

# TRANSPORTATION: CHALLENGES AND OPPORTUNITIES FOR DEVELOPING SUSTAINABLE FOOD MARKETS (THE CASE OF GEORGIA)

Eter Kharashvili<sup>1</sup>, Badri Gechbaia<sup>2</sup>, Ketevan Goletiani<sup>3</sup>

**Abstract.** *Introduction.* The paper analyses the three pillars of transportation and evaluates the development models of the transportation system. It is evident that transportation plays a crucial role in the development of food markets. The level of transportation infrastructure has a direct impact on the improvement of food accessibility and the process of forming a sustainable food market. Furthermore, transportation can greatly contribute to inclusive economic growth, diversification of exports, introduction of innovations, reduction of costs, minimisation of food losses, and so forth. The allocation of resources towards the development of transportation infrastructure, particularly in relation to the export of Georgian agri-food products to international markets, is regarded as a crucial strategy for fostering sustainable food markets. *Aim and tasks.* The principal aim of this paper is to identify the challenges inherent in the transportation of foodstuffs and to determine the opportunities that will encourage the formation of sustainable food markets. To this end, an analysis of the transportation sector was undertaken. The "urgency-impact" matrix was employed to identify the challenges inherent to the field of food transportation, while the "priorities scheme" was utilised to ascertain the potential avenues for the sustainable development of transportation and food markets. *Research results.* The paper concludes that there is a positive correlation between the indicators of the development of transportation and sustainable food markets. Nevertheless, this is inadequate to affect economic growth. The overcoming of challenges in the research area will facilitate improvements in transportation and the diversification of food markets, particularly in Europe. *Conclusion.* The paper presents conclusions regarding the challenges inherent to the transportation of foodstuffs and proffers recommendations for the advancement of sustainable food markets through the surmounting of these challenges.

**Keywords:** transportation, challenges, development priorities, sustainable food market.

**JEL Classification:** R00, R12, R41, R42

## Abbreviations

SDGs – Sustainable Development Goals

SAIS – sustainable innovation systems

SMEs – small and medium-sized enterprises

UN – United Nations

## 1. Introduction

The role of transport in the development of food markets is of great consequence. The development of transport infrastructure exerts a direct influence on the indicators that reflect improvements in food accessibility and the assurance of safety. It is estimated that logistics costs constitute approximately 50%

of the total expenditure on food, from the initial delivery from the farm to the consumer (European Commission, 2020). Such costs are especially onerous in comparison to the total expenditure of SMEs.

The proportion of such enterprises is considerable, representing over 75% of the agri-food sector in Georgia (Kharashvili et al., 2024). Accordingly, the

<sup>1</sup> Ivane Javakishvili Tbilisi State University, Georgia

E-mail: [eter.kharashvili@tsu.ge](mailto:eter.kharashvili@tsu.ge)

ORCID: <https://orcid.org/0000-0003-4013-7354>

<sup>2</sup> Batumi Shota Rustaveli State University, Georgia (*corresponding author*)

E-mail: [gechbaia.badri@bsu.edu.ge](mailto:gechbaia.badri@bsu.edu.ge)

ORCID: <https://orcid.org/0000-0003-2815-2228>

<sup>3</sup> Batumi Navigation Teaching University, Georgia

E-mail: [k.goletiani@bntu.edu.ge](mailto:k.goletiani@bntu.edu.ge)

ORCID: <https://orcid.org/0000-0002-3074-4794>



identification of challenges in transportation and the assessment of barriers are of great importance for this type of enterprise. Furthermore, it is important to consider that approximately one-third of the population resides in countries that import a significant amount of food. In Georgia, the volume of food imports is three times greater than that of food exports (Ministry of Finance of Georgia, 2024). It follows that for a country whose food security and the effective functioning of its food markets are dependent on food imports, the transportation of food is a necessary condition.

In addition, transport decision-making often transcends institutional boundaries and varies at regional, national and global levels, requiring additional analysis from a food market development perspective. Thus, transport plays a crucial role for the development of food markets, improved food security and inclusive economic growth. Therefore, to develop sustainable food markets, transport research should be carried out on the basis of integrated and coordinated approaches.

