Editorial

Special Issue on Advances in Operations and Supply Chain Management with Sustainability Considerations

Sungyong Choi

School of Business, Hanyang University, Seoul 04763, Republic of Korea; sungyongchoi@hanyang.ac.kr

As environmental issues emerge as a topic of concern for people around the world, appropriate international regulations and agreements are required to conserve the planet and prevent climate change that is catastrophic for humans and ecosystems [1]. The business issues in production and operations management (POM) these days mean more than just maximizing profits and minimizing costs or productivity and efficiency in the past. In other words, modern managers are facing increasingly challenging business opportunities, which is how to combine these traditional POM issues with a new one: sustainability issues [2,3]. That is, as sustainability issues have emerged worldwide, it is no longer possible to ensure sustainable growth of the national economy and the economy of individual companies with immediate profitability alone. Due to these changes in the business environment, sustainable supply chain management is a topic that has recently attracted more attention in the POM field, which presents a paradigm shift and new research opportunities. Therefore, I invited high quality papers on sustainable operations and supply chain management to contribute to the relevant literature for publications in the *Sustainability* journal.

The purpose of this Special Issue is to contribute to the literature by publishing the state-of-the-art articles on all research topics and methodologies in the fields of sustainable operations and supply chain management. As a result, the Special Issue had published 17 papers, which cover a wide spectrum of various topics as follows.

(1) Green SCM (Supply Chain Management) application modeling
(2) OM (Operations Management) performance and productivity strategy
(3) Big Data and AI (Artificial Intelligence) application
(4) Inventory optimization modeling
(5) ESG (Environment, Social, Governance) empirical study
(6) Systematic literature analysis

As the first topic, '**Green SCM application and modeling**', Bhavani et al. [4] studied herbal medicines and chemicals in products as a new eco-friendly demand. More specifically, the authors presented an inventory optimization model for non-immediate perishable items that followed a green demand in the face of partially backlogged shortages. Zhao et al. [5] formulated a supplier-driven Stackelberg game model, and in the research model, the authors considered the government's initial quota of carbon emission and the fines for excessive emission amounts. They also identified the mechanisms of companies' optimal choices in low carbon emission supply chains, the impacts of initial ratios for quotas and governmental fines on carbon trading, and the influence of carbon emission trading on the relevant supply chain profits and decisions. Kanan et al. [6] designed a stylized model of biogas supply chain network with an environmental consideration. Due to characteristics of the energy market, the authors suggested a hybrid solution methodology with flexible programming and probabilistic programming approaches. Then, the main results were confirmed by a thorough case-based computational analysis.

As the second topic, '**OM performance and productivity strategy**', Kim and Lee [7] modeled a new production capacity expansion strategy, which is related to shortening the

lead time as much as possible over competitors. The authors also proposed procedures and methodologies to evaluate the superiority of the capacity expansion strategies in terms of cost, utilization, and ESG management. Park and Kim [8] analyzed the efficiency of the Korean ship parts manufacturing industry by utilizing the DEA (Data Envelopment Analysis) model and MPI's (Malmquist Productivity Index). For the purpose of the analysis, the authors divided the entire manufacturing process into two phases: operating activity and financial activity. Additionally, by deriving the overall productivity and efficiency index along with the productivity and efficiency of each stage, it provided an empirical basis for which activities should be improved with priority. The implication of this study is that when measuring productivity and efficiency in a specific industry (e.g., ship parts manufacturing), a more detailed review of the manufacturing process, rather than simply external indicators, is needed. Through this, it is possible to determine detailed weights and priorities related to productivity and efficiency. Rim and Jung [9] evaluated the physical workload of courier delivery drivers who perform pickup and delivery work. In order to achieve this research purpose, the authors conducted experimental research on 20 delivery technicians and performed work analysis through statistical analysis. As a result, pickup and delivery work was classified into classification job inside a truck, luggage delivery, and pickup, driving and rest.

As the third topic, '**Big Data and AI application**', Jiang and Chen [10] provided an analytical model using the Stackelberg game theory to solve the product-counterfeit problem and emphasized the value of the blockchain-enabled e-commerce platform. As a result of the analysis, it was revealed that, contrary to our intuitive expectations, implementation of blockchain technology does not always result in a win-win-win for all of the supply chain partners, manufacturers, retailers, and customers. Jung [11] empirically analyzed the following research goals. First, authors derived medical SCM competitiveness variables through AHP (Analytic Hierarchy Process) analysis and verify causal relationships between the variables. Second, based on the well-known model, UTAUT (Unified Theory of Acceptance and Use of Technology), in the literature, they investigated the relationship between the research variables related to logistics cooperation. By doing so, the authors emphasized the need for collaboration between supply chain partners in logistics activities from a blockchain business model perspective. Kwon et al. [12] proposed a new forecasting framework to establish a logistics R&D roadmap although previous relevant studies mainly relied on expert interview methods (e.g., Delphi Method or AHP). More specifically, the authors effectively predicted technological changes based on patent data in the logistics industry using the LDA (Latent Dirichlet Allocation) cluster analysis technique of topic modeling, a machine learning technique.

As the fourth topic, '**Inventory optimization modeling**', Bieniek [13] considered a price-setting newsvendor problem when probabilistic and price-dependent demand is assumed to be additive. An additional difference between this study and other price-setting newsvendor models in the literature is that barter exchange is allowed in this study. The author analyzed the model by considering both correlated and uncorrelated cases of barter price. Finally, the analytical results were confirmed by a numerical experiment. Kwak [14] formulated a new order-up-to inventory model that reflected eco-friendly costs from the point of view of corporate operations and performed simulation analysis. As an extensive simulation result, it is revealed that the new optimal policy for sustainability-adjusted results in a shorter order cycle compared to the existing policy, thereby reducing the total cost. In addition, the author's study can have insight in that it can provide similar implications for overall corporate inventory control strategies. Vu and Ko [15] investigated how to effectively improve decision-making around inventory transshipment in situations where demand data is partially missing. As a result, a newly developed integrated approach overcame the limitations of currently separated methods. It also improved the appropriate imputation levels and coordination to achieve cost-effective transshipment. Chekobi et al. [16] formulated the integrated production-to-inventory-routing problem where they incorporated remanufacturing returned end-of-life (EOL)

products into a mathematical optimization model. Then, the authors proposed a heuristic solution approach of two-phase decomposition to find an optimal solution through an iterative procedure.

As the fifth topic, '**ESG empirical study**', Kim et al. [17] conducted an empirical study to strengthen the competitiveness of logistics service companies in the e-commerce market from the perspective of ESG management. As a result, the authors presented an integrated ESG strategy through analysis of online platform attributes. Kim et al. [18] evaluated the changes in the impact of Green Supply Chain Management (GSCM) implementation on organizational performance and business performance of small and medium-sized enterprises (SMEs) in the electronics industry. As the analytical results, this study suggests that it will help to increase the understanding of the key factors related to GSCM that positively affect the organizational and business performances of SME suppliers. Jo and Kwon [19] tried to identify the influencing factors that affect to the GSCM performance of Korean manufacturing SME companies. As a result of the analysis, this study revealed that environmental cooperation is the most important factor in GSCM performance. In addition, the study also proposed a strategic direction for successful GSCM implementation of manufacturing-based SMEs.

Finally, as the sixth topic, '**Systematic literature analysis**', Zhou et al. [20] reviewed the history of SCF (Supply Chain Finance) development, terminology, and current research practices, including potential future research topics. To achieve this goal, the authors conducted a comprehensive systematic literature review related to the SCF concept and suggested future research goals.

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