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## **The Role of Globalization in the Spread of Technology and Innovation across Global Markets: The Case of China**

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**Abstract**

**Purpose:** Globalization is a continuously unfolding process characterized by economic integration, cultural exchange, policy transfer across borders, and the dissemination of technological advancements in a contemporary digital age.

**Methodology:** This research paper provides a comprehensive analysis of the globalization process, including its limitations based on existing literature in the academic continuum. Further, given China is a technological powerhouse in the global arena, the research paper also examines the role of globalization in the spread of technology and innovation across the country.

**Findings:** Upon in-depth analysis of academic material, the research paper found that the globalization process arrived in waves over the years, with each wave creating economic and cultural patterns that define emerging waves including contemporary technological globalization. Technological globalization has played a crucial role in upgrading employment and wages for skilled and unskilled laborers in developing nations, disseminating technological knowledge and expertise, fostering competition between local companies and international corporations, and allowing for sustainable developments through green technological innovations from developed economies.

**Unique Contribution to Theory, Practice and Policy:** Studies show that China plays a crucial role in the world of technology owing to technology. Furthermore, considering that technological globalization functions as a top-down structure, China has been able to skillfully use advanced technological knowledge and expertise from developed economies to boost its economy, increase its global political agenda, and steer forward environmentally friendly or rather sustainable development.

**Keywords:** *Globalization, China, Technology, Technological Innovation, Inequality, Dependency*

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## **INTRODUCTION**

The acceleration of globalization since the late 20<sup>th</sup> century has taken over the world, creating more and more international connections in various spheres of life, from economy and trade to cultural exchange. While the sense of interconnectedness arguably contributed to a greater pace of development and progress, for some, globalization only exaggerated the existing inequalities and increase the dependency of one group of nation-states on the other. Thus, researchers have consistently discussed the problems associated with globalization, arguing that it contributed to the growing inequality among the nation-states in different parts of the world (Helpman, 2018). However, when it comes to technological globalization that continues to contribute to the digital market through quicker implementation of technological innovations, it can be argued that developing economies experience unprecedented growth that had previously been unavailable to them. Therefore, it is important to identify both the positive and negative aspects of technological globalization for such an economy, which this project aims to do using the example of China. Indeed, after opening its borders for international trade and exchange at the end of the past century, China experienced unprecedented economic and technological growth. The paper argues by looking at the case of China that globalization has made a significant contribution to the exchange of technological advancements among different nations, allowing developing countries to pick up on the new technological innovations that can shape the economy in new ways.

## **LITERATURE REVIEW**

In the following literature review, the paper discusses an already rich body of academic literature on the topic of globalization, the specific topic of technological globalization, together with its benefits and threats, as well as how these themes are applied to the context of China and its recent technological advancements. Throughout the literature review, I will analyze the key findings from over 10 academic articles dedicated to both the broader problems identified as part of the paper, as well as a more specific case study of China and its technological development.

### **Overview of Globalization**

In the first section of this literature review, the paper will explain the overall dynamics of globalization and the key arguments surrounding this debate, including the more recent works on the topic, as well as earlier arguments. To begin with, an earlier theory by Al-Rodhan and Stoudmann (2006) draws on the various definitions of globalization, suggesting that, currently, there exist numerous definitions concerning various aspects of globalizing influences. However, the academics select one definition that appears to be especially relevant to the current discussion, arguing that globalization “is a process that encompasses the causes, course, and consequences of transnational and transcultural integration of human and non-human activities.” (p. 1). Indeed, based on this definition, we can see the role of transnational communications that push human activities in terms of progress, which also concerns technology, as will be discussed in this paper later. In addition, however, researchers conclude by saying that, in the simplest terms, globalization “involves economic integration; the transfer of policies across borders; the transmission of knowledge; cultural stability” – a definition that will later be relied on in the analysis of the selected case study of China’s technological evolution in light of globalizing influences in recent decades (Al-Rodhan and Stoudmann, 2006, p. 1). In addition to the above characteristics, the researchers stressed the aspect of

growing international investment and, as a result, the growing dependency of nation-states around the globe on each other, as their economies become increasingly intertwined (Al-Rodhan and Stoudmann, 2006, p. 17). Therefore, as we can see from the earlier literature, globalization can be characterized by growing interactions between nation-states on various levels, from investment into the economy to the growing mobility of citizens.