## 2. Materials and Methods

Various methods were used for the study, including grouping, relative and average values, graphical representation, analysis, comparison, grouping of homogeneous materials, panel data analysis, and others. A bibliographic study of scientific papers and reports of organisations was conducted; food transportation problems were identified using the impact-urgency matrix; priority areas for the development of transportation were identified using the priority scheme; and in-depth interviews with experts were conducted.

The global food transportation industry is undergoing significant growth and change. A similar trend is evident in Georgia. In particular, during the initial three-month period of 2023, the volume of transportation reached 3.1 million tonnes, representing a 3% increase compared to the corresponding period of the previous year (Nozadze, 2023). In light of these considerations, the establishment of an effective transport infrastructure assumes particular importance. It is posited by scholars that a country with superior transportation infrastructure can produce a greater quantity of food products (Liu, 2017).

The transportation sector exerts a distinctive influence on the evolution of food markets in developing countries. It is for these reasons that researchers concentrate their efforts on three key areas of transportation: firstly, the reduction of climate-related impacts and an increase in export competitiveness; secondly, the assurance of food safety and the reduction of logistics costs and food losses; and thirdly, the resolution of urban issues (Pinto et al.,

2023). Transportation is a pivotal factor in addressing the challenge of food security (Irigoyen, 2014). In the contemporary era, the necessity for the integration of food and transport systems on a global scale is self-evident. Nevertheless, scientists have identified a need to intensify research efforts to mitigate the discrepancy in environmental issues resulting from the expansion of the food industry and transportation (Pothukuchi & Wallace, 2009). The development of food markets and the effective functioning of food supply chains are contingent upon the availability of efficient transportation systems (Kharashvili, 2017).

The transportation sector has the potential to facilitate the growth of food markets while simultaneously advancing the broader Sustainable Development Goals (SDGs) outlined in the 2030 Agenda. In accordance with the SDGs, scientists are investigating the potential for transitioning to sustainable transport systems, with a view to developing a range of models. The introduction of SAIS is regarded as a particularly pertinent measure (United Nations, 2021).

The use of modern vehicles has changed the geography and distance of food supply. Scientists are actively discussing the environmental value of food transport (Transporting food, 2020). In making the best choice from an environmental perspective, socio-economic issues should also be taken into account, which serve the idea of supporting regional business and the growth of small producers.

The transportation system has a marked effect on market accessibility, which is reflected in the growth of agricultural production (Dorosh et al., 2011). Furthermore, it contributes to the enhancement of the general well-being of the population. A one percent increase in market access for a country is associated with a 0.03 percent increase in GDP per capita, according to studies (Bosker & Garretsen, 2012).

The unequal distribution of production and the disparity of regional development (Kharashvili et al., 2021), as well as the production of competitive agro-food products for the global market, represent particularly acute challenges in Georgia (Kharashvili & Talikadze, 2022). Accordingly, these characteristics must be taken into account when evaluating potential development models for the transport system (United Nations, 2021). Furthermore, innovative development factors should also be considered (Kharashvili & Aduashvili, 2022).

Furthermore, scholars are examining the implications of interventions and information technologies on transportation systems (Ballarano et al., 2022).

The present research has identified the impediments to the development of sustainable food markets, specifically in relation to the transportation of food products. Food transportation is regarded as a significant challenge for producers, with studies

indicating that producers prioritise income growth through local sales (Peterson et al., 2010). Recent studies have also identified the primary transportation challenges confronting developing countries (Peltier-Thiberge & Van Den Berg, 2023). It would be prudent to ascertain the priorities of transportation and to develop a corresponding policy (Kharashvili & Gechbaia, 2023).

### 3. Results and Discussion

The transportation of food is a key aspect of logistics and supply chain management, with a significant impact on the efficient functioning of food markets. The trends in the global food transportation market, together with the analysis of the projected outcomes, indicate that by 2028, there will be a growing trend in the industry across all continents, in terms of both the modes of transport used and the types of food being transported (Global Food Transport Market, 2022). The projected average growth rate of the global food transportation market for the period 2021-2028 is 4.2% (Global Food Transport Market, 2022). The growth of the food industry, an increase in demand for processed products, rising consumer awareness of the significance of consuming healthy products with high nutritional value, and an expansion in the income of major corporations are the primary factors contributing to the expansion of the food transportation industry. By 2028, the market value of food product transportation is projected to reach 225.14 billion USD (Heller, 2017).

