

Guest editorial: Cutting-edge technologies for the development of Asian countries

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Introduction

Artificial intelligence (AI), Internet of Things (IoT)/Internet of Everything, blockchain and Big Data are expected to disrupt public and private sectors in Asian countries. If well implemented, these cutting-edge technologies can promote socioeconomic and ecological developments (Fosso Wamba *et al.*, 2015) and enhance the quality of life (De-Arteaga *et al.*, 2018) in Asian countries. They have the potential to bring great value to Asian countries in terms of reshaping competitive advantages (Akter *et al.*, 2020), improving how organizations respond to disasters (Ofli *et al.*, 2016; Zhou *et al.*, 2018) and emergency (Johnson *et al.*, 2021a), reducing inequalities (Korinek and Stiglitz, 2019), developing new knowledge (Harfouche *et al.*, 2017), improving human health (Guo and Li, 2018; Johnson *et al.*, 2021b; Stone *et al.*, 2018; Wahl *et al.*, 2018), improving education (McCalla, 2004), increasing participation in smart cities (Viale Pereira *et al.*, 2017), reshaping agriculture (Harfouche *et al.*, 2019) and empowering farmers by increasing their economic intelligence (Saba *et al.*, 2018). It can also enhance microfinance and social entrepreneurship (Popkova and Sergi, 2020).

Along with these potential positive impacts, cutting-edge technologies can inevitably have negative consequences. As these technologies were designed in developed countries, they could have been built intentionally or inadvertently with biases. If they were created with a bias or their training data collected from different countries, they could potentially produce biased results in the context of developing countries. This reality could lead to unintended consequences such as increased discrimination and racism, inequalities, low security, reduced privacy, digital divide and lack of national sovereignty.

The special issue tackles the potential impact of cutting-edge technologies in Asia, shedding light on how these technologies are adopted and implemented, and their effects and causes on the strategic, operational and technical levels.

Between the technological and social determinisms

Over the past few years, there has been a growing interest in research dealing with the potential impact of cutting-edge technologies on businesses and societies. To analyze the impact of cutting-edge technologies and their causes, we update Heeks and Bailur's (2007) framework. This framework was proposed to understand perspectives on the impacts of introducing technology and the causes of such impacts. We have selected this framework to introduce our special issue because it can help to integrate the most underlying perspectives and approaches to research dealing with cutting-edge technologies. Heeks and Bailur's (2007) framework is a matrix that has two facets:

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1. the impacts of technologies; and
2. their causes.

The first axis is a continuum of perspectives on technology impacts. It has three possibilities depending on whether the impact of cutting-edge technology can be considered good (optimism), neutral, or bad (pessimism). The second axis is a continuum of perspectives on impact causes. It has three possibilities: cutting-edge technology will certainly make changes (technological determinism), People/organizations and cutting-edge technology can make changes (sociotechnical perspective), or only people/organizations can make changes (organizational or social determinism).

The paper A “*Information technology investment and innovation performance: does investment paradox exist?*” examines the effects of information technology (IT) investment on the innovation performance of Chinese firms. Based on a sample of 134 companies, the paper has found that IT investment in Chinese firms had no significant effect on the number of patent applications, namely, innovation performance in the investment year. However, due to the time lag effect, the positive effect of IT investment on innovation performance in the following two years had been observed for the full sample. This paper indicates that IT investments can be associated with positive impacts in terms of impacts. The causes suggest that the positive impacts are associated with the IT investments and depend on the company size and age. The paper is represented by A in [Figure 1](#).

The paper B “*Enabling organizational use of artificial intelligence: an employee perspective*” aims to understand the underlying factors that motivate employees to use chatbots in the workplace. In terms of impacts, this paper indicates that AI in organizations can augment and improve the way work is achieved. In terms of causes, it suggests that this positive impact is only possible if employees use these technologies in the workplace. The paper shows that five human and organizational factors affect employees’ intention to use AI. It is represented by B in [Figure 1](#).

The paper C “*Artificial Intelligence Impact on Banks clients and employees in an Asian developing country*” underlines how banks’ clients and employees perceive the impact of AI on their everyday activities. Results show an increase in clients’ satisfaction due to the reduction of time waste. Results also show that employees perceive AI as a mean to transform the banking profession without fully taking over human interventions. This positive deterministic point of view is represented by C in [Figure 1](#).

The paper D “*Artificial intelligence in the defense sector: an RBV and isomorphism perspectives to the case of the Lebanese Armed Forces*” underlines how the defense sector is highly affected by the application of AI, which has the potential to increase its efficiency

Figure 1 Research aims and corresponding themes derived from analysis

		Causes		
		Technological determinism	Sociotechnical perspective	Organizational or social determinism
Impact	Optimism	(C) ; (K)	(A) ; (H) ; (L)	(B) ; (G) ; (I)
	Neutrality		(F) ; (J)	
	Pessimism		(D)	(E)

and effectiveness. However, this paper shows how the lack of resources, especially access to an adapted infrastructure in a developing country in Asia, created a dependence on international donations, grants and technical assistance from international bodies, leading them to institutional isomorphism and reducing national security sovereignty. This paper indicates that cutting-edge technology can be associated with negative institutional impacts in terms of impacts. In terms of causes, it suggests that these negative impacts are associated with both technological and technical factors. The paper is represented by D in [Figure 1](#).

