Opening Editorial:

Technology Strategies in Emerging Economies: Emerging Issues, Challenges and New Research Agenda

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Abstract

In this ***issue,*** we present insights from the range of papers accepted. These papers not only shed light on different technology strategies in emerging economies but also explored how emerging economies can learn from other economies in terms of amassing resources and expertise to improve access to new technologies and bridging the technology divide. We offer some vital questions and a new research agenda for the wider domain of technology policy and business strategy.

Keywords: technology development; emerging economies; technology strategy.

INTRODUCTION

Historically, much of the research on technology development and technology strategies have concentrated on industrialized nations that are characterized by stable institutional environments (see Amankwah-Amoah, 2019; Cavusgil, Knight & Riesenberger, 2012; Peng, 2014). These settings have well-developed market supporting mechanisms such as the legal system and capital market which provide the foundations for business transactions and activities to flourish (Khanna & Palepu, 1999). In contrast to industrialized nations, emerging economies are generally characterized by "institutional voids" (Khanna & Palepu, 1999), such as poor transparency, red tape, bureaucracy, administrative delays, inadequate disclosure regime, corruption and political instability (Acquaah, 2007; Ricart et al., 2004). In recent years, the rise of emerging markets such as China, South Africa, Turkey, Indonesia, Mexico, Brazil, and India have also unleashed new sources of opportunities and threats for firms seeking to expand and compete successfully around the globe.

For many businesses, avoiding such promising emerging markets is no longer an option (see Peng, 2014; Khan et al., 2020). As such, creating effective strategies to navigate such an environment has

become an essential ingredient for success (Cavusgil et al., 2012). A large body of research has demonstrated that firms' experience in competing in emerging markets and dealing with the institutional voids equip them better when entering other emerging markets (Khanna & Palepu, 1999; Lall, 1983). Indeed, emerging markets are often viewed by emerging market multinational enterprises (EMMNEs) as training grounds or "learning laboratories" to build the capabilities, resources and market power that equip them to compete with and outwit global incumbents (Cavusgil et al., 2012; Hitt, Li &Worthington, 2005; Ramamurti & Singh, 2009). Although many EMMNEs may not possess cutting-edge technologies, global brands and international experience, they often outperform counterparts from developed markets when entering other emerging markets (Ramamurti, 2012). There is also ample evidence that technology plays a central role in driving productivity and economic development (Schniederjans, 2017; You et al., 2019). Through investment in technology, countries can transform from a traditional agriculture economy to an advanced and knowledge-based economy (Wong & Goh, 2015). Less developed countries may have the windows of opportunity (Perrez & Soete, 1988) to catch up or even leapfrog the developed countries when there is a paradigmatic change of technology or a major change of institutional factors (Bruun & Mefford, 1996). In spite of the numerous challenges to growth and economic development in emerging economies, technological leapfrogging is occurring at an accelerated pace (Amankwah-Amoah, 2015; James, 2009). By technological leapfrogging, we are referring to the process of emerging economies skipping over old technologies to the very latest technologies to power their economies (Binz, Truffer, Li, Shi & Lu, 2012; Gallagher, 2006; Goldemberg, 1998; Socete, 1985). These technological catching-up and leapfrogging have manifested in areas such as telephone services, mobile banking, solar technology and wireless banking. By taking this shorter path to economic growth and development, less resource-rich nations avoid building unnecessary and expensive networks of infrastructure (Amankwah-Amoah, 2015; Chen & Li-Hua, 2011). Taken together, these demonstrate the increasingly prominent and transformational roles of technology in the 21st century as well as the possibilities of how they can be utilized to foster economic development (see Amankwah-Amoah, 2016a, 2016b, 2016c, 2016d; Economist Intelligence Unit, 2007).