Europe dominates the food transport market. Owing to the growth and expansion of the logistics

industry in the region, Europe is expected to maintain its dominant position in the food transport market over the forecast period. On the other hand, due to the growing demand for food in Asia Pacific, globalisation, changing lifestyles, growth and expansion of the agricultural industry, rising incomes and other factors, the food transport market is also expected to grow.

It seems reasonable to posit that the key drivers of the market will include the increasing level of population and the food industry, the trend of increasing demand for food, changes in consumer preferences, and the introduction of advanced technologies in transportation. Furthermore, the advancement of the market will be facilitated by the ongoing enhancement of the e-commerce sector, the evolution of delivery models, and the developments in the logistics of food markets.

Furthermore, the transportation of food is also experiencing growth in Georgia. Road transportation represents the largest proportion (71.9%) of the total transportation market, while rail transportation accounts for 2.7% and air transportation the smallest proportion (0.9%) (see Figure 1).

Interviews with transportation managers revealed that, at the present time, transportation companies are experiencing considerable difficulties, including increased costs for transportation services. Furthermore, it was highlighted that the discrepancy between Georgian legislation and the regulations of other countries represents a significant challenge for transportation companies.

An analysis of the current structure of the transport supply chain in Georgia, assessing the role of producers, distributors, intermediaries, warehouses and other

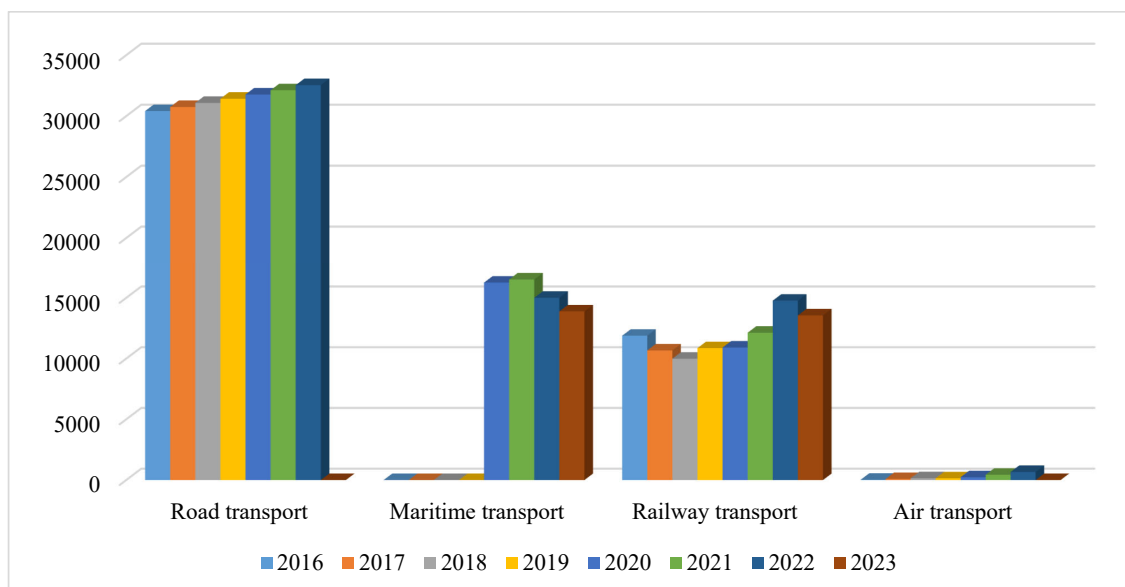


Figure 1. Freight transportation by type of transport in Georgia (thousand tonnes)<sup>1</sup>

<sup>1</sup> National Statistics Office of Georgia (2022). Statistical Yearbook of Georgia, 191. <https://www.geostat.ge/en/single-archive/3383>

actors, showed that reducing the time of delivery of agri-food products from production to consumers is one of the most important challenges for the country (Kharaiashvili & Aduashvili, 2023). Furthermore, highly competitive food markets are present in European and Asian countries. Consequently, the primary objective for any country and its producers is to supply competitive products to the market.

In discussing the upward trajectory of transportation costs, experts have highlighted the interconnectivity between this phenomenon and its ramifications for food prices. It is the view of experts that the government should take action to ensure that the rise in transportation costs does not have a significant impact on food prices (Katamadze, 2022).

Rising transport costs primarily affect food prices and are related to the safe supply of food to the population. Therefore, it is necessary to use public policy instruments in this area to implement the policy of keeping food prices in check. The challenges in the food transportation sector were grouped according to the urgency-impact matrix (see Figure 2).

