



Research Paper

The Contemporary Role of Green Logistics in Sustainable Development: A Focus on the Belt & Road Countries

¹Md. Shahidul Islam, ¹Md Khairul Anam, ²Tanvin Hasan Riead, ³SK Ashik Arafat, ⁴Yu Liang, ⁵Shawon Ibn Rahman, ⁶Asfakul Islam

¹(University of Science and Technology Beijing)

¹(Chang'an University)

²(Yunnan Minzu University)

³(Chang'an University)

⁴(Xi'an International Studies University)

⁵(Chang'an University)

⁶(Southeast University)

Corresponding Author: Md. Shahidul Islam, Md Khairul Anam

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ABSTRACT

The significance of global green logistics in improving green economic activities is a critically considered and debatable research topic in the context of economic growth and the environment. This study aims to analyze the growth and environmental effects of green logistics performance for One Belt and Road Initiative (OBRI) countries over the period 2007–2019. The study generalized method of moments (GMM) estimators with robust inferences. The findings have revealed that green logistics performance improves the economic growth in OBRI, Europe, and MENA economies. While green logistics performance enhances the environmental pollution in OBRI, Central Asia, and MENA economies, it significantly improves the environmental quality in Europe and East and Southeast Asia regions. The explanatory factors also have importance in economic growth and environment in policy implication in OBRI and five sub-regions of OBRI economies. Based on these findings, we can conduct some robust on green logistics policies in OBRI.

KEYWORDS: Green Logistics, Sustainable Development, Belt & Road Initiative, OBRI, GMM

I. INTRODUCTION

Although challenging, recent efforts to implement systems for advancing the Sustainable Development Goals (SDGs) in emerging economies have been forward-thinking (Benintendi et al., 2020). In keeping with such a progressive agenda, it is anticipated that the world's population will reach 10 billion in 2055, 9 billion in 2025, and 8 billion in 2025. Starting from the start of the thousand years, endeavors have been made to lessen the pace of destitution on the planet considerably. Naturally, international leaders are not ignoring the challenge (World Health Organization, 2020; Joined Countries, 2019).

The Millennium Development Goals (MDGs) are a useful plan for global mobilization because they are well-structured and set important social priorities to raise people's standard of living (Emmanuel, et al., 2022). Through the elimination of poverty, the MDGs set the tone for global development initiatives from 2015 to 2030. Strategically, these priorities reflect all

seventeen Sustainable Development Goals, which ultimately aim to ensure that everyone has a basic standard of living regardless of where they live (United Nations, 2019; World Wellbeing Association, 2020). “Build a sustainable industry, innovation, and infrastructure to support economic growth” is one of the nine Sustainable Development Goals. Industry and innovation can only thrive with adequate infrastructure (Ogbeibu et al., 2021a). According to the United Nations (2019); Mohsin et al., 2021; this is essential for achieving growth that is sufficient and inclusive, which will raise living standards. The emerging nations still face the most difficult test to advance the successful sustainable economy agenda around the world, in contrast to the developed economies that have successfully built a sustainable economic environment and the developing economies whose potentials, however, systematically face financial obstacles (Wackernagel et al., 2017; Ogbeibu and other, 2021b; Hossain et al., 2023, Alauddin et al., 2022).

II. LITERATURE REVIEW

Infrastructure development becomes even more important as the world's population continues to rise. According to IT - UNISA (2018), the majority of developing nations, particularly those in Asia and Africa, are experiencing rapid population growth and a high demand for basic infrastructures like reliable electricity, effective transportation, portable drinking water, and effective information technology. Sadly, most non-industrial nations face monetary troubles in financing basic foundation ventures to work on the existences of their residents.

Overdependence on foreign aid, particularly from China, is a real problem for several emerging and underdeveloped economies, and it is becoming an important factor in borrowing levels (World Bank, 2018). For instance, a report based on prior data reveals that, in comparison to other developing regions, countries in Sub-Saharan Africa have a low infrastructure development index in transport, information and communications technology (ICT), energy, water, and sanitation (see Table 1) despite a noticeable lack of public infrastructure. In most developing regions, rapid population growth is the cause of rising electricity consumption, housing shortages, and inadequate ICT resources, according to a 2019 United Nations report. Unless significant infrastructure development occurs, this phenomenon will most likely exacerbate the infrastructure crisis by 2035.

