

Editorial: Accelerating the digital transformation and green transition towards a more inclusive society: shaping dialogue on the twin challenges

Introduction

The new generation of digital technologies is key to create a more inclusive society and economy in the next decade, empowering citizens and businesses in the digital age.

In the case of the European Union, the digital strategy “aims to make this transformation work for people and businesses, while helping to achieve its target of a climate-neutral Europe by 2050” (European Commission, 2023a). The EU has several policy areas like connectivity, digital finance, digital skills, education and European Research Areas, among others. To support the EU’s approach, there are three key pillars: technology that works for the people, a fair and competitive digital economy and an open, democratic and sustainable society (European Commission, 2023b).

There is a new EU funding programme called The Digital Europe Programme (DIGITAL) whose aim is to bring digital technology to citizens, businesses and public administrations in the EU. In particular, this strategic programme will provide funding for five specific areas: advanced digital skills, artificial intelligence, cybersecurity, supercomputing and promoting a wide use of digital technologies in the digital age. The program will fund programmes and traineeships in areas like AI, cybersecurity, high performance computing and quantum as well as the upskilling of the workforce in strategic capacity areas (European Commission, 2023c, 2023d).

Education institutions can actively tackle the digital skills gap, creating the skills and competences for the new jobs in the green economy as well as supporting the transition towards a more sustainable economy (Arafat *et al.*, 2019; Napathorn, 2022; Peng and Tao, 2022; Srivastava *et al.*, 2020; Zhang *et al.*, 2018, 2021). On the path towards the digital transformation, digital skilled citizens and professionals will be a key pillar. Strategic human capital will be a cornerstone for competitive advantage of companies, economies and regions (Ordóñez de Pablos, 2004a, 2004b, 2004c; Vodenko and Lyausheva, 2020).

Now it is pivotal that all relevant stakeholders tackle the big challenges and opportunities of the digital and green transitions, boost sustainable growth and create new jobs in a more inclusive and resilient society (European Commission, 2023e, 2023f; Mai *et al.*, 2023; Verhoef *et al.*, 2021; Zhao and Zou, 2015). Governments, businesses and higher education institutions must encourage active dialogue and vibrant research collaboration to explore these opportunities.

Contents of the issue

The fourth issue (2023) of *Journal of Science and Technology Policy Management* presents a collection of eight papers addressing topics like artificial intelligence, cashless payment adoption, digitalization, knowledge management, machine learning, renewable energy and supply chains, among others. The discussion covers countries like Bangladesh, India, Indonesia and Thailand as well as some Easter European countries.



The first paper of the issue, titled “Integration of UTAUT model in Thailand cashless payment system adoption: The mediating role of perceived risk and trust” (by Namahoot and Jantasri), develops a model that explores “the relationships among the five dimensions of the unified theory of acceptance and use of technology (UTAUT) toward the overall behavioral intentions (BIs); to use cashless payment systems in Thailand, which are practically based on the basic models and theories of consumer behavior such as the theory of reasoned action (TRA), theory of planned behavior (TPB) and technology acceptance model (TAM); and to explain the indirect effects between UTAUT and BIs to use cashless payment systems mediating by perceived risk and trust. A total of 708 respondents, who have had an experience with a cashless payment system in Thailand, were selected using a stage sampling method. The data obtained from the participants were analyzed using a structural equation modelling approach. The results of this paper reveal that UTAUT model, perceived risk and trust have all significant influences on BIs to use a cashless payment system. This suggests that consumers in Thailand adopt to specific financial technological innovation if they perceive that the risk is low and they can trust the system, especially if it is associated with a reliable online banking network”.

The paper titled “Managing the knowledge for innovation in Eastern European firms: open or closed innovation?” (Saunders and Radicic) analyses the “impact of cooperation with external partners on the intensity of product innovation as well as its commercial success. The focus is on firms located in the Eastern European countries that are seldom a subject of empirical innovation studies. The theoretical framework takes into account that moderate and modest innovator countries, which comprise the sample, have distinct innovation ecosystems relative to advanced economies. The study uses data from the Business Environment and Enterprise Performance Survey (BEEPS) that was conducted in 2013–2014 and covering the period of the past three years. Product innovation is measured through its intensity (a number of product innovation) and through its commercial success (innovative sales). A set of hypotheses are tested using a negative binomial estimator (for the number of product innovation) and a tobit estimator (for innovative sales) estimated in Stata statistical software. Empirical findings show that vertical cooperation has a positive effect on the intensity of innovation activities. In contrast, the authors find no evidence that horizontal cooperation or cooperation with science partners (universities and research centres) increase innovation intensity or its commercial success. Besides vertical cooperation, for a commercial success, it is equally beneficial for firms to use their own innovative ideas. These results taken together suggest that closed innovation and cooperation with customers and suppliers are critical determinants of product innovation in Eastern European firms”.

The paper titled “A mixed-method study on the barriers of industry 4.0 adoption in the Indonesian SMEs manufacturing supply chains” (by Fernando, Wahyuni-T.D., Gui, Ikhsan, Mergeresa and Ganesan) explores “the adoption barriers of Industry 4.0 in the Indonesian manufacturing supply chains. The mixed method was deployed to validate the findings. First, the qualitative study was conducted based on the interviews. Then, the companies were approached using filter questions on the involvement in adopting industry 4.0 and its impact on the supply chain. Based on the qualitative study, nine main barriers were found in the thematic analysis. Thus, to get a consensus on the barriers in the industry, the barrier indicators were tested using a structural equation model retrieved from 173 small and medium Indonesian manufacturing firms. Results indicate that five main barriers (e.g. unclear Industry 4.0 policy, higher-risk investment, insecure data sharing, lack of expertise and lack of incentive) are confirmed as the adoption barriers. The successful adoption of supply chain integration with Industry 4.0 technology can strengthen the manufacturing sector and competitiveness. Therefore, this study can be a complimentary assessment to

evaluate the Indonesia Industry 4.0 Readiness Index (INDI 4.0) and the effectiveness of the government support program”.

