Guest editorial

Data-driven decision-making research for supply chain finance

Data-driven decision-making research for supply chain finance develops dramatically in recent years. However, the relevant research work is still lack of attention. The purpose of this special issue is to innovative research methodologies from the perspective of data-driven analysis of supply chain finance considering social influence

Supply chain finance (SCF) has played an increasingly important role in operational and financial practices and attracted growing attention from academia and industry alike (Yan *et al.*, 2016; Milder, 2008). Supply chain finance not only involves the production and operation decisions of traditional suppliers and retailers facing capital constraints but also banks and some financial institutions play a key role in it (Babich and Kouvelis, 2018; Xu *et al.*, 2018). It is particularly important to evaluate the efficiency of banks and other financial institutions. The current literature on supply chain finance involves many aspects, batch ordering (Shang *et al.*, 2009), buyer intermediation (Tunca and Zhu, 2018), factoring and reverse factoring (Kouvelis and Xu, 2021), sourcing and risk management, (Tang *et al.*, 2018) etc. At present, the development of mobile Internet makes the communication between members of the supply chain more timely (Akpakwu *et al.*, 2017; Zhang *et al.*, 2019), and the data of enterprises, consumers and banks also present massive and complex data (Li *et al.*, 2019, 2018). Given that the previous literature rarely studies supply chain finance from these two dimensions, this special issue aims to fill this gap.

This special issue of industrial management and data systems contains 12 research papers. These papers focus on recent advances topics of data-driven decision-making research for supply chain finance including rural supply chain finance problem, blockchain-driven cyber-credit evaluation system (BCCES), the two-stage data envelopment analysis model under meta-frontier and group frontier, optimal selection of standardized modular containers (SSMC) issues, the credit risk of collaboration in a supply chain finance network, sustainable supplier selection problem, a two-stage fairness concern efficiency model, supply chain integration with online financial consumption, merger and acquisitions (M&A), DEA model with assurance region (AR) restrictions, optimal financial and ordering strategies with environmental protection and the two-stage meta-frontier DEA model.

The study by Liu *et al.* proposes a two-stage data envelopment analysis model to evaluate the performance of rural supply chain finance (RSCF) service systems in China. This two-stage model considers not only the technical gap between RSCF systems but also the maximization of intermediate output. First, the paper shows the overall efficiency of China's RSCF systems is low, and there remains great potential for improvement. Second, the relationship between rural residents' disposable income and the efficiency of RSCF systems is U-shaped, and the efficiency of RSCF systems in the high-income group is far greater than that of other income groups. The result indicates that the main reason for the lack of efficiency in RSCF seems to lie in management and technology.

The study by Liu and Jiang proposes a blockchain-driven cyber-credit evaluation system (BCCES) to evaluate micro-and small-scale manufacturing enterprises' (MSMEs') cyber-credit in a decentralized environment. The results confirmed that BCCES can provide reliable cyber-credit for distributed MSMEs without a trusted third party. This can improve the

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efficiency of establishing reliable cooperation among unauthentic MSMEs. With the advantages of blockchain, BCCES can automatically realize cyber-credit evaluation through smart contracts and distributed consensus. At the same time, BCCES can evaluate the real-time cyber-credit of MSMEs based on their latest service evaluation.

The paper by Hu *et al.* uses the two-stage data envelopment analysis model under meta-frontier and group frontier to study the deposit and loan efficiency changes of 16 banks from 2007 to 2014. Under ownership structure heterogeneity, the model introduces the balance parameters between deposits and loans, in order to realize the mathematical abstraction description of the macro-monetary policy. The paper finds that most banks' loan efficiency is higher than their deposits, and different monetary policies have little effect on bank deposit and loan efficiency, while ownership heterogeneity has a significant impact on bank performance. Besides, this study finds that management and technology are two factors that affect the inefficiency of banks.

The study by Ji *et al.* defines two preference matrices to characterize the freight behavior and shippers' segment and then integrates these two matrices into a centralized multi-criteria method to determine the optimal selection of standardized modular containers (SSMC). This paper is the first SSMC-related paper that takes shippers' behaviors and preferences into consideration when making the selection and is expected to fill in the research gap that has existed until now. In addition, this study shows that the SSMC derived by the proposed methodology is found to be Pareto-optimal, ensuring the required sustainability.

The study by Rishehchi Fayyaz *et al.* addresses a data-driven model to analyze the credit risk of collaboration in a supply chain finance network. This paper expands the literature on credit risk evaluation and finds that considering the network attributes of participants in the prediction model can improve the accuracy of the model. Besides, the model regards the network characteristics of supply chain finance as the key attribute to predict credit risk and can provide a basis for financial intermediaries to make more complex decisions in the financial facilitation mechanism.

