Editorial

Fu Jia*

College of Business Administration,
Capital University of Economics and Business,
Beijing, 100070, China
and
School for Business and Society,
University of York,
Church Lane Building, Heslington, York, YO10 5DF, UK
Email: jeff_fujia@hotmail.com
*Corresponding author

Jinghua Ou

Chongqing University,
No. 174 Shazhengjie, Shapingba,
Chongqing, 400044, China
Email: oujinghua@cqu.edu.cn

Min Yan

The City Law School,
City, University of London,
165 Goswell Road, London EC1V 7HD, UK
Email: min.yan@city.ac.uk

Lujie Chen

International Business School Suzhou,
Xi'an Jiaotong-Liverpool University,
No. 8, Chongwen Road, Suzhou, Jiangsu, 215000, China
Email: Lujie.Chen@xjtlu.edu.cn

Biographical notes: Fu (Jeff) Jia is the Chair Professor of Supply Chain Management. His research interests include supply relationship management in a cross-cultural context, global sourcing, supply chain learning and innovation, and sustainable supply management. He has an extensive track record of publications in supply chain management and logistics journals including *Journal of Operations Management*, *International Journal of Operations and Production Management* (*IJOPM*), *British Journal of Management*, *International Journal of Production Economics*, *Journal of Business Logistics* among others.

Jinghua Ou is an Associate Professor of the School of Economics and Business Administration and a researcher of the Centre for Urbanization and Regional Innovation Pole Development at Chongqing University. His research interests include rural economics, poverty reduction, energy economics, and regional economic development. He has published more than 20 articles in renown academic journals, including *China Economic Review*, *Journal of International Financial Markets*, *Institutions & Money*, *International Review of Economics and Finance*, *Finance Research Letters*, and *Economic Research* (in Chinese: 经济研究, Chinese's authoritative academic journals). He is also as a principal investigator over four national and provincial projects, won the second and third prize of provincial outstanding achievements.

Min Yan is a reader in Law at the City Law School, University of London. His research engages with the intersection between business and law and specialises in corporate law, corporate governance, and corporate responsibility. He has published in leading refereed journals such as *Legal Studies*, *Journal of Corporate Law Studies*, *Asia Pacific Law Review*, *Hong Kong Law Journal* and well-known US law reviews such as *Northwestern Journal of International Law & Business*, *Delaware Journal of Corporate Law*, *Hastings Business Law Journal* and *Columbia Journal of Asian Law*. His monograph *Beyond Shareholder Wealth Maximisation* is published by Routledge in 2017 (paperback in 2019).

Lujie Chen is a Senior Associate Professor of Management at Xi'an Jiaotong-Liverpool University, China. She is also an Honorary Associate Professor at University of Liverpool, UK. Her research includes sustainable supply chain management, SCF and CSR reports investigations, supply chain innovations as well as other related empirical operations management research. Her publications have appeared in leading international journals such as *Harvard Business Review*, *International Journal of Production Economics*, *International Journal of Operations and Production Management*, *International Journal of Production Research*, *Business and Society*, *Journal of Purchasing and Supply Management*, and *Supply Chain Management: An International Journal* among others.