The following problems were identified in the field of food transport in Georgia:

- (1) High transport costs;
- (2) weak political support and inconsistency of Georgian regulations with those of other countries;
- (3) the policy of keeping food prices down in the face of rising transport costs;
- (4) small number of innovative transport companies;
- (5) lack of information on transport and food markets;
- (6) low level of digitalisation.

The matrix demonstrates that the further an identified problem is situated to the right and above the coordinate plane, the more detrimental its impact on shipments is likely to be and the more imperative it is to address the issue promptly.

One of the ways to develop Georgia's food markets is to invest in transport and prioritise transport infrastructure, especially in the case of delivering Georgian agri-food products to international markets

(Kharaiashvili & Natsvlishvili, 2019). Furthermore, it is crucial to identify the most appropriate mechanisms for the development of transport infrastructure, with due consideration given to the evolving perspectives of food market development. The implementation of this conceptual framework for transportation development will facilitate the diversification of food markets. This viewpoint was also corroborated by the findings of in-depth interviews with experts. The following priorities for transportation and market development were identified through the application of the "scheme of priorities" and the grouping of homogeneous materials. These priorities are as follows: (1) the promotion of investments; (2) the creation and/or improvement of the regulatory framework and its harmonisation with the regulations of other countries; (3) the utilisation of price discrimination tools for food transportation; (4) the development of databases of innovative transportation companies and food markets; (5) the digitisation of the data of transport systems and transport corridors; (6) the identification of financing mechanisms for maintaining a unified chain of transportation and food markets, and so forth.

In order to facilitate the growth of food markets, it is essential to enhance accessibility to information regarding market conditions and appropriate modes of transportation, and to eradicate the current information deficit. The provision of comprehensive information packages to beneficiaries, accompanied by an increase in the frequency of delivery, will enhance the efficiency of food transportation and facilitate the expansion of food markets.

The selection of an appropriate pricing mechanism should take into account the potential impact of subsidies or taxes on transportation and the associated behavioural patterns. For instance, subsidies for food transportation or fuel tax subsidies may warrant consideration.

It can be observed that there is a positive correlation between the indicators of food production and

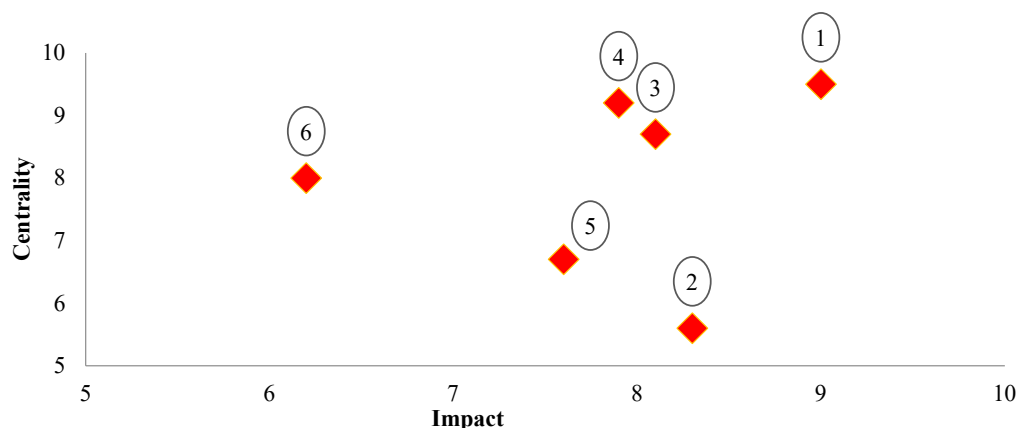


Figure 2. COD transportation challenges in Georgia (by "urgency-impact" matrix)

transportation. However, this does not necessarily have a significant impact on economic growth. In order to achieve inclusive economic growth, it is essential to implement effective transport stimulation mechanisms. The selection of these mechanisms should be based on the perspectives of food market development. The development of an efficient transportation model will have a positive impact on the formation of sustainable food markets, thereby facilitating market diversification, particularly in European countries.

