ONE BELT, ONE ROAD PROJECT:
THE IMPACT OF SMART TECHNOLOGIES
ON INFRASTRUCTURE AND LOGISTICS

Liudmyla Tsymbal¹, Tymur Natsvlishvili², Olga Verdenhofa³

Abstract. This article explores the impact of the smart economy on the infrastructure and logistics of the One Belt, One Road (BRI – Belt and Road Initiative) initiative. The integration of smart technologies into the project has the potential to transform traditional systems, improve communication, increase efficiency and contribute to sustainable development. Purpose. This study aims to fill the existing knowledge gaps and shed light on the impact of the smart economy on the infrastructure and logistics of the One Belt, One Road project. By examining the opportunities, challenges and implications, this study aims to contribute to the understanding and successful implementation of smart technologies in this ambitious initiative. Methodology. The article uses the methods of quantitative empirical research, statistical analysis and visualisation, analysis and evaluation of the analytical assessment of tools for forming an innovative logistics network within the framework of the One Belt, One Road project. Results. The article examines the impact of the smart economy on connectivity, efficiency and sustainability, and highlights the perspectives and recommendations of different stakeholders. It emphasises the importance of cooperation between governments, businesses and local communities for successful implementation. The findings suggest that while the smart economy offers immense opportunities, challenges such as the digital divide, data protection and investment requirements need to be addressed. The article concludes with recommendations to foster cooperation, develop supportive policies, invest in digital infrastructure and prioritise sustainability. By following these recommendations, the One Belt, One Road project can effectively harness the transformative potential of the smart economy and create a sustainable and inclusive future. Practical implications. The materials can be used to plan a development strategy, taking into account new technologies and the possibility of implementation in the national development strategy. Value/originality. The integration of smart technologies into the infrastructure and logistics systems of the One Belt, One Road project plays a pivotal role in shaping the impact of the smart economy. By leveraging advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), big data analytics and blockchain, the project aims to optimise connectivity, enhance operational efficiency and promote sustainable development. Key aspects of development include smart infrastructure projects, digitisation and automation in logistics, blockchain technology for transparency and security, and data-driven decision-making and predictive analytics.

Key words: smart economy, infrastructure, logistics, One Belt One Road, integration, connectivity, efficiency, sustainability, stakeholders, recommendations.

JEL Classification: F02, F15, O19, O33, O53

1. Introduction

The impact of the smart economy on the infrastructure and logistics of the One Belt, One Road project has attracted considerable attention in recent years. As nations strive to improve connectivity, trade and economic cooperation along the ancient Silk Road routes, the integration of smart technologies into infrastructure...
and logistics systems has the potential to be transformative.

The One Belt, One Road initiative, proposed by China in 2013, aims to promote economic cooperation and connectivity between Asia, Europe and Africa through the development of infrastructure networks. This ambitious project envisages the creation of a modern Silk Road, reviving ancient trade routes and promoting regional integration. Numerous countries have expressed interest in and participated in this initiative, recognising its potential to stimulate economic growth, enhance cultural exchanges and foster geopolitical relations (Tang, K. et al., 2017).

The rapid development of smart technologies, such as the Internet of Things (IoT), artificial intelligence (AI), big data analytics and blockchain, is revolutionising various sectors around the world. In the context of infrastructure and logistics, the application of smart technologies offers opportunities to improve efficiency, optimise resource allocation, enhance supply chain management, and enable real-time monitoring and data-driven decision-making. Smart infrastructure initiatives, including smart ports, smart transport systems and smart cities, have shown promising results in improving operational efficiency and sustainability.

Despite the growing interest and implementation of smart technologies in various fields, there is a need to further explore their specific impact on the infrastructure and logistics of the One Belt, One Road project. While it is recognised that the integration of smart technologies has the potential to drive transformative change, the extent of their influence, the challenges they face and the implications for stakeholders remain relatively unexplored.

The complex and interconnected nature of the One Belt, One Road project presents unique challenges that require careful consideration. The diverse geographical and socio-economic contexts, varying levels of technological readiness, and the involvement of multiple stakeholders add significant complexity. In addition, the potential risks related to data protection, cybersecurity and the digital divide need to be examined in the context of the project’s development and implementation.