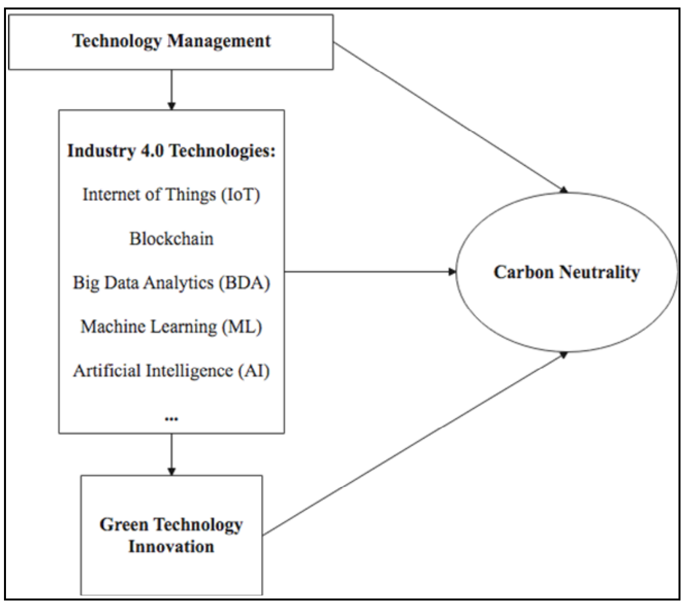
1 Introduction

The continued accumulation of carbon emissions (CEs) has led to severe environmental problems, such as global warming and more frequent extreme weather events (Cai et al., 2021). Reducing CEs has become a fundamental task for governments worldwide (Többelmann and Wendler, 2020). According to Aldy and Gianfrate (2019), carbon dioxide emissions from burning non-renewable energy sources are a significant driver of global warming. The concept of 'carbon neutrality' has become increasingly common as concerns about global warming grow. According to the Intergovernmental Panel on Climate Change (IPCC) and the Paris Agreement, carbon neutrality is defined as net-zero carbon dioxide (CO_2) emissions (Jiang et al., 2020).

Reducing greenhouse gas emissions is necessary to mitigate the effects of climate change and global warming. Carbon neutrality is a state, in which organisations or individuals balance the amount of greenhouse gas emissions they produce with the amount they remove from the atmosphere (de Sousa Jabbour et al., 2019; Chen, 2021). Achieving carbon neutrality involves a combination of strategies, including reducing emissions, switching to low-carbon technologies, and offsetting remaining emissions by purchasing carbon credits or using carbon sinks (Ghosh et al., 2020). Carbon neutrality is a key goal for global organisations, governments, and individuals, given the urgent need to mitigate the effects of climate change and global warming (Zhang et al., 2022).

In this context, several fundamental, rapid, and large-scale systemic changes are required to reduce harmful environmental impacts fully (Van Wassenhove, 2019). In an era of significant knowledge and technological change, open innovation is vital to the sustainable competitiveness of companies (Bagherzadeh et al., 2019). Low-carbon technology investment has emerged as a significant area of study within supply chain management, with considerable research attention devoted to it (Ghosh and Shah, 2012; Raz et al., 2013; Hong and Guo, 2018). Much of the literature on investment in low-carbon technologies has focused on why and how manufacturers invest. For example, Ghosh and Shah (2012) consider supply chain structure and investigate the impact of supply chain leadership on low-carbon technology investment. Ma et al. (2021) suggest that government carbon reduction subsidies encourage investment in low-carbon technologies.

Figure 1 Achieving carbon neutrality through technology management



Green technology innovation (GTI) was initially defined as the technological process of producing products that consume less pollution, raw materials, and energy (Braun and Wield, 1994). GTI can be driven by the effective technical management of Industry 4.0 technologies, which further promotes carbon neutrality. For example, Kuang et al. (2022) argue that GTI requires serendipitous invention and development and the translation of technological innovation activities into expected firm behaviour. Figure 1 shows how technology management, in combination with Industry 4.0 technologies, can generate GTI that can contribute to carbon neutrality.

The rest of this paper is structured as follows: Section 2 presents a review of the relevant literature on technology management and GTI applied to carbon neutrality.

Section 3 categorises and summarises the seven studies in this special issue and their main contributions. Section 4 discusses the implications and conclusions.

2 Technology management and carbon neutrality

2.1 The role of technology management in fostering carbon neutrality

Technology is a potential solution to CO_2-related problems, as it can lead to environmentally friendly and green innovations to eliminate CEs (Blichfeldt and Faullant, 2021). Over the past decade, significant strides have been made in leveraging key technological innovations to reduce CEs, including pollution prevention, energy efficiency, waste recycling and environmental management. Driven by these technological breakthroughs, carbon-neutral pathways are emerging in various sectors such as construction, heat, power, and transport (Li et al., 2020).

