Chapter 11
Conclusions and a Way Forward

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Abstract This book examines how advanced technologies can help manage supply chains that face disruptions and enhance their resilience in the aftermath of Covid-19. The book provides a comprehensive and integrated overview and assessment of the latest developments and practices of supply chain management (SCM) and advanced technologies, as well as real-world examples and cases from different industries and settings. The book also offers useful suggestions and directions for SCM professionals, policymakers, and stakeholders on how to apply advanced technologies successfully and optimally in their supply chains. The book also identifies some gaps and challenges in the current literature and practice of SCM and advanced technologies and proposes a conceptual model for future research in this field. The book concludes with some final remarks and recommendations for improving supply chain performance and resilience through advanced technologies. The book is a valuable and insightful contribution to the field of SCM and aims to stimulate further research and discussion on the complex and fascinating phenomenon of SCM in relation to advanced technologies.

Keywords Advanced · Supply chains · Stakeholders · Conceptual model · Risk management · Sustainability of supply chain operations · Green supply chain management · Competitive advantage · Environmental issues · Adoption of advanced technologies · Aagile supply chain · Responsive supply chain

11.1 Introduction

This chapter summarizes the main findings and implications of this book, which examined how advanced technologies can help manage supply chains that face disruptions and enhance their resilience in the aftermath of Covid-19. The chapter also suggests some directions for future research on the relationship between

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advanced technologies and supply chain management (SCM). The chapter is organized as follows. Section 11.2 presents the key findings and implications for practice derived from the previous chapters of this book. Section 11.3 identifies some gaps and challenges in the current literature and practice of SCM and advanced technologies, and proposes a conceptual model for future research in this field. Section 11.4 concludes the chapter and the book with some final remarks and recommendations.

11.2 Key Findings and Implications for Practice

This book aimed to examine how advanced technologies can help manage supply chains that face disruptions and enhance their resilience in the aftermath of Covid-19. The book gave a thorough and integrated overview and assessment of the latest developments and practices of SCM and advanced technologies, as well as real-world examples and cases from different industries and settings. The book also provided useful suggestions and directions for SCM professionals, policymakers, and stakeholders on how to apply advanced technologies successfully and optimally in their supply chains.

The main findings and implications of this book for theory and practice are:

- Advanced technologies can enable more agile, responsive, and sustainable supply chain operations by providing better visibility, coordination, risk management, and contingency planning across the supply chain network.
- Advanced technologies can improve the quality, productivity, and sustainability of supply chain operations by reducing waste, energy consumption, emissions, and costs.
- Advanced technologies can enhance the creativity, innovation, and personalization of products and services by facilitating the collaboration of humans and machines.
- Advanced technologies can facilitate the adoption of green supply chain management practices that aim to reduce the environmental impacts of supply chain activities.
- Advanced technologies can create value and competitive advantage for supply chain organizations by aligning their supply chain strategy with their corporate strategy and customer needs and expectations.

11.3 Future Research Directions

Despite the exploration and successful demonstration of the role of advanced technologies in various aspects of supply chains in several domains, we, in this book, also acknowledge the limitations and challenges of using advanced technologies in SCM. Some of them are:

- The lack of standardization, interoperability, and compatibility of advanced technologies across different platforms, systems, and devices.
- The lack of skilled workforce, training, and education to use advanced technologies effectively and efficiently.
- The lack of trust, security, privacy, and ethics in the use of advanced technologies, especially those involving data collection, sharing, and analysis.
- The lack of regulation, governance, and compliance in the use of advanced technologies, especially those involving cross-border transactions, contracts, and disputes.
- The lack of awareness, readiness, and willingness to adopt advanced technologies among some supply chain partners, customers, and stakeholders.

