


Chapter 3

Does Digitalization Have a Causal Relationship With Economic Development?

An Experience From a Country–Wise Panel Data Statistical Analysis

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ABSTRACT

The present study created information communication technology index (ICTI) for 109 countries during 2010-2020 using a composite Z-score method. For ICTI estimation, it used 12 different indicators associated with ICT access, ICT use and ICT skills. Statistical values of ICTI were used to explore the comparative performance across countries in digitalization. The correlation coefficient analysis was used to examine the association of digitalization with economic development and other variables. Log-linear regression model (Cobb-Douglas production function model) was employed to observe the causal relationship between economic development and digitalization using a country-wise panel data. Granger causality test was applied to observe the causal association of digitalization and economic development.

INTRODUCTION

Any country cannot grow without technological development in the era of globalization and digitalization (Singh & Singh, 2020). Technological development is essential to increase the growth of production activities and human well-being (Hernandez et al., 2016; Aksentijevic et al., 2021). Evidence imply that

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science and technological development is an essential driver to sustain the economic growth in long-term (Singh & Singh, 2020; Bakari, 2022). Most countries have developed digital technologies, cloud technologies, digital knowledge, information of communication technologies (ICT), digital camera, 3D printer, financial technologies, electronic digital devices, digital devices, artificial intelligence, cloud computing technologies, mobile apps, internet of things, high speed internet devices, computers and broadband devices, appropriate technology, green technology, environmental technology due to science & technological development, R&D activities, technology transfer and commercialization (Aly, 2020; Singh and Kumar, 2022c; Ashraf & Singh, 2022). Furthermore, aforesaid technologies are useful for a country to be a digital economy (Mentsiev et al., 2020; Ahmedov, 2020) and create an infrastructure for it (Magomedov et al., 2020). Digital economy is an integration of digital devices and electronic services which helps to create e-business and e-commerce. Digital economy has a greater contribution to increase communication across individuals, businessmen and government to exchange desired information. Digital technologies and ICT indicators create a process for digitalization that reduce transaction cost, and enhance skills and knowledge of people (Nguyen, 2021; Irtyshcheva et al., 2021). ICT is helpful to increase the economic growth and development as it creates extensive opportunities for job seeker, entrepreneurs, consumers and investors (Rath & Hermawan, 2019; Appiah-Otoo & Song, 2021; Aleksandrova et al., 2021; Habibi & Zabardast, 2020; Irtyshcheva et al., 2021). Furthermore, internet technology sustains a bridge between suppliers, consumers and economic agents as increasing their market accessibility (Hernandez et al., 2016; Kutsuri et al., 2019). Digital economy is also seemed suitable to achieve sustainable economic development (Li & Gospodarik, 2021; Jio & Sun, 2021). Digital economy may be beneficial to increase green growth and green GDP.

Digitalization is also useful to increase product innovation in manufacturing sector (Zhou, 2013; Singh et al., 2019b). It is helpful to transforming most activities such as available information, knowledge, education, entertainment, text, devices, images, factor of production, currency and market in digital forms (Mondejar et al., 2021). Thereupon, these digital forms can be spread across world without any barriers (Dahlman et al., 2016). Consequently, digitalization can contribute to increase social-economic, institutional, science & technological, institutional and environmental development (Dobrota et al., 2012; Gerpott & Ahmadi, 2015; Aly, 2020; Ahmedov, 2020). Most countries are using various digital technologies and ICT indicators in production system to increase economic growth and development (Mentsiev et al., 2020; Irtyshcheva et al., 2021). Accordingly, national and global investors, consumers, producers and government can used digital information to meet their needs (Dahlman et al., 2016; Jio & Sun, 2021). At present the dependency of common people, businessman, entrepreneurs, government and other stakeholders on digitalization, ICT and other digital devices increased consistently (Hernandez et al., 2016; Mentsiev et al., 2020; Aksentijevic et al., 2021).

Accessibility and dissemination of required information for large users associated with health, energy, agriculture, food stuffs, education, transport, weather, climate change, goods and services, product and financial market, exchange rate and social media also increase due to digitalization (Mondejar et al., 2021). For instance, businessmen and market representative can access the requirements of labours, consumers, raw materials and prices of products through digital platforms (Magomedov et al., 2020). Subsequently, digitalization may be supportive to nurture an appropriate business and entrepreneurship ecosystem (Carbo-Valverde, 2017; Ahmedov, 2020; Mentsiev et al., 2020; Aleksandrova et al., 2021; Jio & Sun, 2021; Singh & Kumar, 2022b). New entrepreneurs can use digital technologies and ICT to start new start-ups or business which would enhance appropriate entrepreneurship ecosystem (Jyoti & Singh, 2020). Appropriate entrepreneurship ecosystem would create employment for skilled and un-

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