Furthermore, in the era of Industry 4.0, several emerging disruptive digital technologies promise to be new enablers for achieving carbon neutrality goals. These information technologies, including the Internet of Things, blockchain, big data analytics, machine learning, and artificial intelligence, show great potential for optimising economic and environmental performance. For example, IoT enables companies to improve and expand visibility, which can help them track carbon footprints and verify green products in their business activities (Saadi et al., 2020). Due to its decentralised and transparent nature, blockchain technology can be cleverly applied to streamline transaction processes and reduce unnecessary time, complexity, and costs, thereby reducing anthropogenic greenhouse gas (GHG) emissions (Al Saqa et al., 2019; Saberi et al., 2019).

However, despite the growing interest in these emerging IT and Industry 4.0 concepts, most of the literature on carbon neutrality still focuses on energy-related technology transitions such as hydropower, wind, solar, and biofuels, with very little research on carbon neutrality from an IT perspective. Furthermore, most of these information technologies have not yet reached large-scale commercial applications due to the many uncertainties, such as barriers to optimal use and deployment. Some researchers point out that organisations and institutions have a significant influence on the adoption and diffusion of sustainable technologies (Warbroek et al., 2019), especially in agriculture (Vinholis et al., 2020; Manda et al., 2020), which contributes to more ‘climate-smart’ agricultural practices and the ultimate pursuit of carbon neutrality.

Therefore, organisations and institutions need to analyse the role and barriers in promoting and adopting environmental technologies. Policy tools are technologies used by governments to develop, evaluate and implement policy options to achieve specific policy outcomes (e.g., reducing CEs). Some literature has demonstrated that appropriate policies promote innovation and diffusion of low-carbon technologies (Liu et al., 2018; Du et al., 2021). At the same time, despite the intertwining of technological, institutional, market, and policy barriers, global carbon neutrality remains complex and highly uncertain, creating new risks and opportunities for regulators and academics to manage carbon neutrality on a global scale effectively (Engwall et al., 2021).

2.2 GTI in CE reduction

GTI is widely considered beneficial in reducing CEs (Paramati et al., 2020; Shan et al., 2021). More than two-thirds of the world's countries are still seeking appropriate GTI to achieve environmental and economic goals (Shan et al., 2021). In contrast to traditional technological innovation, a central feature of GTI is the consideration of environmental impacts, such as alternative energy production, energy conservation, carbon capture and storage, and reuse of waste materials (Xu et al., 2021). At the national level, the benefits of GTI in reducing CEs have been observed in all developed countries (Dong et al., 2022), EU member states (Többelmann and Wendler, 2020) and OECD economies (Paramati et al., 2020).

Some researchers have studied low-carbon technology investment from the perspective of policies and trading mechanisms, such as Chen et al. (2021), whose findings suggest that manufacturers will invest more in low-carbon technologies when governments implement aggregate control and trading policies. Tong et al. (2018) state that China offers a priority review system for patents related to green technologies (mainly energy efficiency and environmental protection) and other important industries for the country's economic development. At the same time, a growing body of research focuses on the impact of technology management on carbon neutrality. Many empirical studies have shown that GTI is critical for CE reduction. For example, Shan et al. (2021) find that GTI mainly improves energy efficiency, while renewable energy technologies contribute to developing clean energy. Some scholars claim that GTI can significantly reduce CE by improving energy efficiency (e.g., Wang et al., 2012; Töbelmann and Wendler, 2020).

3 Review of special issue's contributions: carbon neutral technology management

This editorial notes that the application of technology management for carbon neutrality is still an emerging area of research. As a result, many topics related to technology management and carbon neutrality, including information processing and digital technologies, are receiving increased attention. However, many technical, process, and motivational challenges remain to be overcome before carbon neutrality can be achieved.

The seven papers accepted in this special issue are based on innovative and valuable findings that provide new perspectives and contribute to advancing carbon-neutral practice through technology management. While we believe these papers focus on the current state of arts at the intersection of technology management and carbon neutrality, we also believe they provide a solid foundation for future research. We hope this special issue will further advance the research agenda at the intersection of technology management and carbon neutrality. According to the focus of the seven papers in this special issue, we group and summarise them into two main themes: innovation implications and technology implications.