Each nation is accountable for monitoring and tracking the achievement of the MDGs under the UN SDGs agenda. By submitting a proposal for various nations to achieve the 2030 Sustainable Development Goals (SDGs) and describing strategies for putting the agenda into action in 2016, China established itself as one of the major global proponents of the MDGs (United Nations, 2019).

The launch of the intercontinental mega infrastructure project, also known as the Belt and Road Initiatives (BRI), which aimed to accelerate regional infrastructure development in order to implement the 9th Five Year Plan preceded this initiative. In accordance with this global framework for the development of infrastructure. In light of the achievement of the 9th Sustainable Development Goal (SDG), which places an emphasis on key economic sectors

*Corresponding Author: *Md. Shahidul Islam, Md Khairul Anam*

like energy, information and communication technology (ICT), transportation, and others, there are a number of reasons to be concerned about the progress of BRI in more than 65 developing nations. Feng and co., 2019; Yanqiang and others, 2018).

It is still unknown how the BRI's initiatives will affect the 9th Sustainable Development Goal (SDG) in a number of emerging economies, despite the BRI's excellent potential to contribute to the SDGs. Therefore, in order to comprehend the role that BRI plays in the 9th SDG, additional comprehensive exploratory investigations are required.

The creation of the Transcontinental Belt and Road Initiative (BRI) in 2013 to connect Chinese economic influence with all six economic corridors serves as China's primary foundation for bilateral cooperation (UNISA, 2018). This groundbreaking drive, checking Chinese financial power, is assessed to contribute more than \$1 trillion over the BRI lifecycle and plans to make significant foundation interests in Africa and Asia (Thurer et al., 2020). The research (Thurer et al., 2020; Benintendi and others, 2020; According to UNISA (2018), 140 nations are participating in the BRI.

These nations comprises of 40 nations in Sub-Saharan Africa, 34 nations in Europe and Focal Asia (counting 18 European Association nations), 24 nations in East Asia and the Pacific, 17 nations in the Center East and North Africa, 19 nations in Latin America and the Caribbean, and six nations in Southeast Asia. In connection with the BRI, these nations have trade and investment ties with China. The BRI, which is expected to last for 30 years, provides poor and developing nations with sustainable economic opportunities, according to the World Bank (World Bank, 2018). Anarfo and others 2019) emphasized that the BRI's primary goal is to significantly reduce the infrastructure deficit in developing nations in order to boost economic growth and accomplish the SDGs. The majority of BRI projects, as stated by the World European Investment Bank (2018), are infrastructure projects that directly influence economic performance through enterprise development. As a result, the Business and Investment Corridor Initiative (BRI) between China and Algeria has established the most significant logistics corridor in North Africa and enhanced the business network between China and Africa. In every subregion of Asia, Africa, and Latin America, sustainable development is still at the heart of the BRI project as one of its main goals. This is because projects to boost economic growth must take into account sustainable infrastructure development's impact on project quality and longevity. China's BRI ensures that all development initiatives align with the SDGs because integrity is at stake (Feng et al., 2019; Anarfo and other, 2019).

Anarfo and others 2019) stated that the initiatives greatly assist economically disadvantaged nations in achieving the 9th SDG. In addition, it provides the resources necessary to construct a sustainable economic infrastructure in areas such as transportation, energy, information and communication technology (ICT), and others, bringing economic issues to light and addressing them. According to Hahm and Raihan (2018), the BRI is anticipated to assist

developing nations in resolving economic issues that impede business expansion due to a lack of standard infrastructure. Prior research (Yanqiang et al., 2018; Rauf and others, 2018; Anarfo and other, 2019) have stated that, despite the fact that there are a number of skepticisms regarding the BRI's primary objective, which is to investigate the possibility of political interference and the exploitation of natural resources from other nations.

Numerous developing countries in Sub-Saharan Africa and South Asia that require assistance to boost their economic activities cannot ignore the overwhelming opportunities provided by the BRI. The BRI is interpreted as an investment in economic development by many uninformed citizens as an investment without a commitment to repay the debt (Mengdi and Wang, 2021; Benintendi and others, 2020).