Given the gaps in understanding and the transformative potential of smart technologies, it is crucial to study their impact on the infrastructure and logistics of the One Belt, One Road project. The objectives of this study are as follows:

1. To assess the current state of smart technology integration in the infrastructure and logistics systems of the One Belt, One Road project.
2. Identify the opportunities and challenges associated with the use of smart technologies to improve connectivity, efficiency and sustainability.
3. Analyse the implications of smart infrastructure and logistics for stakeholders, including governments, enterprises and local communities.
4. Provide recommendations and guidelines to facilitate the successful integration of smart technologies into the One Belt, One Road project.

By gaining insight into these issues, policymakers, businesses and researchers can make informed decisions, harness the potential of smart technologies and contribute to the development of a robust and efficient infrastructure and logistics network along the One Belt, One Road routes.

This study aims to fill the existing knowledge gaps and shed light on the impact of the smart economy on the infrastructure and logistics of the One Belt, One Road project. By examining the opportunities, challenges and implications, this paper aims to contribute to the understanding and successful implementation of smart technologies in this ambitious initiative.

2. Analysis of Recent Researches and Publications

An analysis of recent research and publications provides valuable insights into the impact of the smart economy on the infrastructure and logistics of the One Belt, One Road project. One article (Tang K. et al., 2017) discusses China’s Belt and Road Initiative, highlighting its contribution to global health and multilateral organisations. Another article (Luna Sun, 2023) highlights China’s leadership in the development of smart cities through the use of AI, IoT, big data and cloud computing. It shows the transformative impact of these technologies on urban planning and management. Another article (IoT in Supply Chains..., 2023) highlights the potential of IoT in optimising supply chains, enhancing inventory management and improving customer satisfaction. Another study (Valliappan R. et al., 2021) delves into the role of big data analytics in understanding logistics efforts in the Belt and Road Initiative. In addition, the applications of blockchain technology in logistics are explored in an article by Mario Honrubia (2023), highlighting its benefits in inventory tracking and traceability. The concept of China’s country-as-platform strategy for global influence is examined in the work of Sanjeev Paul Choudary (2020), who shows how China is exporting its digital infrastructure and reshaping the global economic and political landscape. The importance of smart logistics for smart cities is the subject of research in the work of Lehmacher W. (2020), highlighting the need for sustainable and efficient solutions to address the challenges of urbanisation. The potential for greener power projects within the Belt and Road Initiative is the subject of research by
experts (Greener Power Projects..., 2019), focusing on investments in renewable energy. Finally, the implications of the Belt and Road Initiative for the United States are explored, addressing concerns related to economic competition, cybersecurity risks, and China’s growing influence.

The analysis of recent research and publications provides a comprehensive overview of the impact of the smart economy on the infrastructure and logistics of the One Belt, One Road project. These studies highlight China’s unique global engagement, development of smart cities and integration of transformative technologies. While the smart economy offers significant opportunities for real-time data collection, efficient resource management and sustainable logistics solutions, challenges such as cybersecurity risks and potential geopolitical impacts need to be addressed. Understanding these dynamics is crucial for stakeholders to reap the benefits of the smart economy while addressing the challenges associated with the One Belt, One Road project. However, the issue of the complex implementation of smart technologies as the basis for the formation of a modern logistics network remains outside the attention of scholars.

The article uses the methods of quantitative empirical research, statistical analysis and visualisation, analysis and evaluation of the analytical assessment of tools for forming an innovative logistics network within the framework of the One Belt, One Road project.

3. Integration of Smart Technologies into Infrastructure and Logistics Systems

The integration of smart technologies into the infrastructure and logistics systems of the One Belt, One Road project plays a pivotal role in shaping the impact of the smart economy. By leveraging advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), big data analytics and blockchain, the project aims to optimise connectivity, enhance operational efficiency and promote sustainable development. Key aspects of development include smart infrastructure projects, digitisation and automation in logistics, blockchain technology for transparency and security, and data-driven decision-making and predictive analytics.

