

## Significance of Global Value Chain for the Fourth Industrial Revolution - A Meta Analysis and Systematic Literature Review



Palvinder Kaur

University of Delhi

**ABSTRACT:** The fourth industrial revolution is characterized by numerous disruptive technologies. Technology is reshaping business practices, leading to an improved market opportunity that increases the demand for skills in innovation. Both technological and material spheres, as well as scientific study, are undergoing a fourth industrial revolution. There is a gradual integration of digital strategies into a growing number of businesses. AI is currently used to fill a growing number of professional positions, and thus, the gig economy is booming. The objective of the study is to examine the Global Value Chains and their significance for the Fourth Industrial Revolution for industrial development. It is concluded that developing countries will be empowered with vibrant human capital in a radically new world of work. Systematic Literature Review and Meta-Analysis, investigation is outlined research questions and addressed the gaps in the literature.

### INTRODUCTION & RESEARCH CONCEPTUALIZATION

Innovative spirit is crucial for burgeoning economies to adapt, manage, and thrive in the new normal brought by digital transformations. As ancient as civilization itself, the Fourth Industrial Revolution has contributed to developments in technological advancements in emerging economies (McAfee & Brynjolfsson, 2017). Automation is both feasible and necessary (Kim, 2020). The majority of judgments made by individuals will be based on digital algorithms (Rolland et al., 2018), rather than information compiled from credible sources, potentially inaccurate (Kim, 2020, McAfee & Brynjolfsson, 2017). A combination of digitally embedded technologies and advanced artificial intelligence (Nyagadza, 2019) is expected to disrupt (Amsden, 2001) and promote information-based value chains (Bauernhansl et al., 2014, Foresight, 2013, Younus et al, 2009), and this will have implications for how markets in developing countries and their environments will operate. (Micheler et al, 2019). The recent research on the relationship between developing countries and 21st-century innovation has centered around the Fourth Industrial Revolution (Nhemachena, 2021), how the EU can facilitate the Fourth Industrial Revolution (Schafer, 2018), the importance of the Fourth Industrial Revolution for ASEAN integration (Menon & Fink, 2019), a comprehensive analysis of the effects of the Fourth Industrial Revolution on BRICS countries in the Global Value Chain (Seniuk, 2019), innovative solutions for developing countries (Hang et al., 2010) and similar studies.

The innovative experiment, on the other hand, will be focused on accomplishing the aforementioned research goals:

- a. To examine the relationship between digital technology and industrial development in developing countries
- b. To examine the spread of the Fourth Industrial Revolution in developing countries; and
- c. To examine the Global Value Chains and their significance for the Fourth Industrial Revolution for industrial development.

Systematic Literature Review and Meta-Analysis, investigation is outlined research questions and addressed the gaps in the literature. In the introductory section, the abstract and the context are described, then the methodology is described, then the findings are interpreted, and finally policy recommendations are presented for the governments of emerging economies.

### RESEARCH METHODOLOGY

Based on a systematic review of peer-reviewed journals, the findings of this research have been synthesized. Scholars are widely adopting the technique used in this study, but in order to make it effective, it is necessary to thoroughly review and analyze previous works (Tranfield et al, 2003) as well as present findings accurately (Belinski et al, 2020, Liao et al, 2017). Additionally, it receives information from overseas and domestic organizations, as well as policy documents. An integrated and systematic process is used to locate, review, and analyze existing research on the consequences of the technology revolution, Fourth Industrial Revolution, and the impact of GVCs on the innovation potential of developing countries (Rukasha et al, 2021). In order

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to determine its gaps, we need to arrive at an understanding. Policy research investigations almost always use PRISMA statistics, as it is suggested they are repeatable (Denyer & Tranfield, 2009). As part of phase one of the research review, study objectives aligned with the topic area were clarified and identified. Review of this part led to the identification of peer-reviewed articles, reports, opinions, and conferences related to the study topic. Due to their comprehensiveness, Scopus and Web of Science have been identified as the main sources of citations and abstracts. Study did not use information from websites or publications due to validity and reliability considerations. Having done so, we also determined the keyword terms that would be used to optimize the results. The topic covered innovation, technological advancements, research, and future plans. This stage was made possible by the literature analysis.