Regarding the technological impact of foreign direct investment (FDI) on host countries' economies, there have been diverging views. One argues that domestic firms can learn from foreign-invested firms and therefore FDI works as a conduit for technology transfer (Liu, 2008), which is especially important in developing countries (Calvo & Sanchez-Robles, 2002). However, contrarily it has been argued that foreign investment brings in monopolies, which leads to "underutilization of a productive force economy" and that an economy controlled by foreigners would not develop healthily and could lead to stagnant growth in the developing countries (Bornschier and Chase-Dunn, 1985). In the quest for access to these new markets, a firm can utilize technology to achieve competitive advantage. From both a business and societal standpoint, there are emerging and unresolved issues around the roles of businesses facilitating access to technology in the 21st century. The call is in the spirit of the growing quest for a better understanding of the effects of new technologies in the emerging world. We aim to provide space to explore these potential linkages between doing business in emerging economies and the increasingly prominent roles of technology.

Overview of the issue

This special issue (SI) attracted numerous innovative papers on an array of issues. Table 1 provides a summary of the papers.

Table 1: Summary of articles included in the Special Issue.

Authors/study	Data/approach	Comments on key findings	Overall contribution to the SI
Rahman, Billah, Hack-Polay & Alam (2020).	Qualitative study by using semi-structured interviews with experts.	The advantages of textile biotechnologies include bio-desizing, bio-scouring, and bio-bleaching. Adoption of enzymatic textile processing technologies yields environmental and economic benefits.	Offer insights to demonstrate biotechnologies (enzymatic procession) as opportunities for the Global South.
Attah-Boakye, Adams, Kimani & Ullah (2020).	Quantitative study with data from Thomson Eikon/ 472 multinational corporations operating in 21 emerging economies.	Demonstrate that national culture and country-level institutional quality influence on boardroom diversity and innovation.	Useful insights on gender representation in emerging and advanced countries.
Donbesuur, Ampong, Owusu-Yirenkyi & Chu (2020).	Quantitative study by using a survey of 204 internationalized SMEs operating in Ghana.	High levels of organizational and technological innovation jointly enhance SMEs' international performance.	Formal legal provisions can enrich the effects of technological and organizational innovations on SMEs' internationalization efforts.
Afrifa, Tingbani,Yamoah & Appiah (2020).	Quantitative study by using secondary data on CO_2 emissions per capita from 29 emerging countries and 725 country-year observations, from 1990 to 2018.	Investment in innovative technologies negatively affects climate change. Innovation input inversely affects CO_2 emissions.	The negative effect of innovation input on CO_2 emission is more pronounced in countries with better governance.
Arakpogun, Elsahn, Nyuur, & Olan, (2020).	A qualitative study by conducting interviews with different stakeholders in seven sub-Sahara African (SSA) countries.	Infrastructure sharing has the potential to expand telecommunication and mobile network services to underserved areas.	Strong and efficient institutions help in scaling up infrastructure sharing among mobile network operators in Africa.
Owusu-Agyei, Okafor, Chijoke-Mgbame, Ohalehi, & Hasan (2020).	Data from the Global Financial Development and the World Bank Development Indicator databases.	Internet use impacts on financial development.	Levels of human capital development and economic freedom enhance the link between internet adoption and financial development. Further adoption and use of the internet present great opportunities for the SSA region.
Shamim, Zeng, Khan & Zia, (2020).	Survey data collected from 108 Chinese firms engaged in big data-related activities	Both contractual and relational governance are positively associated with decision-making performance.	The study provides an understanding of big data management and value creation in emerging economy (EE) context.
Senyo, Effah & Osabutey, (2021).	A case study of Ghana's paperless port digital transformation.	Develops a transformational affordance framework. Offers insights on digital platforms leading to public sector transformation.	Provides insightful perspectives on public sector digital transformation in an EE.
Benzidia, Luca, & Boiko (2021).	Survey data are collected from 307 survey participants.	Electric vehicles' unique focus on channels has effects on business model and customer satisfaction.	Insights on environmental concerns, awareness of carbon emissions issues and buying electric vehicles.