However, many educated citizens strongly believe that China is using the BRI as a ruse to gain political influence over the affected emerging economies. Despite the BRI's potential economic benefits, the possibility of debt default is one of its many concerns. Although China's commitment to economic development in the developing world is widely regarded as a drive toward achieving a balanced economic arrangement with western banks, it also has the potential to transform into economic desperation for many nations that are responsible for the debt payment for the BRI (Mengdi and Wang, 2021; The authors, 2020; Benintendi and others, 2020).

The new global economy is increasingly being shaped by global interactions, which are increasing the length of the supply chain and putting pressure on the transport sector across nations in response to rising global demand for goods and services and efficient resource utilization. As a result, global warming (GHG) emissions are steadily rising, exacerbated by environmental issues worldwide. In this present circumstance, the Paris understanding objectives will confront a serious test as one of these objectives is to diminish mean worldwide temperature at under 2° over the pre-industrialization levels to counter the ecological dangers and harm.

As of late, investigating the nexus between green coordinated factors and manageability has been getting overall consideration from scholarly analysts, ecological financial specialists, government authorities, associations, policymakers, and states. The green supply chain, which includes all environmentally friendly logistics operations like procurement, transportation, distribution, and delivery, is included in studies on green logistics. By controlling the external negative effects of logistic tasks, the research in this area aims to conserve the environment (Ozturk 2010; 2012, Dekker et al.; Lai and co. 2012; 2012a, b, Lai and Wong; 2012, Bajdor)

According to Lai and Wong (2012)a, b, the literature, green logistics practices can effectively reduce environmental damage and operational costs, as well as improve energy conservation and the competitive flow of goods and services. 2007 by Srivastava). Besides, many examinations affirmed the positive job of ecological guidelines for coordinated factors tasks (Mangla et al. 2014; 2012a, b) Lai and Wong Green logistics practices are supported by

*Corresponding Author: *Md. Shahidul Islam, Md Khairul Anam*

stringent environmental laws, which improve global ecological quality. In the United States, for instance, "the Transportation Equity Act for the 21st Century in 1998" promoted clean transportation and jobs. In a similar vein, to combat waste pollution, member states of the European Union have established stringent regulations for eco-friendly packaging. These practices additionally have overflow impacts as firms of exchanging patterners likewise will undoubtedly observe these regulations (Zhang and Xu 2016). China proposed "the One Belt and Road Initiative (BRI)" in 2013. Since then, nations have found it useful because this project offers numerous promising benefits for economic, energy, financial, and cultural collaboration among member states.

As a result of these advantages, more nations are joining the initiative, fostering strategic cooperation (NDRC, 2017). The countries of Asia, Europe, and Africa will benefit from greater economic integration as a result of this BRI project.

Additionally, this project's infrastructure investments will encourage economic expansion in BRI-participating economies. However, these economic activities may have a negative impact on the quality of the environment. As a result, gaining an understanding of the economic and environmental effects of logistics in BRI nations has emerged as an essential research agenda.

According to the available literature, little research has been done on the growth and environmental effects of logistics investment. The experiences of one nation serve as the basis for the available studies (Chu, 2010; Wang 2010; Kayode and co. 2013), especially in relation to China. These studies yield inconclusive results that cannot be generalized to the economy as a whole. Additionally, the investigations mostly center around various elements of planned operations like transportation (Fleisher and Chen 1997; Lv and co. 2019), and telecommunications infrastructure projects (Majeed and Ayub, 2018).

Aside from this, previous research typically focuses on the length of the road and rail as well as the number of phones (Demurger, 2001; Ding and co. 2008) to gauge progress in transportation and telecommunications without taking into account the quality and effectiveness of the infrastructure. However, the literature lacks a comprehensive logistics performance indicator for a deeper analysis.

Particularly, there is, to the best of our knowledge, no study on BRI economies. By investigating the connections between green logistics, economic growth, and environmental quality in BRI countries, this study addresses the aforementioned research gaps. We try to answer the following research questions in particular. First, does BRI member country economic growth benefit from logistics performance? Second, does the performance of international logistics contribute to the sustainability of the environment? Thirdly, do all aspects of logistics performance have the same effect on environment and economic growth?