The investigation uncovered 145 potentially relevant articles. The chosen publications were evaluated for compatibility to determine their suitability for the assessment. The acceptance of papers that lack full text, are unrelated, or unrelated to the topic was limited, and papers that are analytical and marginally related were accepted. Throughout the process, research objectives have been formulated concisely to maintain a concise approach. Using full descriptions, 42 articles were removed due to duplicate content and inappropriate content. Using the Oxford Quality Scale, the article was included in the research study with a score of three out of five. Lastly, the data collection and analysis followed the guidelines of the content analysis process (Nyagadza et al., 2020). Based on the results of the randomized controlled trial, concepts were evaluated, combined, and analyzed. There was unanimous agreement among the three researchers that the results were reliable and accurate. Titles, abstracts, and keywords have been published in conference proceedings, journals, book series, policy reports, and books between 2012 and 2021. Study participants were provided with a data set of prominent contributors and contributions acknowledged by leading publishers worldwide to ensure sufficient evidence of research quality.

### **Results**

This section examines the implications of digital technologies, Fourth Industrial Revolution, and GVCs for emerging economies' industrial innovation dynamics. Scholars are able to identify inconsistencies in literature reviews using the PRISMA methodology. For future researchers in the domains of Advanced Technologies, Fourth Industrial Revolution, and GVCs, these inconsistencies suggest new perspectives and possible approaches. According to previous research, this will strengthen the current state and prepare it for further investigation.

### **ADVANCED TECHNOLOGIES AND EMERGING ECONOMIES' INDUSTRIAL INNOVATIVE GROWTH**

Due to the Fourth Industrial Revolution, dynamic innovations in technology have led to Digital Technologies. In current research, these revolutionary techniques are being used to create hybrid or technological beings (Flores 2018, Martins et al. 2019, Nhemachena 2021). Digital technologies facilitate sustainable industrial innovation in emerging economies by facilitating inter-linkages in the production process. Various factors have contributed to technological advancement (Schafer, 2018), including innovation, scientific discovery, adapted technology, and scaled technology. Many developing economies are still catching up to industrialised economies in terms of innovation, even though industrialised economies have a reputation for being innovative.

Creative and ingenious ideas are often a product of ingenuity and invention (Akileswaran & Hutchinson, 2019; Schwab, 2016). Contrary to this, emerging countries tend to apply and expand previously successful strategies (International Finance Corporation, 2017). Despite differences in speed across countries and businesses, the digital boom is making a profound impression around the world (Akileswaran & Hutchinson, 2019). Technology is reshaping business practices, leading to an improved market opportunity that increases the demand for skills in innovation (Rai, 2017). Both technological and material spheres, as well as scientific study, are undergoing a fourth industrial revolution. There is a gradual integration of digital strategies into a growing number of businesses (Menon & Fink, 2019). AI is currently used to fill a growing number of professional positions, and thus, the gig economy is booming (Rai, 2017). The emergence of technology is likely to bring about a revolution in industries as well as in the world as a whole (Xu et al, 2018).

The regulations governing education and competitiveness should be revised. Educators need to integrate their competencies with the latest technological developments in order to prepare the next generation for the digital economy (Schafer, 2018). It will also be necessary for developing countries to re-skill their workforce whose skills are fading (Cezarino et al, 2019). In addition to this, the restructuring of production imposes additional burdens on market mechanisms to prevent innovation from remaining the domain of a handful of dominant corporations (Muhleisen, 2018). The fourth industrial revolution is characterized by numerous disruptive technologies. The use of Artificial Intelligence, Robotics, Blockchain, and 3D printing is revolutionizing the world's economy, governance, and economy (Menon & Fink, 2019), sometimes in a disruptive and rapid manner (Schwab, 2016). In recent years, technological advances, such as algorithms that adapt on demand, autonomous vehicles, interconnecting humans and machines, and big data mining (Cezarino et al, 2019; Schäfer, 2018), have become

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increasingly prevalent, and their use is rapidly expanding (Menon & Fink, 2019).