		Hybrid vehicles' focus on value propositions leads to positive results.	
Ali (2021).	Survey data collected from 269 firms in South Korea.	The effect of exploitative learning is stronger on imitation than on innovation.	Exploitative and exploratory learning have complementary positive effects on both imitation strategy and innovation strategy.
Hu, You, & Esiyok, (2021).	Panel data of Chinese FDI in 24 African nations from 2006-2017.	Chinese FDI has enhanced technological progress in Africa, while non-Chinese FDI has not.	FDI from China as a developing country induces stronger technological benefit on the host than that from the developed countries.
Ko, Zigan, & Liu, (2021).	Qualitative thematic analysis to analyze secondary data from 2004 to mid-2020.	Industry incumbents, government and international support organizations are the key actors that impact the technological innovation system.	The technological innovation system approach neglects the explicit focus on political and institutional dynamics.
Zhou, Cai, Tan, Zhang, Du & Song, (2021).	Provincial panel data in China from 2000 to 2014.	Technological progress demonstrates an inverted U-shaped effect on China's economic growth. Economic growth effect in the eastern and central areas is stronger than in the western area.	For the central and western regions, the priority is to develop environmental conservation technology, whereas for the eastern region, the focus should be on fostering energy-saving innovations.
Ghouri, Akhtar, Haq, Mani, Arsenyan, & Meyer (2021).	A survey of 221 middle-level managers from Malaysia.	Real-time information sharing positively influences customer purchase and repurchase behaviors through the mediation of customer orientation.	Provides understanding of the service sector to achieve industry 4.0 goals.
Lopez-Vega and Tell (2021)	Case study of seven of the largest Brazilian subsidiaries of Swedish MNEs.	Identifies four different MNE technology strategy types: 1) technical; 2) improvement; 3) development; and 4) creation. Technology strategy influences subsidiary upgrading through development of operational and dynamic capabilities.	The study findings underline some of the problems that subsidiaries face such as coordinating across borders and engaging in global value chains.

A substantial body of research has illuminated our understanding of the role played by technology in improving the processes and innovation capacity of firms. In recent years, local communities, business and policy officials are confronted with new challenges stemming from COVID-19 pandemic that have prompted a new set of technology policies that address the current needs of society (Amankwah-Amoah, 2020a, 2020b; Amankwah-Amoah et al., 2020, 2021). In this new era, society demands policies that not only eliminate digital exclusion but also deliver equality in access to opportunities for individuals and markets for businesses. The COVID-19 pandemic has also brought home the realization that countries' destiny has increasingly been linked to activities beyond their national borders and thereby emphasizing a greater need for collaboration (Amankwah-Amoah, 2020b). At firm level, stemming from the pandemic is not only temporary closures of businesses but also permanent closure of many small businesses. Accordingly, collaboration has also emerged as a strategic necessity for firms in times of crisis.

Technology Policies and Post Covid-19 Pandemic Era

Although many technologies have diffused at a fast pace to the developing economies, it is now a strategic imperative for this to move at a much faster pace. The pandemic has demonstrated a need for digital technologies to be harnessed in addressing societal problems such as access to medical information and preventing the spread of counterfeit products across the globe. Following the crisis, digital technologies such as the internet of things, fifth generation (5G) technology, and artificial intelligence (AI) have become a necessity for countries to harness to power their economies into the 21st century and post-pandemic environment (Ting, Carin, Dzau & Wong, 2020). The need for new technologies that allow governments and researchers to gain access to real-time data about health issues and challenges has been demonstrated by the COVID-19 pandemic (Ting, Carin, Dzau & Wong, 2020) and the Ebola outbreak in sub-Saharan Africa (Amankwah-Amoah, 2016c). This necessity for access needs to move in tandem with government policies to scale up new technologies.

Also, the limited window to avoid a catastrophe during pandemics and crisis as demonstrated in the cases of Ebola (Amankwah-Amoah, 2016c) means that national technology policy needs to move at an accelerated pace to not only tackle the crisis but also facilitate resource deployment and shift in governments' attention towards the scaling up of basic technologies that allow individuals to protect themselves. Reverting to the pre-pandemic status quo of reactive technology policy is likely to hamper countries' ability to accelerate the spread of new technology and firms' ability to innovate. This era demands policies that focus on improving access and availability of the latest technologies including 5G technology with enhanced connectivity to the mass population, especially in the developing world.

Going forward, future studies could explore the COVID-19 pandemic and its effects on technology adoption and firm corporate strategies in emerging economies. Studies could also continue to explore how technology and innovation have transformed the emerging countries. Another fruitful area is to explore how technological progress has affected wealth and the concentration of wealth in emerging economies. Another area is how technologies can be leveraged to address socio-economic and environmental problems confronting developing/emerging countries.

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