#### 4. Conclusions

Food transport in Georgia is not in line with the SDGs set out in the 2030 Agenda. The transport market has an asymmetric transport infrastructure, and the role of transport in inclusive economic growth is small. Transport is critical for achieving food security and developing food markets. Therefore, identifying transport challenges will have a positive impact on the development of sustainable food markets.

The transportation companies of Georgia are unable to compete with their international counterparts. The integration of international and regional transportation systems will assist Georgian transportation companies in adapting to the competitive environment, thereby facilitating their involvement in international transportation on a larger scale.

In order to achieve this, it is essential to gain political support for the transportation of food. It is crucial to align the regulatory framework and standards with those of other countries, particularly those of European countries, and to develop suitable financing mechanisms to ensure a unified chain of transportation and food markets. Furthermore, the underdevelopment of transportation and technological systems gives rise to a considerable proportion of transportation costs within the total costs incurred, which in turn gives rise to an increase in food prices and a reduction in market share. The utilisation of innovative transportation and technology in the food industry will result in increased economies of scale and a reduction in the proportion of transportation costs.

The food transportation system exhibits a notable deficiency in innovative transportation infrastructure and a corresponding lack of digital technology implementation. In order to further enhance the transport infrastructure, it would be prudent to encourage investment in the fields of transportation and logistics. It would be prudent to implement the digitisation of the transport system, transport corridor, and food markets in Georgia in the near future.

The overcoming of challenges in food transportation will facilitate the formation of sustainable food markets and encourage the diversification of food markets, particularly in European countries.

#### References:

- Ballarano, D., Patella, S. M., & Asdrubali, F. (2022). Sustainable Transportation for Events: A Systematic Review. *Sustainability*, Vol. 14(23), p. 15815. DOI: <https://doi.org/10.3390/su142315815>
- Bosker, M., & Garretsen, H. (2012). Economic Geography and Economic Development in Sub-Saharan Africa. *The World Bank Economic Review*, Volume 26, Issue 3, 2012, Pages 443–485. DOI: <https://doi.org/10.1093/wber/lhs001>
- Dorosh, P., Wang, G. H., You, L., & Schmidt, E. (2011). Road connectivity, population, and crop production in Sub-Saharan Africa. *Agricultural Economics*, Vol. 43(1), p. 89–103. DOI: <https://doi.org/10.1111/j.1574-0862.2011.00567.x>
- European Commission (2020). A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system. Available at: [https://eur-lex.europa.eu/resource.html?uri=cellar:ea0f9f73-9ab2-11ea-9d2d-01aa75ed71a1.0001.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:ea0f9f73-9ab2-11ea-9d2d-01aa75ed71a1.0001.02/DOC_1&format=PDF)
- Global Food Transport Market – Industry Trends and Forecast to 2028 (2021). Data Bridge Market Research. Available at: <https://www.databridgemarketresearch.com/reports/global-food-transport-market#:~:text=Market%20Analysis%20and%20Insights%20of,forecast%20period%20of%202021%2D2028>
- Heller, M. (2017). Food Transportation – Executive Summary: Environmental Footprint Literature Review. A report by: *the Center for Sustainable Systems, University of Michigan*. Available at: <https://www.oregon.gov/deq/FilterDocs/PEF-FoodTransportation-FullReport.pdf>
- Irigoyen, J. L. (2014). *To feed the future, let's make logistics and transport sustainable*. World Bank Blog. Available at: <https://blogs.worldbank.org/en/transport/feed-future-let-s-make-logistics-and-transport-sustainable>
- Kharaishvili, E. (2017). Directions for Improving the Supply Chain in the Agro-food Sector of Georgia. In *Foresight management: formation and transformation adaptive business organizations. International collective monograph*, Volume 2, Section 6, 6.2: 268.
- Kharaishvili, E., et al. (2024). Digital Transformation in Small and Medium-Sized Enterprises: Approaches and Challenges (Focus: Agricultural Sector of Georgia). *Medicon Agriculture & Environmental Sciences*, 6.1: 16–26, ISSN: 2972-2691.
- Kharaishvili, E., & Aduashvili, L. (2022). The importance of innovation in vegetable production and management (The example of Georgia). Kyiv, 16 November,