The paper titled “Application of confirmatory factor analysis (CFA) as the basis of the evaluation of the green building certification systems” (by Blackburne, Gharehbaghi, Farnes, Moore and Russo) aims to “evaluate the green building certification systems. In doing so, a validation process, using confirmatory factor analysis (CFA), was undertaken. An extensive literature review was conducted to highlight the paramount aspects of green building certification systems. Then, using a grounded theory, key findings of the initial literature review were explored. This was necessary to form a broad theoretical framework. Finally, CFA was performed to evaluate various green building certification systems. Initially, it was noted that accreditation process was the central key for effective building certification systems, particularly at the international level. Further, using CFA, it was also determined that to increase the sustainable performance of the green building certification, meeting the increasing expectation of the system user is paramount. When evaluating the green building certification systems, it is recommended to focus on a specific aspect of the programmes holistically. This needs to be done particularly towards delivering a clear message to the stakeholders globally; doing so may alleviate the many challenges of green building certifications”.

The paper titled “Digitalization of the supply chain: transformation factors” (by Aamer, Sahara and Al-Awlaqi) states that “there is an increasing interest in the supply chain’s digitalization, yet the topic is still in the preliminary stages of academic research. The academic literature has no consensus and is still limited to research assessing the supply chain’s digitalization of organizations. This study aims to explore the supply chain digitalization drivers to understand the emerging phenomena. More specifically, the authors devised from the literature the most common factors in assessing the readiness in scaling supply chain digitalization. This study followed a five-phased systematic literature review (SLR) methodology in this research: designing, analyzing, conducting, writing and assessing the quality of the review. The SLR is beneficial for justifying future research regardless of the complex process that requires dealing with high-level databases, information filtering and relevancies of the content. Through analysis of 347 titles and abstracts and 40 full papers, the authors showed and discussed the supply chain digitalization: transformation factors. The results generated three main themes: technology, people and processes. The study also generated ten subthemes/primary drivers for assessing the readiness for supply chain digitalization in organizations: IT infrastructure, cybersecurity systems, digitalization reskilling and upskilling, digitalization culture, top management support, digitalization and innovation strategy, integrated supply chain, digital innovation management, big data management and data analytics and government regulations. The importance of each factor was discussed, and future research agenda was presented”.

The paper titled “Monetization of customer futures through machine learning and artificial intelligence based persuasive technologies” by (Bhattacharyya) analyses “how real options investment perspective could be applied towards monetization of customer futures through the deployment of machine learning (ML) and artificial intelligence (AI)-based persuasive technologies. M-commerce apps and e-commerce sites have been deploying ML and AI-based tools (referred to as persuasive technologies), to nudge customers for increased and quicker purchase. The primary objective was to increase engagement time of customers (at an individual level), grow the number of customers (at market level) and increase firm revenue (at an organizational level). The deployment of any persuasive technology entailed increased investment (cash outflow) but was also expected to increase the level of revenue and margin (cash inflow). Given the dynamics of market and the emergent nature of persuasive technologies, ascertaining favourable cash flow was challenging. Real options

strategy provided a robust theoretical perspective to time the persuasive technology-related investment in stages. This helped managers to be on time with loading customer purchase with increased temporal immediacy. A real options investment space involving six spaces has also been developed in this conceptual work. These were Never Invest, Immediately Investment, Present-day Investment Possibility, Possibly Invest Later, Invest Probably Later and Possibly Never Invest”.

The paper titled “Cashless preferences during the COVID-19 pandemic: investigating user intentions to continue UPI-based payment systems in India” (by Kirmani, Haque, Sadiq and Hasan) explores “the factors influencing user satisfaction with unified payment interface (UPI)-based payment systems during the COVID-19 pandemic in India. The study also aimed to examine whether the user satisfaction with UPI-based payment systems during the COVID-19 pandemic will transform into their continuance intention post-COVID-19 pandemic. The study was performed in three phases, i.e. pre-testing (for developing questionnaire), pilot study (using exploratory factor analysis to ensure unidimensionality) and the main study. The main study was based on the feedback from a sample of 369 internet users who first used the UPI-based payment system during the COVID-19 pandemic. Data generated were analysed using the structural equation modelling approach. The study findings suggest that the users who are satisfied with UPI-based transactions during the COVID-19 pandemic are likely to continue their use of this payment mode in future. Factors such as post-adoption perceived value, perceived usefulness and post-adoption perceived risk were observed to be key constructs in explaining user satisfaction and continued intention for UPI-based payment systems”.

Finally, the paper titled “Renewable energy in Bangladesh: economic growth and policy perspectives” (by Sarker, Wang, Adnan, Pooja, Akhi and Akter) studies “the energy relation to economic growth and find a way to solve the energy crisis for Bangladesh. Bangladesh is facing a high rate depletion of traditional energy sources. Renewable energy technology may be an alternative solution to meeting Bangladesh’s rising energy demand. Despite huge potential, Bangladesh fails to use renewable energy sources properly due to insufficient information and technical knowledge. The present research studied the current energy condition and potentiality of renewable energy with its influence on economic growth in Bangladesh. This study analyzes the relationship between renewable energy consumption and economic growth of Bangladesh for the period of 2001–2016, based on yearly data, by using multiple regression model where augmented Dickey–Fuller unit root test has been chosen for testing the viability. The result of this study showed that economic growth of Bangladesh is influenced positively by the consumption of renewable energy”.

I hope you have a productive time reading this collection of papers. Thanks for your interest!

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