III. METHODOLOGY

Based on theoretical literature, this study establishes a dynamic empirical link between green logistics performance, economic growth, and environmental pollution in OBRI economies. Numerous studies have demonstrated a dynamic relationship between economic expansion and green logistics performance (Khan et al. 2017, 2018; Liu and co. 2018). Green logistics performance is an important metric for economic expansion.

During the 2000s, several businesses widely implemented the idea of green logistics by boosting economic growth. According to Khan et al., green logistics performance has an impact not only on-air pollution but also on economic activity. (2018). Khan et al. carry out a comprehensive investigation (2017), who pointed out the connection between economic indicators and logistics performance. (Khan and Qianli, 2017; Khan and Qianli, 2017) Another strand of literature describes the various channels of impacts that describe the green logistics and environmental pollution nexus. Liu and co. 2018; Khan and co. 2018). We choose IND, AG, FFC, and FDI as the control variables to investigate the dynamic relationship between green logistics and economic growth in Eq. based on the preceding empirical discussion, which considers the macro perspective of green logistics performance, economic growth, and CO2 emissions. 1a), as well as CO2 emissions and green logistics in Equation 1b)

$$\begin{aligned} \text{Economic growth}_{it} = & \beta_0 + \beta_1 \cdot \text{GL}_{it} + \beta_2 \cdot \text{IND}_{it} \\ & + \beta_3 \cdot \text{AG}_{it} + \beta_4 \cdot \text{FFC}_{it} + \beta_4 \cdot \text{FDI}_{it} \\ & + \text{et}_{it} \end{aligned} \quad (1a)$$

$$\begin{aligned} \text{CO}_{2it} = & \beta_0 + \beta_1 \cdot \text{GL}_{it} + \beta_2 \cdot \text{IND}_{it} + \beta_3 \cdot \text{AG}_{it} \\ & + \beta_4 \cdot \text{FFC}_{it} + \beta_4 \cdot \text{FDI}_{it} + \text{et}_{it} \end{aligned} \quad (1b)$$

IV. RESULT AND DISCUSSION

Particularly, there is, to the best of our knowledge, no study on BRI economies. By investigating the connections between green logistics, economic growth, and environmental quality in BRI countries, this study addresses the research gaps. We try to answer the following research questions. First, does BRI member country economic growth benefit from logistics performance? Second, does the performance of international logistics contribute to the sustainability of the environment? Thirdly, do all aspects of logistics performance have the same effect on environment and economic growth?

The discoveries of this study give superior comprehension and fundamental data and proof to people, scholarly specialists, financial experts, and policymakers. Policymakers, environmentalists, and government officials can use the economic implications of this research to ensure environmental preservation. The developing world, which lacks green

logistics development and faces energy and environmental issues, can benefit from our research in terms of economic performance and environmental quality.

We have provided a summary of the related literature on infrastructure, energy, growth, and the environment in the given sections and we investigate the effects of green logistics on economic growth and the environment for BRI nations from 2007 to 2019. The green logistics performance index of OBRI and its subregions' economies was used to estimate the coefficient using the 2SLS and GMM panels (Aboulilah et al., 2022). The empirical results for OBRI subregions are comparable to those for the OBRI. Green logistics performance has a significant positive effect on economic expansion and CO₂ emissions at the OBRI. Green logistics performance enhanced economic expansion in Europe and the Middle East and North Africa at the OBRI subregions. While green operations execution harms the climate in Focal Asia and MENA, it worked on the natural quality in Europe and East and Southeast Asia. This result may persuade policymakers to adopt a more integrated and sustainable perspective that gives economic growth higher priority using green logistics.

V. CONCLUSION

The management authorities of the OBRI regions ought to implement eco-friendly packaging, eco-friendly transportation, and eco-friendly supply chain design to boost their eco-friendly economic growth and global competitiveness. Additionally, the OBRI donor urgently facilitated green logistics and reduced the domestic and international environmental impact of logistics operations. The quality of green logistics services and transport infrastructures ought to influence FDI inflows. Government officials must adopt a serious mindset if they are to maximize economic growth while simultaneously minimizing environmental pollution. The environment should be cleaned by every nation; otherwise, getting some fresh air for a day would be a dream. If properly implemented in OBRI regions, all the economic recommendations are very realizable and practicable. The micro-level data sample of green logistics performance can be used in future studies to address issues like economic growth and environmental sustainability.

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