmental impact. It involves changing consumption patterns and reducing consumption volumes to improve environmental quality.

Megatrends of the Fourth Industrial Revolution

The Fourth Industrial Revolution brings significant changes to business models through the application of Industry 4.0 technology. Key technologies such as the Industrial Internet of Things, Big Data, cloud computing, and augmented reality are driving this transformation. In Chapter 2, the author states that new service-based business models are facilitated by the Industry 4.0 pillar, which encourages communication between producers, service providers, and customers. Sensors in cyber-physical manufacturing systems monitor product conditions, enabling rapid response to failure and wear, resulting in a service-oriented business model. The service model provides product sales facilities for the provision of ongoing services, thereby encouraging customer involvement. Manufacturers benefit from valuable data for research and development, improving product performance and innovation.

Industry 4.0 as new Environment for business models

Chapter 3 discusses the transformative impact of Industry 4.0 on business, highlighting the shift to smart manufacturing and decentralized production systems. The authors emphasize the role of big data, the Industrial Internet of Things (IIoT), and simulation techniques, such as digital twins, to adapt business behavior to demand fluctuations, supply chain changes, and process irregularities. To support this fact, the author argues, "This is done by using, among other things, big data, technology based on processing a large set of data (Big Data), IIoT (Industrial Internet of Things) and simulation techniques, such as using digital twins" (p. 58). This chapter emphasizes the need for modern companies to develop innovative, customer-oriented value-creation strategies by leveraging new digital technologies and redesigning network-oriented business processes. This new environment requires fully integrating supply systems,

manufacturers, and customers in a sophisticated open network to deliver personalized products using Industry 4.0 technologies. This chapter concludes that the Fourth Industrial Revolution brings opportunities and challenges for the business world that require awareness of new market opportunities.

Concept for planning cyber-physical production networks

Chapter 4 discusses the use of advanced technologies such as digital twins and predictive simulation in cyber-physical production network planning. Digital twins enable the creation of virtual replicas of physical systems, enabling testing of new solutions, process improvements, and employee training. Examples from industries such as telecommunications and automotive demonstrate the practical applications of digital twin technology. Companies like OneWeb, Airbus, and Ford use simulation tools like WITNESS Horizon to optimize production processes and analyze factory operations. Predictive simulation combined with digital twins aids decision-making by optimizing resource allocation and providing active control in complex supply chain disruptions. This chapter also provides an example of the Mars Chocolate case study, showing how predictive simulation supports digital twins to improve production planning accuracy and operational efficiency. The integration of predictive simulation and digital twins is critical for analyzing new projects and optimizing operational planning in cyber-physical production networks.

The concept of Business Model 4.0

Chapter 5, entitled "Business Model Concept 4.0," provides a comprehensive overview of how the business world, especially SMEs, can adapt their strategies and operations to face the Fourth Industrial Revolution. This chapter introduces Business Model 4.0 as a new paradigm that combines the social and technical aspects of the enterprise, emphasizing the need for robust business processes to support cyber-physical networks and the production of personalized products. The authors highlight the importance of SMEs forming e-business networks to compete with larger-scale Smart Factories. As the author states, "The implementation of strategies in the Business 4.0 model in practice is carried out through the construction of cyber-physical collaboration networks, ensuring both the efficient use of resources and skills, as well as their renewal and process resilience." (p. 105). This model describes a configuration that integrates social and technical architecture, supported by Industry 4.0 and Industry 5.0. This chapter highlights the importance of collaboration and networking for the SME sector within the Business Model 4.0 framework. SMEs should encourage collaboration in the value chain and motivate customer loyalty, with an emphasis on unique value-added offerings that are economical and cost-effective.

Measures for Business Model 4.0

In Chapter 6, the author outlines the practical implementation and performance assessment of Business Model 4.0 in the context of the Fourth Industrial Revolution. This chapter introduces a series of Key Performance Indicators (KPIs) to evaluate the effectiveness and efficiency of business models adapted to the digital environment. The author discusses the use of the Balanced Scorecard (BSC) as a strategic management tool that can be adapted to Business Model 4.0, helping SME managers measure the value generated by the business model and assess its competitiveness and transformation. Value is an important point emphasized by the author as a goal that must be achieved by SMEs implementing the 4.0 business model. The author defines value as "The value obtained finds expression in profitable sales, customer satisfaction, and customer loyalty, which translates into building a competitive advantage for the company." (p. 118). This chapter provides a comprehensive guide to monitoring and improving business strategies in line with Industry 4.0. Qualitative and quantitative measures for continuous improvement are used, with the final section providing insight into adapting necessary measures to a company's specific needs and characteristics.