3.1 Innovation implications

In the study by Hong, Chen, Wang and Yao titled 'Impact of green technology innovation on carbon emissions: evidence from China's 276 cities', the authors examined the overall influence of GTI on CE. To analyse this relationship, they utilised a fixed effects model and a comprehensive panel dataset encompassing 276 cities in China from 2007 to 2017. The background is that GTI is often seen as an important way to reduce CE. However, its progress may lead to the so-called carbon rebound effect, offsetting its emission reduction effect. The main findings of this paper reveal an inverted U-shaped relationship between GTI and both per capita and total CE across the data sample, as well as regional heterogeneity in the relationship between GTI and CE (CE per capita). The empirical results of this paper have important policy implications on GTI to contain CE.

Xu, Chen, Li and Jiang conducted a study titled 'Impact of green subsidies on green innovation of environmental service firms in China'. The study employs multiple linear regression to analyse the influence of green subsidies on green innovation in environmental service firms. The research focuses on environmental service firms listed on the Shanghai and Shenzhen stock exchanges between 2014 and 2020. First, the results suggest that green subsidies can promote green innovation in environmental service firms, while R&D investment mediates this effect. Second, the intensity of environmental regulation negatively moderates the relationship between R&D investment and green innovation. Furthermore, green subsidies are more effective in promoting green innovation in less developed regions. The authors' findings help the government to design green subsidy schemes and formulate sensible environmental policies to promote the green development of environmental service firms.

Yi and Zhang's study, titled 'How does product innovation affect the performance of university-industry collaboration? A dynamic knowledge transfer perspective', offers valuable insights by adopting a dynamic knowledge transfer perspective that integrates the dynamic nature of knowledge transfer and strategies to examine the R&D strategies of university-industry collaboration (UIC). The authors argue that product innovation is gaining traction in university-industry collaborations, but little research has been conducted on its impact on performance. In addition, the authors use a Stackelberg differential game to model the knowledge transfer process and examine how product innovation affects the performance of UIC. The findings indicate that university leaders exhibit superior performance in situations where the leadership positions of two participants are interchangeable. Furthermore, the study reveals that the revenue maximisation strategy remains constant regardless of the game leader, with revenue demonstrating a U-shaped relationship with product innovation. Finally, the authors' research suggests that companies' revenue-sharing ratios do not always guarantee higher profits.

3.2 Technology implications

Yang, Jiang, Chen and Jia argue in their article titled 'ICT-empowered rural e-commerce development in China: an adaptive structuration perspective' that the emergence of e-commerce has rejuvenated China's backwards and poor remote rural areas. However, knowledge about how information and communication technology (ICT) can develop e-commerce in rural areas is still limited. The authors present an in-depth case study of four typical e-commerce enterprises in rural China from the adaptive structuration theory perspective. The findings suggest that the development of ICT-driven rural e-commerce involves forming a platform strategy (including quality management and revenue structure) and developing related services (including supply chain management and marketing services). Firm-specific characteristics influence this process and ultimately lead to intended/unintended outcomes for e-commerce firms and rural development. This study develops by explaining how e-commerce firms use ICT.

The study conducted by Zhao, Chen and Liu, titled 'The impact of three-dimensional printing technology investment on a low-carbon manufacturing supply chain, investigated through the Stackelberg game', explores investment strategies for three-dimensional printing (3DP) technologies aimed at fostering low-carbon development within the supply chain. They developed a theoretical model in which manufacturers or retailers can lead investments in 3DP technologies. First, the authors find that manufacturers are always interested in investing in 3DP technologies and are willing to lead the investment, while retailers also gain more benefits but are only willing to lead the investment when the cost factor of investing in 3DP technologies is higher. Second, investing in 3DP technologies increases consumer demand and reduces unit CEs. Third, contrary to intuition, introducing 3DP technologies may reduce optimal wholesale and retail prices and R&D investment and increase total CEs. Finally, optimal investment decreases as the cost factor increases. It is interesting to note that the authors find both positive and negative effects of the cost factor on both wholesale and retail prices.