The study by Nemati *et al.* considers the concepts of sustainable development and sustainability assessment to solve the problem of sustainable supplier selection. This paper uses a new DEA method to study the partial effects of input on desirable and undesirable output. This new model calculates the efficiency of suppliers and introduces that an efficient supplier should have high aggregate efficiency, overall efficiency and subunit efficiency.

The work by Zhuo *et al.* proposes a two-stage fairness concern efficiency model based on the classical theory of DEA and performed an empirical study to measure agricultural loan efficiency in the 20 major Chinese banks. The findings of the empirical analysis of this paper are as follows, first, peer-induced fairness concern has no impact on deposit efficiency in a centralized bank supply chain; second, The China Merchants Bank (CMB) has the third-lowest deposit efficiency and monotonicity of loan efficiency with input allocation depends on a bank's ownership structure and third, efficiency ranks are strongly affected by the fairness concern and most Chinese banks show a low agricultural loan efficiency. This paper also contributes to the literature in several ways.

The study of Li *et al.* examines the significance of supply chain integration affecting online financial consumption, analyzes the online financial consumption demand of mobile phone consumers and promotes the optimization of supply chain services with consumers. In this study, TF-IDF (term frequency-inverse document frequency) and cosine similarity text analysis are used for analyzing online demand for mobile phone products and analyzes online reviews on mobile phone topics from the JD platform and Weibo platform. The study shows that online demand for mobile phone products is greatly influenced by supply chain links such as product design, logistics transportation and marketing promotion. The consumption demand for different mobile phone products has different emphases, but the differences are

not significant. This study contributes to the existing literature by integrating online consumption trends into a supply chain analysis framework.

The study by Zhu *et al.* aims to select the best partner from different candidates for a given company to merge. Merger and acquisitions (M&A) is a process of restructuring two or more companies into one, a process that occurs frequently in many companies. Previous studies on M&A mainly paid attention to the potential gains from a merger, while ignored the problem of how to select the partners to merge. They propose a 0–1 integer programming to select the best partner for M&A and use the operation data from 27 China's commercial banks to verify the applicability of their model. Their work not only can help banks to construct its own production technology to compressively reflect the production change after M&A but also can help the 27 commercial banks in China to select their best merger partner.

The work by Xu and Zhou aims to evaluate Chinese commercial banks efficiency based on different non-performing loans in the process. AR restrictions are combined with a two-stage DEA model in their work. The efficiency scores of 26 Chinese commercial banks (listed banks) are analyzed by a two-stage AR-DEA model in the study period of 2013–2017. The results show that state-owned commercial banks had better performance than joint-stock commercial banks and city commercial banks over the five-year study period. The development of Internet finance has positive impact on deposit producing sub-stage and insignificant non-homogeneity existed among the different groups in the circumstances of considering different non-performing loans.

The work by Zhao *et al.* aims to explore the optimal financial and ordering strategies when considering environmental protection. First, this paper proposes a Stackelberg game modeling and backward induction methods to derive the optimal equilibrium solutions. Next, the paper further explores the influences of various financing strategies on the green degree of product and ordering policies through numerical experiments. Finally, the paper comes to the conclusion that no matter which financing modes the capital-constrained retailer chooses, both the loan interest rate and order quantity considering environmental protection are larger than that without environmental protection concerns. This paper contributes to data collection and environmental protection behaviors in supply chain finance and provides meaningful guidance for the financing and environmental decision-making of enterprises.

The study of Yu *et al.* proposes a two-stage meta-frontier DEA model to examine the relative efficiency of each bank. Researches on the bank's efficiency and optimal allocation of the bank's resources are quite necessary. Thus, this paper explores the optimal allocation of resources between the bank savings system and loan system under the premise of environmental heterogeneity. Moreover, it analyzes the two-stage operation performance of all banks under group-frontier and meta-frontier and analyzes the impact of the technical differences between the branches. This paper has positive guiding significance for the banking industry in the new era of big data to improve its operational efficiency in various business practices and will also provide practical advice and support to the government and relevant departments.

We would like to extend our appreciation to all the authors who have submitted their impressive works for this special issue. We also thank all the reviewers for their service and commitment to this journal. It is crucial to analyze supply chain finance decision-making in a data-driven manner. This special issue collects several recent works in this area, which could provide advanced perspective to the existing literature.

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