Limitations of the Business Model 4.0 Concept

Previous research conducted by experts shows that digital business models offer several advantages for SMEs. First, this business model allows SMEs to reach a wider audience and access a wider market

through digital platforms. In fact, this model will be beneficial for SMEs who want to internationalize their business operations. Digitalization simplifies the internationalization process by overcoming the challenges of traditional business models (Reim et al., 2022). Second, digital platforms play an important role in building business model innovation for SMEs. The integration of digital technologies enables the reconfiguration of SME capabilities, which in turn drives business model innovation (Xie et al., 2022). Third, adopting digital technology, such as the Internet of Things (IoT), can encourage business model innovation in SMEs. IoT facilitates the exploration of new business models, especially for SMEs (Paiola et al., 2022). Fourth, business model innovation, especially through digital means, has been proven to positively impact company performance, as proven by research on SMEs in the manufacturing sector (Salfore et al., 2023). Fifth, digital transformation integrated into SME business models can help SMEs face changes in the external environment (Priyono et al., 2020).

Furthermore, in line with the research results of these experts, the book "Business Models for Industry 4.0: Concepts and Challenges in SME Organizations" offers an innovative and adaptive Business Model 4.0 concept, especially for SMEs to face the challenges of the Industry 4.0 era. To overcome these challenges, the author summarizes his recommendations in four important points: Develop a Clear Strategy, invest in Skills Development, Leverage Partnerships and Networks, and Utilize Government and Industry Support.

However, there may still be some shortcomings or challenges associated with the concepts offered by this book. First, adopting Business Model 4.0 may require significant changes in existing organizational structures and business processes, which can be complex and challenging to implement, especially for SMEs with limited resources. The author does suggest the concept of collaboration, but can collaboration with fellow SMEs who also have similar resource limitations be a solution? If collaborating with large-scale companies, how can this provide more benefits to SMEs? Second, Transformation towards Business Model 4.0 may require large initial investments in technology, training, and infrastructure, which may not be easily accessible to all SMEs. Third, implementing this new business model requires special skills and knowledge that may not be possessed by all employees in an SME, so it requires continuous and time-consuming training and development. Fourth, SMEs may face challenges in integrating advanced Industry 4.0 technologies into their operations due to technical limitations or lack of interoperability with existing systems. Fifth, the changes brought by Business Model 4.0 may encounter resistance from employees or stakeholders who are more comfortable with traditional ways of working and even from larger-scale companies disturbed by the proposed business concept. Sixth, increased connectivity and use of big data in Business Model 4.0 also increase cybersecurity risks, which must be addressed.

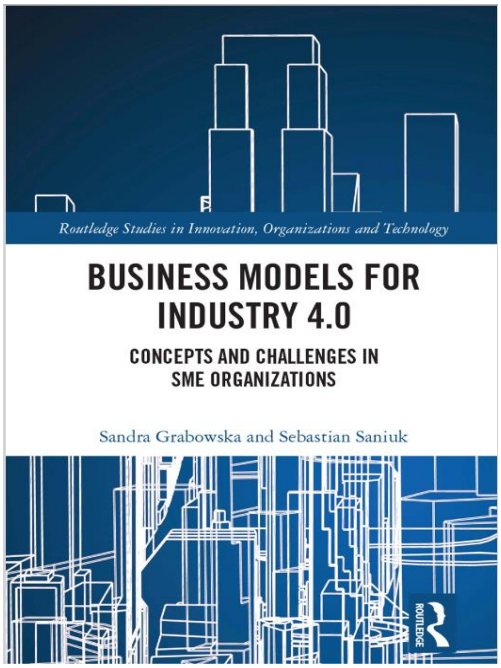
Meanwhile, we also see the need to look at the context of regional economic capacity when implementing this business model. The condition of SMEs in Western countries, which is the authors' background, is undoubtedly different from that of SMEs in countries with economies still developing, such as in South Asia or Southeast Asia. A similar book entitled "Digital Transformation of SME Marketing Strategies Innovating for the 4.0 Era" (2023) also states the importance of SMEs combining the concepts of exploration (skill development) and exploitation in the form of optimizing performance or profits (Rialti & Zollo, 2023) that often called as ambidexterity, something that not yet found from this book.

Conclusion and Rating

The author of this book provides an accurate picture of the phenomena and external environment that are changing as a result of the Industrial Revolution 4.0 and hopes that small and medium-scale companies will be able to adapt to increase the value of their company. The business model concept, which emphasizes the existence of a network of cooperation and collaboration, can become the main strength of SMEs so that this phenomenon does not leave them behind. However, there is still the question of whether collaboration should be carried out with fellow SMEs or with large-scale companies that are more mature and stable with sufficient resources.

Lastly, if you are interested in developing SMEs or are a small-scale business owner yourself, this book is important material, and you should not miss reading it. Ratings? I have no hesitation in giving this book an A rating and great appreciation to the authors for their concern for the sustainability of SME businesses.

Cover Book



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