Yang, Liu and Liu's study titled 'Do carbon emissions trading pilots effectively reduce CO_2 emissions? County-level evidence from eastern China' employs a difference-in-differences approach to empirically estimate the impact of a CEs trading pilot project. The study utilises county-level data, encompassing 413 units in eastern China. In recent years, China has been committed to effectively controlling greenhouse gas emissions and achieving peak CEs by 2030 and carbon neutrality by 2060. To this end, China has taken several measures to strengthen its intervention in industrial CEs, the most important of which is the CEs trading pilot project initiated in 2013. Few previous studies have examined the emission reduction effects of the pilot projects from a county-level perspective. The main findings of this study suggest that carbon trading policies effectively reduce carbon dioxide (CO_2) emissions and are positively associated with CO_2 emission intensity. Another key finding is that the environmental Kuznets curve holds for the relationship between CEs and economic growth. The authors' findings on trade pilots suggest that governments at all levels should continue to promote a trade market framework that considers regional heterogeneity. Additional measures should also be taken to create positive policy effects for carbon efficiency.

The study by Zhang, Liu, Wang and Huang aims to examine how government subsidies impact investments in research and development (R&D) and the innovative performance of Chinese industries with a high number of patents. The study focuses on patent-intensive industries that are listed on the Shenzhen and Shanghai Stock Exchanges between 2013 and 2019. By utilising univariate linear regression and exponential regression analyses, the authors found that government subsidies have a direct positive impact on the innovative performance of firms, with R&D investment playing a mediating role. In addition, the results also indicate that state-owned enterprises experience a greater facilitation effect from government subsidies in terms of innovation, while The Greater Bay Area shows a higher level of facilitation from government subsidies. Consequently, it is recommended that the government should increase R&D

subsidies specifically targeted at promoting innovation in patent-intensive enterprises. Simultaneously, enterprises should enhance their own R&D capabilities to improve the efficiency of their innovation processes.

4 Conclusions and look forward

This position paper aims to summarise key themes from recent research on technology management for achieving carbon neutrality. It begins by providing an overview of the context surrounding CEs and then explores the contributions of technology management to carbon-neutral practices. Additionally, it discusses the commonly mentioned barriers associated with carbon-neutral practices. Finally, the paper highlights the critical relationship between emerging innovative technologies and carbon-neutral practices, emphasising their role in reducing CEs and achieving sustainable development goals through adopting GTI.

The papers in this special issue demonstrate that managing technology for carbon neutrality and embracing technological progress provide a multitude of research opportunities. In this special issue, we aim to enhance the understanding of the application of technology management to carbon-neutral practices while providing a foundation for future research in this area. As emerging technologies are continually updated to support the achievement of the carbon neutrality aim, the potential of academics and researchers for generating new knowledge and advancing this value agenda is noticeable.

References

Al Saqa, Z.H., Hussein, A.I. and Mahmood, S.M. (2019) 'The impact of blockchain on accounting information systems', *Journal of Information Technology Management*, Vol. 11, No. 3, pp.62–80.

Aldy, J.E. and Gianfrate, G. (2019) 'Future-proof your climate strategy', *Harvard Business Review*, Vol. 97, No. 3, pp.86–97.

Bagherzadeh, M., Markovic, S. and Bogers, M. (2019) 'Managing open innovation: a project-level perspective', *IEEE Transactions on Engineering Management*, Vol. 68, No. 1, pp.301–316.

Blichfeldt, H. and Faullant, R. (2021) 'Performance effects of digital technology adoption and product & service innovation – a process-industry perspective', *Technovation*, Vol. 105, p.102275.

Braun, E. and Wield, D. (1994) 'Regulation as a means for the social control of technology', *Technology Analysis & Strategic Management*, Vol. 6, No. 3, pp.259–272.

Cai, A., Zheng, S., Cai, L., Yang, H. and Comite, U. (2021) 'How does green technology innovation affect carbon emissions? A spatial econometric analysis of China's provincial panel data', *Frontiers in Environmental Science*, Vol. 9, p.813811.