In addition to the above, to contextualize globalization in more detail, it is important to turn to more recent studies, as globalizing processes continue to evolve continuously. Jacks, Meissner, and Novy (2010), for instance, point out the fact that globalization arrived in waves, with the first wave dating back to the late 19<sup>th</sup> century, as these processes began with globalization. They argue that those earlier waves of globalization essentially create economic and cultural patterns that defined the later waves, which also applies to technological globalization nowadays (Jacks, Meissner & Novy, 2010, p. 127). Indeed, a study by Beatty (2015) also emphasized that the first wave of globalization in Mexico specifically was linked to the import of new technologies, demonstrating that technological globalization was in place in the earliest stages of globalizing processes and highlighting the importance of the technological aspect in this discussion (p. 45). This way, considering these findings, we can also interpret globalization to be a continuous process through the ages, as it presents a continuously unfolding process.

### **Challenges of Globalization**

Furthermore, the impact of globalization on the world has long been viewed by critics from a rather pessimistic perspective. For instance, in the theory of Malthusian pessimism, the academic also points out that globalization, like many abrupt changes leading to acceleration of progress, should always have been associated with injustice, inequalities, and climate change (Gleditsch, 2021, p. 177). Other researchers pointed out that globalization essentially “undermined the traditional definition of economic security that centered on economic vulnerability to other states.” (Kahler, 2004, p. 485) In addition to the above view, indeed, researchers have argued that later waves of globalization exacerbated inequality between the Global North and Global South, as, at the end of the 20<sup>th</sup> century, the global trade development shifted to the development of “Southern” economies, as a result of which “the United States also shifted to running enormous persistent trade deficits, giving rise to the problem of so-called global imbalances” (Palley, 2019, p. 49). In confirmation of this argument, Udo et al. (2019) found that globalization, indeed, has played a role in widening the gap between rich and poor countries over the recent decades (p. 10). Therefore, the processes associated with globalization often come across as problematic on the scale of the world, as globalization replicates the existing power patterns around the globe.

### **Technological Globalization**

To build on the previous body of arguments, I plan on considering some of the key works by researchers that touch upon specifically the technological aspect of globalization to better contextualize the current topic. First and foremost, researchers continuously underlined the complex relationship between technological globalization and labor, demonstrating that the former contributes to the “upgrading in affecting employment and wages of skilled and unskilled workers” in middle-income developing countries (Meschi, Taymaz, & Vivarelli, 2016, p. 654). The researchers also elaborate that globalization played a role in knowledge exchange and technological imports, as well as fostering competition between local and international companies, also resulting in technological progress (Meschi, Taymaz, and

Vivarelli, 2016, p. 654). It is also important to mention that technological globalization functions as a top-down structure, being passed from the most developed countries to the less developed ones. This way, Awosusi, Kirikkaleli, and Altuntaş (2022) demonstrated that, based on the evidence from patent applications, BRICS countries collectively “dominated the world with 29% in 2016 and increased to 34% in 2018”, suggesting that the direction of technological innovation indeed starts from the developed countries who hold the power (p. 594). Finally, with regard to technological innovation, as suggested by Chen and Lee (2020), the environmental aspect should also be considered, despite the concerns that technological advancements contribute to a greater level of CO<sub>2</sub> emissions (Awosusi, Kirikkaleli and Altuntaş, 2022, p. 595), there is evidence that technological globalization in high-income countries can significantly reduce CO<sub>2</sub> emissions in neighboring countries (p. 1). This happens because technological innovations introduce more efficient energy sources and aim to reduce energy consumption (Chen & Lee, 2020, p. 2).