To overcome the limitations and challenges, this book suggests some directions for future research. Some of them are:

- To develop frameworks, models, standards, and protocols for the integration, interoperability, and compatibility of advanced technologies across different platforms, systems, and devices.
- To conduct studies on the impact of advanced technologies on the skills, roles, responsibilities, and behaviors of supply chain workers and managers.
- To investigate the ethical, legal, social, and environmental issues related to the use of advanced technologies in SCM.
- To evaluate the effectiveness, efficiency, and return on investment of advanced technologies in SCM.
- To explore the adoption barriers and drivers of advanced technologies among different supply chain partners, customers, and stakeholders.

To facilitate the aforementioned future research, we present a conceptual model, in Fig. 11.1. This is a conceptual model of the relationship between advanced technologies (**AT**) and various aspects of supply chain management (SCM). It shows how different factors can influence the adoption and impact of advanced technologies in SCM.

The model shows that advanced technologies can have both opportunities and challenges in various aspects of SCM. For example:

- Opportunities and Positive effects: advanced technologies can improve the integration, interoperability, and compatibility of different supply chain processes, systems, and partners; enhance the skills, roles, responsibilities, and behaviors of supply chain workers and managers; address the ethical, legal, social, and environmental issues related to SCM; and increase the effectiveness, efficiency, and return on investment of SCM.
- Challenges: advanced technologies can also create challenges or risks for the integration, interoperability, and compatibility of different supply chain processes, systems, and partners; require new or different skills, roles, responsibilities, and behaviors of supply chain workers and managers; raise new or complex ethical, legal, social, and environmental issues related to SCM; and entail high costs or uncertainties for the adoption and implementation of SCM.

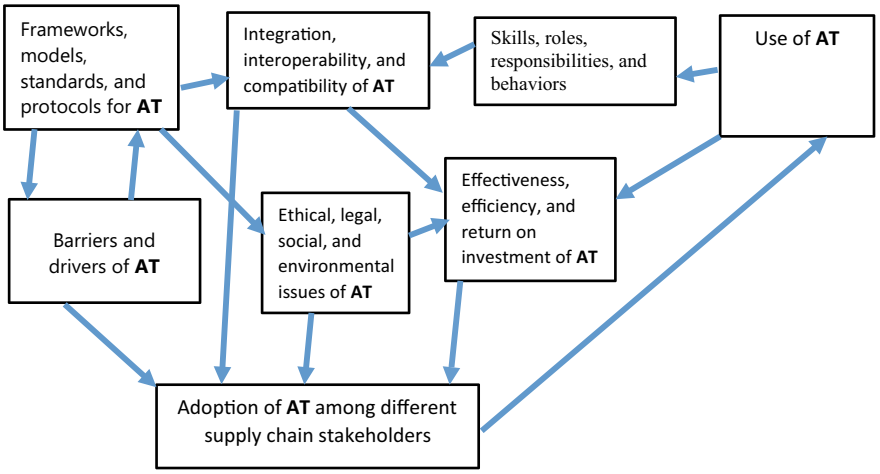

Fig. 11.1 A conceptual model for future research in SCM

The model also shows that many factors can influence the adoption of advanced technologies among different supply chain partners, customers, and stakeholders that future research can investigate empirically. Some of these factors are:

- *Barriers*: factors that hinder or prevent the adoption of advanced technologies in SCM, such as lack of awareness, knowledge, skills, trust, resources, infrastructure, etc.
- *Drivers*: factors that facilitate or encourage the adoption of advanced technologies in SCM, such as market demand, competitive advantage, innovation potential, cost reduction, performance improvement, etc.

The model suggests that there is no simple or direct relationship between advanced technologies and SCM. Rather, many factors can mediate or moderate the effects of advanced technologies on SCM. Some of these factors are:

- *Frameworks*: conceptual or theoretical structures that provide guidance or direction for the design or implementation of advanced technologies in SCM.
- *Models*: abstract or simplified representations that describe or explain the behavior or characteristics of advanced technologies in SCM.
- *Standards*: agreed-upon rules or criteria that define the quality or performance of advanced technologies in SCM.
- *Protocols*: established procedures or methods that regulate the communication or interaction of advanced technologies in SCM.