In pursuit of a smarter and more connected project, the integration of smart technologies is transforming infrastructure development along the One Belt, One Road routes. The implementation of smart cities, intelligent transport systems and advanced communication networks enables the creation of a seamless and interconnected infrastructure network. By using innovative solutions and technologies such as intelligent traffic management systems, integrated logistics hubs and energy-efficient infrastructure, the project aims to improve connectivity, reduce costs and enhance the overall quality of infrastructure (Luna Sun, 2023).

Smart technologies are becoming more widespread and are being implemented in both infrastructure projects and smart city ecosystems. The number of smart cities is expected to grow at a compound annual growth rate (CAGR) of 19.3% between 2020 and 2025, and global investment in smart city technology will reach 158 billion USD in 2022 and is expected to reach 158 billion USD by 2025 (The Ultimate List..., 2023). China ranks second in the world in terms of the number of smart cities (Figure 1).

![Figure 1. Number of smart cities, 2023](Source: (The Ultimate List..., 2023))
The Belt and Road Initiative (BRI) has played a significant role in driving the development of smart cities, especially in China. According to the latest statistics, China leads the way with 45 smart cities, demonstrating its commitment to using advanced technologies and digital infrastructure for urban development. The BRI has provided a platform for Chinese cities to showcase their smart city initiatives and contribute to the global discourse on urban innovation. By embracing technologies such as AI, IoT, big data and cloud computing, these smart cities aim to improve the quality of life for their residents, optimise resource utilisation and create sustainable urban environments. The BRI has not only accelerated the growth of smart cities in China, but has also inspired other countries along the Belt and Road route to invest in their own smart city initiatives, fostering a global movement towards more intelligent and connected urban landscapes (The Ultimate List..., 2023).

The digitisation and automation of logistics processes under the One Belt, One Road project is revolutionising the way goods and services are transported and managed. Smart technologies such as IoT-enabled sensors, AI-driven analytics, and automation solutions are being used to optimise supply chain management, improve real-time tracking and tracing of goods, and streamline customs processes. The adoption of digital platforms, e-commerce systems, and advanced logistics technologies aims to improve operational efficiency, minimise delays, and facilitate secure and efficient cross-border trade (IoT in Supply Chains..., 2023).

Digitisation and automation in logistics play an important role in expanding the scale of China’s smart logistics market (Figure 2). With the rapid advancement of technologies such as artificial intelligence (AI), Internet of Things (IoT), big data analytics, and robotics, logistics operations in China are undergoing a significant transformation. These digitisation and automation initiatives have revolutionised supply chain management, enabling real-time tracking, efficient inventory management and predictive analytics. Through the integration of these technologies, China’s logistics industry has experienced increased operational efficiency, improved customer experience, and improved overall productivity. In addition, the adoption of digitalisation and automation has enabled streamlined processes, reduced costs and minimised errors in logistics operations, driving the expansion of China’s smart logistics market scale. As a result, the country has become a global leader in smart logistics, setting trends and paving the way for innovative solutions in the industry (Weihua L. et al., 2020).

Data-driven decision-making and predictive analytics play a critical role in optimising infrastructure and logistics operations under the One Belt, One Road project. By harnessing the power of big data analytics and AI, stakeholders can gain valuable insights into supply chain patterns, demand forecasting, and route optimisation. These insights enable informed decision-making, efficient resource allocation and proactive risk management. By integrating data-driven approaches, the project aims to increase operational efficiency, reduce costs, and improve the overall resilience of infrastructure and logistics systems (Valliappan R., Wang Juan, Sandeep Shrestha, Ramachandran K., 2021).

The implementation of smart technologies, which is part of the smart economy, will only facilitate this
process. The integration of blockchain technology into the infrastructure and logistics systems of the One Belt, One Road project introduces greater transparency, security and efficiency. By leveraging distributed ledger technology, blockchain enables secure and tamper-proof record keeping, facilitating transparent and traceable transactions. This technology has immense potential for supply chain management, contract verification, and customs processes, increasing trust among stakeholders and reducing the risk of fraud. Through the adoption of blockchain, the project aims to create a more secure and efficient logistics ecosystem (Mario Honrubia, 2023).

The integration of smart technologies into infrastructure and logistics systems under the One Belt, One Road project is transforming the traditional landscape, promoting connectivity, efficiency and sustainability. By embracing digitalisation, automation, data-driven decision-making, and blockchain technology, the project is poised to unlock new opportunities, optimise resource allocation, and improve the overall performance of infrastructure and logistics operations.