### **China and Globalization**

Finally, in this section of the literature review, I will discuss some of the key implications of technological globalization for China in recent years, which will help us deepen our understanding of this specific case study and how the country was developing in recent decades after the opening of its borders. A study by Wang and Hong (2012) draws on recent Chinese history by demonstrating how the country has become one of the key economic players in the world because of globalization. However, the authors state that, despite the unprecedented growth, China’s current growth rate is unsustainable due to the uneven distribution of wealth, rapidly aging population, and low-wage manufacturing (p. 78). Furthermore, a study by Wei and Liefner (2012) found that globalization in China relies, once again, on the use of experience of foreign companies’ information and communication technology (ICT) industry, allowing China to, in turn, localize its products more and enhance local contexts (p. 103). Finally, other recent studies, such as one by Saud et al. (2018) found that China’s rapid growth takes place because of the country’s skillful use of advanced technological knowledge from developed nations (p. 24327). In addition to that, the authors state that technological progress as a result of globalization plays a major role in China’s decreasing energy intensity, as it allows to reduce energy demand, therefore, also becoming a factor in China’s becoming a more sustainable economy (Saud et al., 2018, p. 24327). Therefore, it can be argued that the rise of technological innovation in China not only contributes to the growing role of the country in the international political and economic arena but also ensure a more independent mode of development using local resources, as well as potentially contributing to more sustainable practices.

### **Theoretical Framework**

The paper is informed by three major theoretical frameworks, Globalization, Dependency, and Innovation Diffusion theories. First, Globalization theory examines the interconnectedness of economies, cultures, and societies globally. This theory focuses on the processes that lead to increasing interdependence and integration between countries, including the flow of goods, ideas, technology, and people across borders (Rosenberg, 2005). Globalization theory is an important to understand the impact of globalization in the spread of technology and invention in the case of China. Also, it provides a frame for determining how China integrates into the global economy, including trade liberalization and foreign direct investment (FDI), which ease the transfer of technologies and inventions between countries. The theory also considers the

impact of Chinese policies and strategies on using global networks to acquire and borrow new technologies (Wang & Hong, 2012).

In addition, the Dependency Theory also emphasizes the role of globalization and the spread of technology in the world, as in our case, China. The theory emphasizes the unstable power dynamics between developed and developing countries in the global economy. It posits that the profitable development of developing countries is frequently hindered by their reliance on more important and advanced nations for technology, resources, and access. In the case of China, the spread of technology and invention provides perceptivity into the dynamics of technology transfer and adaption to new technologies (Wei & Liefner, 2012).

The Innovation Diffusion Theory explores how new ideas, inventions, and technologies spread through social systems over time. It identifies factors that impact the rate and pattern of adaption, such as the communication channels, social networks, and the perceived benefits and risks of technology (Miller, 2015). This theory is largely applicable to studying the part of globalization in technology and innovation in China. It helps explain how inventions from global requests are introduced, accepted, and integrated into Chinese society.

These three theories give a robust theoretical foundation for examining the complex relationship between globalization and the spread of technology and innovation in China. The theories explore how global economic forces, power dynamics, and invention prolixity processes shape China's technological development and its part as a crucial player in the global technology market.

## **METHODOLOGY**

There already exists a rich body of literature within the academic realm that broadly discusses the globalization process and its evolution during the past century. This study simply adds to the existing body of literature by focusing on the role globalization has played in spreading technological markets across the global community with a specific emphasis on China. To realize the study's research objectives, and answer its research questions, the study employs the methodology of a qualitative analysis. A qualitative analysis of existing researchers' contributions, both old and new, as well as experts' opinions on the research topic was thought to be the most appropriate in gaining a broad and clearer understanding of the concept of the globalization process as well as technological globalization, especially in light of the contemporary digital revolution. Furthermore, a qualitative study is instrumental in gaining a deeper understanding of phenomena and the context of data that cannot be easily quantified.