Chen, J.M. (2021) 'Carbon neutrality: toward a sustainable future', *Innovation*, Vol. 2, No. 3, pp.1–2.

Chen, W., Chen, J. and Ma, Y. (2021) 'Renewable energy investment and carbon emissions under cap-and-trade mechanisms', *Journal of Cleaner Production*, Vol. 278, p.123341.

de Sousa Jabbour, A.B.L., Jabbour, C.J.C., Sarkis, J., Gunasekaran, A., Furlan Matos Alves, M.W. and Ribeiro, D.A. (2019). Decarbonisation of operations management-looking back, moving forward: a review and implications for the production research community', *International Journal of Production Research*, Vol. 57, Nos. 15–16, pp.4743–4765.

Dong, F., Zhu, J., Li, Y., Chen, Y., Gao, Y., Hu, M., Qin, C. and Sun, J. (2022) 'How green technology innovation affects carbon emission efficiency: evidence from developed countries proposing carbon neutrality targets', *Environmental Science and Pollution Research*, Vol. 29, No. 24, pp.35780–35799.

Du, G., Yu, M., Sun, C. and Han, Z. (2021) 'Green innovation effect of emission trading policy on pilot areas and neighboring areas: an analysis based on the spatial econometric model', *Energy Policy*, Vol. 156, No. 1, p.112431.

Engwall, M., Kaulio, M., Karakaya, E., Miterev, M. and Berlin, D. (2021) 'Experimental networks for business model innovation: a way for incumbents to navigate sustainability transitions?', *Technovation*, Vol. 108, p.102330.

Ghosh, D. and Shah, J. (2012) 'A comparative analysis of greening policies across supply chain structures', *International Journal of Production Economics*, Vol. 135, No. 2, pp.568–583.

Ghosh, P., Jha, A. and Sharma, R.R.K. (2020) 'Managing carbon footprint for a sustainable supply chain: a systematic literature review', *Modern Supply Chain Research and Applications*, Vol. 2, No. 3, pp.123–141.

Hong, T., Chen, Y.X., Wang, T.Z. and Yao, S.J. (2023) 'Impact of green technology innovation on carbon emissions: evidence from China's 276 cities', *International Journal of Technology Management*, ahead-of-print.

Hong, Z. and Guo, X. (2019) 'Green product supply chain contracts considering environmental responsibilities', *Omega*, Vol. 83, pp.155–166.

Jiang, Y., Jia, F., Blome, C. and Chen, L. (2020) 'Achieving sustainability in global sourcing: towards a conceptual framework', *Supply Chain Management*, Vol. 25, No. 1, pp.35–60.

Kuang, H., Akmal, Z. and Li, F. (2022) 'Measuring the effects of green technology innovations and renewable energy investment for reducing carbon emissions in China', *Renewable Energy*, Vol. 197, pp.1–10.

Li, G., Li, L., Choi, T.M. and Sethi, S.P. (2020) 'Green supply chain management in Chinese firms: innovative measures and the moderating role of quick response technology', *Journal of Operations Management*, Vol. 66, Nos. 7–8, pp.958–988.

Liu, X., Du, H., Brown, M.A., Zuo, J., Zhang, N. and Rong, Q. (2018) 'Low-carbon technology diffusion in the decarbonization of the power sector: policy implications', *Energy Policy*, Vol. 116, pp.344–356.

Ma, S., He, Y., Gu, R. and Li, S. (2021) 'Sustainable supply chain management considering technology investments and government intervention', *Transportation Research Part E: Logistics and Transportation Review*, Vol. 149, p.102290.

Manda, J., Khonje, M.G., Alene, A.D., Tufa, A.H. and Manyong, V. (2020) 'Does cooperative membership increase and accelerate agricultural technology adoption? Empirical evidence from Zambia', *Technological Forecasting and Social Change*, Vol. 158, p.120160.

Paramati, S.R., Mo, D. and Huang, R. (2021) 'The role of financial deepening and green technology on carbon emissions: evidence from major OECD economies', *Finance Research Letters*, Vol. 41, p.101794.