The paper E "*FinTech innovation and knowledge flows in Hong Kong's financial sector: a social network analysis approach*" examines how FinTech knowledge from foreign firms flows into and among elite commercial banks in Hong Kong's financial sector to drive innovation. Results find interesting untold patterns of innovation and inequality in Hong Kong's financial industry. For example, only three banks are responsible for all the FinTech knowledge entering Hong Kong. In terms of impacts, this paper indicates that FinTech innovation can be associated with negative institutional impacts such as exasperating disparities in the banking sector. In terms of causes, it suggests that these negative impacts are associated with organizational factors. E represents the paper in [Figure 1](#).

The paper F "*Smart technologies challenges and issues in social inclusion: case of disabled youth in a developing country*" examines how smart technologies promote the social inclusion of disabled people in Lebanon. Results showed that disabled people need to develop the capacity to engage in meaningful practices of using smart technologies. From this perspective, social inclusion could not be achieved merely by providing technological equipment and devices, but it depends on the capabilities approach that is much broader. In terms of impacts, this paper indicates that smart technologies cannot be associated with positive impacts such as increasing inclusion of disabled people as they are suffering from a capability failure resulting from a gap in policy commitment to promote universal access for the disabled. In terms of causes, it suggests that these results from a lack of physical and technological infrastructure and social resources such as networks to exchange information and learning support. The paper is represented by F in [Figure 1](#).

The paper G "*Understanding artificial intelligence: insights on China*" sheds light on local Chinese aspects influencing the development and implementation of AI. Results show that it requires tailored solutions which account for the location (i.e. the territorial extension and the administrative boundaries), the government approach and the human capital. These results show that the potential positive impact of AI is embedded in a particular political and social context that should be considered when implementing AI. The paper is represented by G in [Figure 1](#).

The paper H "*Digital transformations and supply chain management: a Lean Six Sigma perspective*" examines digital transformations of supply chains from a process improvement angle using the lean six sigma DMAIC approach. The sociotechnical perspective proposed to show how digital transformations and Lean Six Sigma applications in supply chains can contribute greatly to elevate the positive impact or benefits of Lean Six Sigma process improvements by using emerging technologies such as IoT, three-dimensional printing or additive manufacturing, AI, augmented reality, virtual reality, drones, robotics, blockchains, cloud computing and collaborative platforms expands the toolkits for LSS. The paper is represented by H in [Figure 1](#).

The paper I "*Unbanked to banked: reintermediation role of banks in e-government services for financial inclusion in an Indian context*" develops a framework to implement electronic delivery systems for connecting a federal government with rural citizens using banking infrastructure as a reintermediation platform. Results show the process in which banks leverage facilitators called Bank Mitras (friends from the bank as per the local language) to disseminate services offered by the banks to rural customers at each village. This paper shows that technology can increase financial inclusion in terms of impacts. In terms of

causes, it suggests that these results depend on bank employees who can help in completing the process of e-government transactions by the beneficiaries due to the trust factor. I in [Figure 1](#) represents the paper.

The paper J “*Eleven years of cyberattacks on Chinese supply chains in an era of cyber warfare, a review and future research agenda*” offers a look at the Chinese government’s approach to addressing cyberattacks on Chinese supply chains and its calls for global governance. Results show that the top five factors influencing the adoption process in firms are: relative advantage and technological readiness (technology context), top management support and firm size (organization context) and government policy and regulations (environment context). This sociotechnical neutral perspective is represented by J in [Figure 1](#).

The paper K “*Blockchain adoption in health market: a systems thinking and modelling approach*” shows that health market blockchain adoption is increasing in many geographic locations but struggling in Asia. Results show a strong relationship between blockchain technology in the health sector and electronic health records (EHR) systems’ implementation. The positive impact of such technology can be related to the integration of the EHR system on a common platform that leverages interoperability by various health stakeholders, including remote doctors, hospitals, pharmacists and other health-care providers. The causes of such a positive result depend on the deterministic effect of this integration. The paper is represented by K in [Figure 1](#).

The paper L “*The effect of social media use on empathy and welling: a personality perspective in Saudi Arabia*” explores the impact of social media on empathy and well-being in light of the personality traits in Saudi Arabia. Results could lead to a promising research stream, which addresses the influence of social media on the well-being of users based on their personality traits. The paper exemplifies a positive impact of a sociotechnical perspective represented by L in [Figure 1](#).

The duality of cutting-edge technologies

Cutting-edge technologies are now part of the everyday life of Asian companies. It is clear from the 12 papers of this special issue that the period of skepticism is over. Customers, employees, managers, and all stakeholders perceive the real positive impact of these technologies on business in Asia. This impact is possible only if the duality of these technologies is considered. Therefore, strategies, operations, processes, and human knowledge must be adapted to the new business environment created by the implementation of cutting-edge technologies within their organizations.

Asian companies must cultivate a workforce of knowledgeable employees and engineers ready to solve technical issues. They must create and maintain collaborations with research centers that can enable them to work with academics and researchers to quickly transition technology into capabilities. Each of these elements is critical to nurturing an innovation ecosystem adapted to the company’s needs.

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Further reading

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