First, a comprehensive preliminary review of the concept of globalization was conducted based on both old and new research data in the existing literature. Finding both old and current definitions of the globalization process was essential given that the process is continuously unfolding with each new wave of globalization. A search for the concept of globalization was conducted by using multiple keywords including "Globalization," "Globalization concept," "definitions of Globalization," or "Globalization process." To assess and gain an in-depth understanding of what technological Globalization entails, multiple keywords were also searched including "technological Globalization," "international technological transfer," and "digital Globalization." Furthermore, the study also utilized Boolean operators 'OR' and 'AND' to narrow down the findings from data searches in online academic databases and sources. For instance, "Globalization and technological capabilities," "Globalization, technological change, and Labor," as well as "Globalization and Inequality." Search results

were also assessed in terms of date of publication to provide a fundamental analysis of the changing concept of globalization over the years.

Databases spanning across multiple fields, including *International Relations*, *Economics*, *Innovations*, *Technology*, and *Environmental Sciences* among others were utilized to find appropriate, credible, and scholarly material for the purpose of this study. Precisely, studies published from 2004 onwards were sourced from accredited databases such as Springer, Research Gate, ScienceDirect, Scopus, and the Education Resources Information Center (ERIC) among others. Furthermore, Google Scholar was a crucial search engine for available academic material if the aforementioned databases provided little to no results involving the concepts of globalization and or the role of globalization technological dissemination across China. After locating a reliable scholarly article, a careful assessment of the study's reference list was also conducted to find prospective relevant research studies that may complement the study's findings and conclusions. Additionally, credible online articles, especially from credible websites and news sources such as *Forbes*, *The New York Times*, *The Guardian*, *Reuters*, *Council on Foreign Relations*, *The Financial Times*, and *South China Morning Post* were also used to amplify the study findings, mainly by drawing from experts' opinions on the subject. Relevant government reports were also examined to understand government policies toward the globalization process.

## **FINDINGS**

The globalization process has brought more international connectedness over the years, across different spheres of life, from economy to trade, cultural exchange, and even technological exchanges in the digital age. The concept of globalization has consistently attracted the attention of governments, policymakers, and researchers alike. Research studies indicate that globalization arrived in waves over the years, with each wave creating economic, cultural, and technological patterns that eventually define later waves. At the same time, studies affirm that the process of globalization has its fair share of limitations. Specifically, globalization exacerbates the gap between developed and developing economies. This is largely due in part to how globalization undermines the conventional definition of economic security through trade openness, in turn fostering economic vulnerability by forcing developing nations to be economically dependent on developed nations. Rich countries have an upper hand in globalization process because they can dictate the rules of international trade in ways that favor their respective economies, and developing economies can only participate based on set rules. Furthermore, the process of globalization is also tied to environmental unsustainability through elevated levels of carbon emissions, especially through increased mobility of goods and people across international borders as well as an increased thirst for energy for industrial activities.

These patterns of injustice and inequality are also visible in the technological aspect of globalization. For example, there is a complex relationship between globalization and labor, whereby the process can negatively affect the employment wages of both skilled and unskilled workers in developing economies. Such is especially true given that technological globalization functions as a top-down structure, whereby dissemination of technological information, expertise, and products is mainly from developed to developing economies. Furthermore, when technological advancements are injected into specific industries, they lead to favorable competition between local businesses and international corporations, in turn resulting in rapid technological progress as well as the production of quality goods and distribution of quality services.

In the case of China, the study found that upon opening its borders and becoming more economically connected to the outside world, the country has taken significant advantage of the technological globalization process by harnessing and skillfully using foreign technological innovations and knowledge from developed economies to advance major sectors. Subsequently, China has been able to rapidly advance its economy through technology and play a major role in international trade as well as the globalization process in general. On environmental grounds, studies show that technological advancements from developed economies that advocate for green and sustainable solutions such as renewable energy technologies and efficient energy usage can be particularly helpful in reducing carbon emissions from developing nations. For this reason, China has been able to take advantage of sustainable technological solutions to decrease its carbon footprint by adopting sustainable energy systems, sustainably meeting its energy system, and becoming a more sustainable economy. As such, there is sufficient evidence to suggest that the rise of technological globalization has led to rapid technological innovations in China, in turn, steering forward the country's economic independence, global political agenda, and sustainable development.



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