Raz, G., Druehl, C.T. and Blass, V. (2013) 'Design for the environment: life-cycle approach using a newsvendor model', *Production and Operations Management*, Vol. 22, No. 4, pp.940–957.

Saadi, H., Touhami, R. and Yagoub, M.C. (2020) 'Revolution of artificial intelligence and the internet of objects in the customer journey and the air sector', *Journal of Information Technology Management*, Vol. 12, No. 2, pp.59–69.

Saberi, S., Kouhizadeh, M., Sarkis, J. and Shen, L. (2019) 'Blockchain technology and its relationships to sustainable supply chain management', *International Journal of Production Research*, Vol. 57, No. 7, pp.2117–2135.

Shan, S., Genç, S.Y., Kamran, H.W. and Dinca, G. (2021) 'Role of green technology innovation and renewable energy in carbon neutrality: a sustainable investigation from Turkey', *Journal of Environmental Management*, Vol. 294, p.113004.

Töbelmann, D. and Wendler, T. (2020) 'The impact of environmental innovation on carbon dioxide emissions', *Journal of Cleaner Production*, Vol. 244, p.118787.

Tong, T.W., Zhang, K., He, Z.L. and Zhang, Y. (2018) 'What determines the duration of patent examination in China? An outcome-specific duration analysis of invention patent applications at SIPO', *Research Policy*, Vol. 47, No. 3, pp.583–591.

Van Wassenhove, L.N. (2019) 'Sustainable innovation: pushing the boundaries of traditional operations management', *Production and Operations Management*, Vol. 28, No. 12, pp.2930–2945.

Vinholis, M., Saes, M., Carrer, M.J. and Filho, H. (2021) 'The effect of meso-institutions on adoption of sustainable agricultural technology: a case study of the Brazilian low carbon agriculture plan', *Journal of Cleaner Production*, Vol. 280, No. 5, p.124334.

Wang, Z., Yang, Z., Zhang, Y. and Yin, J. (2012) 'Energy technology patents – CO_2 emissions nexus: an empirical analysis from China', *Energy Policy*, Vol. 42, pp.248–260.

Warbroek, B., Hoppe, T., Bressers, H. and Coenen, F. (2019) 'Testing the social, organizational, and governance factors for success in local low carbon energy initiatives', *Energy Research & Social Science*, Vol. 58, p.101269.

Xu, L., Fan, M., Yang, L. and Shao, S. (2021) 'Heterogeneous green innovations and carbon emission performance: evidence at China's city level', *Energy Economics*, Vol. 99, p.105269.

Xu, X.F., Chen, X.Y., Li, Y.Q. and Jiang, G.R. (2023) 'Impact of green subsidies on green innovation of environmental service firms in China', *International Journal of Technology Management*, ahead-of-print.

Yang, X.S., Jiang, Y., Chen, X.W. and Jia, F. (2023a) 'ICT-empowered rural e-commerce development in China: an adaptive structuration perspective', *International Journal of Technology Management*, ahead-of-print.

Yang, J., Liu, C.L. and Liu, X. (2023b) 'Do carbon emissions trading pilots effectively reduce CO_2 emissions? County-level evidence from eastern China', *International Journal of Technology Management*, ahead-of-print.

Yi, H.Y. and Zhang, Q. (2023) 'How does product innovation affect the performance of university-industry collaboration? A dynamic knowledge transfer perspective', *International Journal of Technology Management*, ahead-of-print.

Zhang, S., Zhou, Z., Luo, R., Zhao, R., Xiao, Y. and Xu, Y. (2022) 'A low-carbon, fixed-tour scheduling problem with time windows in a time-dependent traffic environment', *International Journal of Production Research*, Vol. 61, No. 18, pp.1–20.

Zhao, Q., Chen, W. and Liu, M.U. (2023) 'The impact of three-dimensional printing technology investment on a low-carbon manufacturing supply chain, investigated through the Stackelberg game', *International Journal of Technology Management*, ahead-of-print.