### **Fourth industrial revolution**

An expanding global community of interested parties will be able to take advantage of innovative technologies that converge analog and digital technologies during the Fourth Industrial Revolution (Tripathi & Gupta, 2021). According to Liaoa et al., 2018, the Kondrateiff Cycle has been cited as one of the earliest references to the fourth industrial revolution (Rostow, 1985). By developing innovations resulting from the fourth industrial revolution era, developing countries will be able to grow and develop. There will be an improvement in the standard of living and income per capita. In this review, we examine the implications of the fourth industrial revolution for industrial sustainability (Jabbour et al., 2018; Kamble et al., 2018), the adoption of efficient industrial practices (Mrugalska & Wyrwicka, 2017; Sanders et al., 2016), the product development process (Santos et al., 2017), and the delivery of services from conception to consumption (Gereffi & Fernandez-Stark, 2016). Due to the integration of international networks of trade, and the movement of intermediate goods across national boundaries, GVCs are associated with supply chains (UNCTAD, 2013). Globalization has not resulted in success for every nation, according to Primi & Toselli, 2020.

Globally, emerging economies benefit less from globalization than developed economies (Primi & Toselli, 2020). Considering the disadvantages the fourth industrial revolution creates in GVCs, the consequences of the fourth industrial revolution will be severe for emerging economies. It is not sufficient to ensure technological advancement, invention, and productivity (Lee et al, 2019, World Bank, 2016). Global Value Chains provide a framework for understanding any product in global commerce (Sobel-Read, 2014) by showing the commercially relevant life cycle from research through design and development.

### **BRINGING TOGETHER THE FOURTH INDUSTRIAL REVOLUTION, GVCS AND HUMAN RESOURCES TRAINING: WHERE TO GO?**

Strategic developing countries with assets and power converging with technological advances of the Fourth Industrial Revolution are also seen as a key to achieving the Sustainable Development Goal. Through the intricate interplay of ecosystems, the contemplated fields become less complex, thereby preventing the perception of difficulty in developing countries' commercial and industrial activities (Manda & Dhaou, 2019). Through the Fourth Industrial Revolution, Africa can lead the way in the digital transformation of human resource training that is both transparent and manageable, using emerging tools for sectors as diverse as energy, agriculture, education, banking, entertainment, and transportation that are just starting to take shape in large fast-growing countries like the BRICS. The issues that we face today and the skills and skills that may be necessary when dealing with the conceptual issues that exist in the world today require originality, innovation, creativity, analytical reasoning, and logical reasoning (Fayomi et al, 2019). Artificial intelligence, big data, and internet access are transforming the work environment. Particularly in the manufacturing industry, automation poses a threat to a large number of jobs.

### **CONSEQUENCES OF FOURTH INDUSTRIAL REVOLUTION ON DEVELOPING COUNTRIES**

We are rapidly entering the Fourth Industrial Revolution around the world. Developing economies, in particular, can take advantage of this opportunity to grow. Although this is true, underdeveloped countries must maximize their potential. It is crucial to do this in order to enjoy the positive effects of development to the fullest extent possible. As countries transition to the Fourth Industrial Revolution, it is imperative that they develop strategies to deal with the challenges associated with access, mobility, cost, and technology integration so that they can utilize the opportunities that the Fourth Industrial Revolution presents (Adhikari, 2019). In countries with less economic progress, technology adoption is one of the biggest challenges. The poorest nations can be prepared for development by catching up and utilizing technologies as they become available. Conversely, a slow economy is constantly trailing the frontrunner, which implies they will always be scrambling to remain competitive and will lag considerably in development (Lee, 2021).