The model implies that there is *no one-size-fits-all solution* for improving SCM through advanced technologies. Rather, firms need to be aware of their own needs and preferences and adjust their use of advanced technologies accordingly. Some possible strategies are:

- *Evaluating*: assessing the benefits and costs of adopting or using advanced technologies in SCM for different purposes or contexts.
- *Selecting*: choosing the most appropriate or suitable advanced technologies for different SCM problems or opportunities.
- *Integrating*: combining or coordinating different advanced technologies to create synergies or complementarities for SCM.
- *Adapting*: modifying or customizing existing advanced technologies to fit specific SCM requirements or conditions.

In summary, this section has identified several gaps and directions for future research on the relationship between advanced technologies and SCM. Future research can explore how different factors, such as frameworks, models, standards, protocols, barriers, and drivers, can influence the adoption and impact of advanced technologies on various aspects of SCM, such as integration, interoperability, compatibility, skills, roles, responsibilities, behaviors, ethical, legal, social, environmental issues, effectiveness, efficiency, and return on investment. Future research can also employ different methods and approaches, such as surveys, experiments, case studies, simulations, etc., to collect and analyze data and generate insights or solutions for different SCM problems or opportunities. For empirical testing, this conceptual, structural equation modeling would be appropriate to account for mediating and moderating factors in this model. By doing so, future research can contribute to the advancement of knowledge and practice in the field of SCM.

11.4 Concluding Remarks

This book has explored how advanced technologies can help manage supply chains that face disruptions and enhance their resilience in the aftermath of Covid-19. The book has provided a comprehensive and integrated overview and assessment of the latest developments and practices of SCM and advanced technologies, as well as real-world examples and cases from different industries and settings. The book has also offered useful suggestions and directions for SCM professionals, policymakers, and stakeholders on how to apply advanced technologies successfully and optimally in their supply chains.

The book has shown that advanced technologies can enable more agile, responsive, and sustainable supply chain operations by providing better visibility, coordination, risk management, and contingency planning across the supply chain network. Advanced technologies can also improve the quality, productivity, and sustainability of supply chain operations by reducing waste, energy consumption, emissions, and costs. Moreover, advanced technologies can enhance the creativity, innovation, and personalization of products and services by facilitating the collaboration of humans and machines. Furthermore, advanced technologies can facilitate the adoption of green supply chain management practices that aim to reduce the environmental impacts of supply chain activities. Additionally, advanced technologies can

create value and competitive advantage for supply chain organizations by aligning their supply chain strategy with their corporate strategy and customer needs and expectations.

However, the book has also acknowledged the limitations and challenges of using advanced technologies in SCM. Some of these are the lack of standardization, interoperability, and compatibility of advanced technologies across different platforms, systems, and devices; the lack of skilled workforce, training, and education to use advanced technologies effectively and efficiently; the lack of trust, security, privacy, and ethics in the use of advanced technologies; the lack of regulation, governance, and compliance in the use of advanced technologies; and the lack of awareness, readiness, and willingness to adopt advanced technologies among some supply chain partners, customers, and stakeholders.

Therefore, the book has suggested some directions for future research on the relationship between advanced technologies and SCM. Future research can explore how different factors, such as frameworks, models, standards, protocols, barriers, and drivers, can influence the adoption and impact of advanced technologies on various aspects of SCM. Future research can also employ different methods and approaches to collect and analyze data and generate insights or solutions for different SCM problems or opportunities.

We hope that this book has offered a valuable and insightful contribution to the field of SCM. We also hope that this book has stimulated further research and discussion on the complex and fascinating phenomenon of SCM in relation to advanced technologies. We also hope that this book has provided some practical guidance and recommendations for SCM practitioners, policymakers, and stakeholders on how to improve their supply chain performance and resilience through advanced technologies.

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