4. Implications of the Smart Economy on Connectivity, Efficiency, and Sustainability

The smart economy has far-reaching implications for connectivity, efficiency and sustainability within the infrastructure and logistics systems of the One Belt, One Road project. Through the use of smart technologies, data-driven decision-making and innovative practices, the project aims to enhance connectivity between regions, improve operational efficiency and promote sustainable development.

The integration of the smart economy into the One Belt, One Road project has a significant impact on connectivity. Smart technologies such as IoT-enabled sensors, satellite communications and intelligent transport systems facilitate the seamless exchange of information, improve transport links and bridge geographical distances. The project’s focus on building smart cities and digital platforms promotes connectivity by enabling real-time data sharing and collaboration between stakeholders. By improving connectivity, the project aims to strengthen regional integration, facilitate trade and promote economic growth (Sangeet Paul Choudary, 2020).

The smart economy brings improvements in operational efficiency within the infrastructure and logistics systems of the One Belt, One Road project. Through the adoption of AI-driven predictive analytics, IoT-enabled asset tracking and automation, stakeholders can optimise supply chain management, streamline logistics operations and reduce costs. The integration of digital platforms and collaborative technologies enables real-time collaboration, data sharing and process optimisation, improving operational efficiency at various stages of the logistics value chain. Through the use of intelligent technologies, the project aims to improve resource allocation, minimise delays and enhance overall operational performance.

As an example of the importance of improving operational efficiency in the development of China’s smart economy through the implementation of smart technologies, the following statistics can be provided: the demand for urban last-mile delivery is expected to increase by 78% by 2030, resulting in 36% more delivery vehicles in cities. The operational efficiency of smart logistics can help meet this challenge (Lehmacher W., 2020).

The integration of the smart economy into the One Belt, One Road initiative holds great promise for promoting sustainable development. Through the use of smart technologies, stakeholders can address environmental challenges and promote resource efficiency. Smart cities, powered by IoT and data analytics, can optimise energy consumption, reduce carbon emissions and improve urban planning. They also focus on integrating renewable energy sources, implementing waste management systems and adopting sustainable practices to minimise the environmental footprint of infrastructure and logistics operations. Through smart economics, projects aim to achieve long-term sustainability, resilience and a balance between economic development and environmental stewardship (Greener Power Projects..., 2019).

To fully realise the potential of the smart economy under the One Belt, One Road project, collaborative approaches among stakeholders are crucial. Governments, businesses and communities need to work together to harness smart technologies, share best practices and address challenges together. Policy frameworks, regulatory mechanisms and public-private partnerships play an important role in fostering cooperation towards common goals of connectivity, efficiency and sustainability. Capacity building, knowledge sharing platforms and international cooperation are essential to promote the adoption and implementation of smart technologies in the project regions.

The impact of the smart economy on connectivity, efficiency and sustainability within the infrastructure and logistics systems of the One Belt, One Road initiative is significant. By harnessing the transformative power of smart technologies, the project aims to strengthen regional integration, improve operational efficiency and promote sustainable development. Through enhanced connectivity, optimised operations and collaborative approaches, the project is poised to realise the potential benefits of the smart economy and shape the future of infrastructure and logistics in the One Belt, One Road region.
5. Stakeholder Perspectives and Recommendations for Successful Implementation

In order to ensure the successful implementation of the smart economy within the infrastructure and logistics of the One Belt, One Road project, it is essential to consider the perspectives and recommendations of various stakeholders. This section explores the perspectives of key stakeholders, including government agencies, enterprises and industries, as well as local communities and civil society organisations. By understanding their perspectives and incorporating their recommendations, it will be possible to foster collaboration and create an enabling environment that promotes the effective integration of smart technologies.

Government stakeholders play a critical role in shaping the implementation of the smart economy. Their perspectives provide insight into the policy frameworks, regulatory measures and governance structures needed to support the integration of smart technologies. Governments recognise the potential benefits of the smart economy, such as increased efficiency, improved connectivity and enhanced sustainability. However, they also recognise the challenges and risks associated with implementation, such as data security and privacy concerns, and the need for a skilled workforce. By examining government perspectives, valuable insights can be gained to guide the development of supportive policies, regulatory frameworks and strategic initiatives that facilitate the seamless integration of smart technologies within the One Belt, One Road project.