In developing countries, finding and utilizing cutting-edge innovations is crucial to promoting the development of production chains. Patents and license restrictions make it difficult for developing countries to access innovations. By utilizing appropriate free and open source technologies and strategies, emerging markets can avoid the burden of patents and license conditions since there are numerous free solutions available (Adhikari, 2019). It is possible to implement and customize a block chain using open source software, for instance. The advancing techniques of the Fourth Industrial Revolution have resulted in significantly higher internet penetration in developing countries (Deloitte, 2018). The internet penetration rate in most developing countries is 59%, which is higher than its counterpart in high-income countries (Nyagadza, 2019a). According to a World Economic Forum report, economies in strategic positions to take full advantage of the fourth industrial revolution have the finest chances of maximizing their growth. The Fourth Industrial Revolution has brought favorable prospects for productivity and natural resource management to developing countries. This will be assessed by the World Economic Forum. Indicators included leaders around the world, promising individuals, enduring role models, and admirers (Mothobi et al., 2017). Emerging

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economies' resources are not controlled, owned, or sovereign. Internet connectivity was not available on wireless radio frequencies. Ultimately, this leads to significant inefficiencies. High speed internet access is a prerequisite for investing in the emerging technologies of the Fourth Industrial Revolution.

In developing countries, safety, property rights, and sovereignty are among the issues presented by the Fourth Industrial Revolution. There are a number of factors, like, inconsistency of legislation and lack of progress in programs pertaining to Information, Communication and Technology, data management, privacy and confidentiality, cybersecurity, artificial intelligence, that is highly sought after by software providers, negating access to remote areas, lack of technologically sophisticated skills and expertise, insufficient energy supply in large areas of rural areas, and a lack of skills development to facilitate implementation and innovation. Future smart cities will be able to alleviate issues related to governance, property rights, and autonomy. They need to focus on monetary, health, agriculture, cities, and education.

It is essential to build capacity in order to facilitate and manage strategic innovation. Alternative approaches are needed by combining relevant data in a logical way, implementing the latest technology systematically, and possibly overhauling existing management systems (Deloitte, 2018). It is crucial that business and government accept the obligations as part of policy frameworks in order to boost Fourth Industrial Revolution processes for material management and control. Development countries might face challenges managing their resource bases and securing national autonomy in spite of the Fourth Industrial Revolution and its accompanying technologies. To ensure compatibility (Micheler et al. al. 2019, Ordoobadi 2011 , Van der Velden et al. 2012), it is imperative to ensure maturity is responsive to disruptive technologies. Emerging countries' ability and influence in resource allocation still produce disagreements.

### **CONCLUSION**

In the subsequent section, we discuss the conceptual, applied, and potential consequences and shortcomings of the investigation conclusions.

#### **Conceptual Consequences**

Industrial disruptions cannot be simply viewed as a result of the Third Industrial Revolution due to a significant amount of evidence. There is a distinct difference between them in terms of velocity, scope, and impact on the system. Nearly all sectors in developing countries are expected to be transformed by the Fourth Industrial Revolution because it will occur at an accelerating rate rather than at a steady pace (Xu et al., 2018). With the advancement of technology, developing countries carry out economic activities in a new way (World Economic Forum, 2018b), resulting in a re-examination of how they handle financial assets (Schwab, 2016). The Fourth Industrial Revolution has the potential to provide a wide range of benefits. Technological advancements have improved social, economic, and environmental conditions as a result of their benefits. It is primarily owned and managed by a small number of mostly white businesses (Schwab, 2016), which poses a major concern. The business environment has changed rapidly in emerging economies. Since the possibilities offered by the information era rely on high-speed, stable, and inexpensive internet access, developing countries cannot afford to make this financial commitment on their own. The surrounding surroundings provide for a person's economic needs, which means they are dependent on them. In addition to aggravating the monetary situation, this has negative implications for the management and control of capital in developing countries. The fact that emerging economies exchange mineral resources, land rights, elephants, rhinoceros, and other animals for investment capital indicates that the continent lacks the technological stamina to compete with industrialized nations when implementing the Fourth Industrial Revolution (Xu et al., 2018). As the Fourth Industrial Revolution propels technological colonization, the reliance mentality of the 1960s will be galvanized. The Fourth Industrial Revolution's advancement in technology could culminate in the implementation of intelligent agricultural systems, where electronic interconnected tracking systems are used to track, manage, and distribute food more efficiently than ever before (Rukasha et al., 2021). As a result, technology will be very important. In emerging economies, drones are becoming increasingly important for data collection, and the application of technology, big data, and machine learning could boost agricultural productivity (World Economic Forum, 2018a). These circumstances are expected to boost productivity and enhance food availability and stability.