- Kharaishvili, E., & Aduashvili, L. (2023). Digital Agricultural Development Trends in Georgia. Ministry of Education and Science of Ukraine, Kyiv National Economic University named after Vadym Hetman, Economics and Management Faculty, Management Department, 4th International Scientific Student Conference «Management: Challenges and Prospects», November 17, p. 72–74.
- Kharaishvili, E., & Gechbaia, B. (2023). The Impact of Sustainable Transportation on the Development of Food Markets. *Journal Innovative Economics and Management*, Vol. 10 No. 2, p. 129–139. DOI: <https://doi.org/10.46361/2449-2604.10.2.2023.129-139>
- Kharaishvili, E., Gechbaia, B., Mushkudiani, Z., Goletiani, K., & Tsilosani, A. (2021). Challenges of sustainable and equal development of regions in Georgia. *Second International Conference on Sustainable Futures: Environmental, Technological, Social and Economic Matters (ICSF 2021)*. DOI: <https://doi.org/10.1051/e3sconf/202128011007>
- Kharaishvili, E., & Natsvlishvili, I. (2019). Markets of Georgian Agro-food Products and Export Stimulating Economic Policy. *Journal of Globalization and Business*, Vol. 8.
- Kharaishvili, E., & Talikadze, N. (2022). Competitiveness characteristics of agri-food products – what does the consumer choose? (Case of Georgia). *Innovative Marketing*, Vol. 18(1);, p. 195–207.
- Katamadze, G. (2022). Business entity's preventive-anti-crisis strategy model and possibilities of its implementation in Georgia. *Economics. Ecology. Socium*, Vol. 6(2), p. 38–45. DOI: <https://doi.org/10.31520/2616-7107/2022.6.2-4>
- Sanikidze, H. (2021). Factors hindering the development of agricultural cooperatives in Georgia. *Economics. Ecology. Socium*, Vol. 5(3), p. 29–38. DOI: <https://doi.org/10.31520/2616-7107/2021.5.3-4>
- Liu, S. (2017). Transport and agricultural productivity: A cross-national analysis. *2Research on Modern Higher Education* 2, 01012. Available at: [https://www.researchgate.net/publication/314219295\\_Transport\\_and\\_agricultural\\_productivity\\_A\\_cross-national\\_analysis](https://www.researchgate.net/publication/314219295_Transport_and_agricultural_productivity_A_cross-national_analysis)
- Ministry of Finance of Georgia (2024). *Export-Import Information, Taxation System*. Available at: <https://www.mof.ge/en/4685>
- National Statistics Office of Georgia (2022). *Statistical Yearbook of Georgia, 191*. Available at: <https://www.geostat.ge/en/single-archive/3383>
- Nozadze, G. (2023). *Transport shipments have increased in Georgia*, Business Insider Georgia.
- Peterson, H. H., Selfa, T., & Janke, R. (2010). Barriers and Opportunities for Sustainable Food Systems in Northeastern Kansas. *Sustainability*, Vol. 2(1), p. 232–251. DOI: <https://doi.org/10.3390/su2010232>
- Peltier-Thiberge, N. & Van Den Berg, R. (2023). *5 Key Transport Challenges Facing Developing Countries and What to Do About Them*. TheCityFix. Available at: <https://thecityfix.com/blog/5-key-transport-challenges-facing-developing-countries-and-what-to-do-about-them/>
- Pinto, A. M., Calatayud, A., Scholl, P. L., Lee, S., & Acosta, C. D. (2023). *Ensuring Food Security through Better Transport and Logistics*. Moviilblog. Available at: <https://blogs.iadb.org/transporte/en/ensuring-food-security-through-better-transport-and-logistics/>
- Pothukuchi, K., & Wallace, R. (2009). Sustainable Food Systems: Perspectives on Transportation Policy. In S. Malekafzali (Ed.), *Healthy, Equitable Transportation Policy: Recommendations and Research* Oakland, CA: Policy Link, Prevention Institute, and Convergence Partnership: 113–129.
- Transporting food (2020). Alimentaryum. Available at: <https://www.alimentaryum.org/en/fact-sheet/transporting-food>
- United Nations (2021). *Sustainable transport, sustainable development*. Interagency report for second Global Sustainable Transport Conference. Available at: [https://sdgs.un.org/sites/default/files/2021-10/Transportation%20Report%202021\\_FullReport\\_Digital.pdf](https://sdgs.un.org/sites/default/files/2021-10/Transportation%20Report%202021_FullReport_Digital.pdf)

Received on: 18th of September, 2024

Accepted on: 21th of November, 2024

Published on: 17th of December, 2024