The Chinese government is keen to use the initiative to achieve economic and geopolitical goals, and foreign policy analysts view it largely through a geopolitical lens, seeing it as Beijing’s attempt to gain political leverage over its neighbours. The United States has a fundamental interest in ensuring that no single power dominates the Eurasian supercontinent, and new infrastructure will be an important indicator and tool of influence. The Belt and Road Initiative is also seen as a set of technology platforms that can boost trade in China. By examining government perspectives, policymakers can gain valuable insights to guide the development of supportive policies and regulatory frameworks that facilitate the seamless integration of smart technologies within the project (China's Belt and Road..., 2021).

The perspectives of businesses and industry stakeholders are crucial to the successful implementation of the smart economy. They recognise the opportunities for smart technologies to transform infrastructure and logistics operations. Businesses highlight the potential for increased supply chain visibility, improved customer experience and cost optimisation through the use of smart technologies. Industry stakeholders also acknowledge the need for innovation, investment and collaboration to fully realise the benefits of the smart economy. Understanding the business and industry perspectives will provide valuable insights to drive the adoption and implementation of smart technologies across the project regions.

The perspectives of local communities, civil society organisations and non-governmental stakeholders are essential to ensure that the smart economy benefits all. Community stakeholders express their expectations for job creation, skills development and inclusive growth resulting from the integration of smart technologies. They also emphasise the importance of social equity, cultural preservation and the protection of local interests in the implementation of the smart economy. Civil society organisations provide insights into the social implications and ethical considerations of the smart economy, advocating for transparency, accountability and the inclusion of marginalised groups. Incorporating community engagement and taking social perspectives into account can lead to a more inclusive and sustainable implementation of the smart economy (Innovation, Equity..., 2022).

Incorporating the perspectives and recommendations of different stakeholders is crucial for the successful implementation of the smart economy in the infrastructure and logistics of the One Belt, One Road project. Government insights guide the development of supportive policies and regulatory frameworks, ensuring an enabling environment for the integration of smart technologies. Business and industry stakeholders provide valuable perspectives on the use of smart technologies to optimise supply chains and improve operational efficiency. In addition, community engagement and social perspectives contribute to inclusive growth, cultural preservation and the protection of local interests. Taking into account these stakeholder views and recommendations can foster a collaborative and enabling environment, leading to the effective integration of smart technologies and maximising the positive impact of the smart economy on project objectives.

The use of smart technologies has greatly enhanced connectivity within the One Belt, One Road project. Advanced communication systems, Internet of Things (IoT) devices and real-time data exchange have facilitated seamless information flow and improved coordination across the project’s regions. This enhanced connectivity has led to faster and more efficient decision-making processes, streamlined logistics operations and reduced transport delays.

The smart economy has led to remarkable improvements in the efficiency of infrastructure...
and logistics systems. Automation, robotics and artificial intelligence have enabled optimised resource allocation, improved operational processes and increased productivity. Smart sensors and monitoring systems have enabled real-time tracking and predictive maintenance of transport networks, resulting in reduced downtime and increased overall efficiency.

The integration of smart technologies has had a positive impact on the sustainability of the One Belt, One Road project. Smart energy management systems, renewable energy sources and efficient waste management practices have been implemented, reducing the project’s environmental footprint.

The smart economy has also contributed to increased safety in infrastructure and logistics. Advanced surveillance systems, intelligent traffic management and secure data exchange protocols have improved the overall security of transport networks. In addition, cybersecurity measures and data encryption techniques have been implemented to protect critical infrastructure and safeguard sensitive information.

The implementation of the smart economy has empowered decision-makers by giving them access to real-time and accurate data. Advanced analytics and data visualisation tools have facilitated data-driven decision-making processes, enabling stakeholders to make informed choices about infrastructure development, logistics optimisation and resource allocation. This has led to more effective and efficient decision-making, resulting in better project outcomes.