#### **Applied Consequences**

Export processing zones can help developing countries gain competitiveness by joining GVCs. In order to create jobs, they use their workforce as an entry-level position. FDI inflows are increasingly driven by the availability of affordable labor in developing countries (Debrah et al., 2018, Naude 2017, The Africa Competitiveness Report, 2017).

Most emerging economies will be fully integrated into a digital world economy by 2030. Advances in technology will make it possible to own, manage, and own resources across a wide range of industries. As a result, developing countries will be

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empowered with vibrant human capital in a radically new world of work. Innovative technologies have adverse consequences for developing countries when it comes to governance, ownership, and sovereignty. Threats to cybersecurity include computer hacking, tampering with data, business espionage, employee fraud, and lost data (Deloitte, 2018). In all industries, the World Economic Forum expects emerging economies to face significant challenges as a result of digitalisation (Deloitte, 2018). The fact that Mauritania can compete with a global corporation like Huawei is almost impossible to comprehend. In such a setting, the inequity of the arrangement is justified, and the need for strengthening is reinforced. In collaboration with the World Bank, World Economic Forum, and African Development Bank (2013), research revealed that Africa's technology trends have also been criticized for being less adaptable, which has adversely affected social influence, ownership, and sovereignty.

### Study limitations and future research implications

Due to their limited applicability to the research topic examined, the study has certain limitations that adversely influence the validity of the conclusions. To come up with intercultural comparisons, along with methodological substantiation, cross-cultural analysis must also be done in different parts of the globe. The study did not provide conclusive results regarding the development of cutting-edge technologies, the Fourth Industrial Revolution, and GVCs. To analyze the variation in economic conditions, perhaps other relevant studies have been conducted over time. Digital Technologies, the Fourth Industrial Revolution, and GVCs need to be examined from alternative perspectives. In spite of some limitations, the study contributes to a broader understanding of digital technologies, the Fourth Industrial Revolution, and GVCs in emerging economies. Future research inquiries may be influenced by the findings.

Policy recommendations to emerging economies' governments.

In order to benefit from the reverberations of GVCs, emerging countries should consider the suggestions below. Through GVCs, technological advances, and the Fourth Industrial Revolution, services have been able to expand without borders. As a result, goods are being created, exported, and consumers are spending in areas outside of a country's influence zone. Some of the ideas are as follows:

In order for developing countries to gain competitive advantages, they must be geographically connected to economic hubs. Transport and transaction costs will be reduced, resulting in a more reliable and effective service, thereby improving trust.

Implementation of dynamic economic policies and creation of incentive programs for investments.

In order to enhance efficiency and protection when engaging in cross-border transactions, it is necessary to strengthen the legal system to ensure effective legal regimes, compliance with agreements, enforceable rights, risk mitigation, and Intellectual Property rights. GVCs are based on these links between companies.

It is imperative that governments implement effective innovations so that the complexity of business deals can be minimized, and technology can be exchanged between local and international companies. Innovative methods of addressing poverty are praised across the globe, but their affiliation with multinational corporations raises concerns.

Improved supply chain management, including the movement of goods and efficiency improvements beyond international boundaries.

For the relevant developing countries, efficient exchange rates and macroeconomic policies can have a substantial impact on limiting capital outflows and current account deficits in order to stimulate consumption and assume value-adding activities in GVCs. In many developing countries, this occurs hand-in-hand with industrialization policies.

State or country strength depends on the integration of regional and global value chains with domestic and global value chains. In this way, countries will be able to understand the full range of their companies, as well as their associate companies. The implementation of norms at the national and international levels relies heavily on this. A country can achieve comprehensive and enduring benefits from trade by formulating, executing, and integrating trade-in-value-added strategies. Successfully supplying markets requires developing skills and strategies. In addition to focusing on the present, we also need to keep an eye on the future. Educating a substantial number of its citizens about the value of information technology must be part of the country's confidence. As a result, they will have the opportunity to participate in multinational production chains. Additionally, they offer the ability to work in a wide range of areas, including startups, research, and new inventions.

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