Overall, the results of integrating smart technologies into the infrastructure and logistics of the One Belt, One Road project demonstrate significant improvements in connectivity, efficiency, sustainability, safety and decision-making. These results highlight the transformative impact of the smart economy on the project’s objectives and pave the way for further progress in the future.

The smart economy has significant implications for the infrastructure and logistics of the One Belt, One Road project. The benefits of improved connectivity, efficiency and sustainability highlight the potential for long-term positive impacts. The integration of smart technologies has the potential to transform traditional infrastructure systems into interconnected, data-driven networks that can adapt to changing demands and optimise the use of resources. This has implications not only for the project itself, but also for regional economic development, trade facilitation and global connectivity.

While the results are promising, several challenges and limitations need to be considered. One of the main challenges is the digital divide, as some regions along the One Belt, One Road route may lack adequate digital infrastructure and access to smart technologies. Bridging this gap and ensuring equitable access to the benefits of the smart economy is crucial. In addition, privacy and security concerns need to be addressed to mitigate the risks associated with the collection, storage and exchange of large volumes of data. Furthermore, the implementation of smart technologies requires significant investment, the development of a skilled workforce and supportive policies, which may pose challenges for certain regions and stakeholders.

Collaboration among stakeholders, including governments, businesses, academia and international organisations, can promote knowledge sharing, technology transfer and capacity building. Public-private partnerships can leverage the expertise of both sectors to drive innovation and address the unique challenges of the One Belt, One Road project. In addition, the smart economy offers opportunities for the development of new business models, entrepreneurship and job creation, contributing to regional economic growth and social development.

An important aspect of the discussion is the alignment of the smart economy with the United Nations Sustainable Development Goals (SDGs). The integration of smart technologies can contribute to the achievement of several SDGs, such as Goal 9 (Industry, Innovation and Infrastructure), Goal 11 (Sustainable Cities and Communities) and Goal 17 (Partnerships for the Goals). By harnessing the potential of the smart economy, the One Belt, One Road project can make significant progress towards sustainable development, including economic growth, social inclusion, and environmental sustainability (THE 17 GOALS...).

The directions for further development remain continued investment in digital infrastructure, capacity building programmes and research and development initiatives. Stakeholders should work together to address regulatory challenges and privacy concerns, and to ensure the ethical use of smart technologies. In addition, policy frameworks should be designed to promote inclusive growth, social equity and environmental sustainability. Continuous monitoring, evaluation and adaptation of the implementation of the smart economy will be crucial to maximise its potential and address emerging challenges.

6. Conclusions

The integration of the smart economy into the infrastructure and logistics of the One Belt, One Road project has demonstrated significant potential for transforming traditional systems into interconnected, data-driven networks. The results have shown improved
connectivity, increased efficiency, sustainability benefits, empowered decision-making and enhanced security. These results highlight the transformative impact of smart technologies on the project's objectives, regional economic development, trade facilitation and global connectivity.

However, several challenges and constraints need to be addressed for the successful implementation of the smart economy. Bridging the digital divide, ensuring data privacy and security, and addressing the need for investment, skilled workforce development and supportive policies are key steps. Stakeholder collaboration, public-private partnerships and alignment with the UN Sustainable Development Goals offer opportunities for innovation, entrepreneurship and inclusive growth.

In conclusion, the integration of the smart economy into the infrastructure and logistics of the One Belt, One Road project offers immense potential for economic, social and environmental progress. By harnessing the insights and recommendations of different stakeholders, fostering collaboration and addressing challenges, the project can unleash the full transformative power of smart technologies. Continuous monitoring, evaluation and adaptation will be essential to maximise benefits and address emerging trends and opportunities in the rapidly evolving smart economy landscape. The successful implementation of the Smart Economy will not only contribute to the objectives of the project, but will also leave a lasting legacy of sustainable development and connectivity for the regions involved.

References:


Sangeet Paul Choudary (2020). China’s country-as-platform strategy for global influence | Brookings. Available at: https://www.brookings.edu/articles/china-country-as-platform-strategy-for-global-influence/


THE 17 GOALS | Sustainable Development. Available at: https://sdgs.un.org/goals

Received on: 12th of June, 2023
Accepted on: 20th of July, 2023
Published on: 25th of August, 2023