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## Economic and Information Support of Technological Integration with the use of “Green” Traffic Flows

Maxim Miller<sup>a,b,\*</sup>, Lyudmila Davidenko<sup>c</sup>

<sup>a</sup>*Institute of Economics and Industrial Engineering of the Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia*

<sup>b</sup>*Omsk State Technical University, Omsk, Russia*

<sup>c</sup>*Innovative University of Eurasia, Pavlodar, Kazakhstan*

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### Abstract

The article deals with the issues of the “green” economy in transition to environmentally friendly modes of transport. Based on the generalization of approaches to organizing optimal traffic flows, measures are proposed for the technological integration of interconnected industrial companies. The research uses official statistics of European countries, information from Russian and Kazakh integrated economic structures, which in their technological process emphasize “green” traffic flows as an independent business process.

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**Keywords:** technological integration; green economy; green transport.

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### 1. Introduction

In a “green” economy technological integration increasingly began to get features of a dynamic process of transforming flows of production resources in the form of new technologies at the level of integrated economic structures with the use of reserves of internal and external development. Logistics and optimal transport flows can reduce the costs of large Russian and Kazakh industrial companies by 15 - 20%; it is in this corridor that the costs of transporting intermediate products for their further processing vary. Global environmental requirements based on the reduction of air emissions and the use of renewable energy sources have affected the transport and transportation sector. As the experience of European companies and their partners in Russia, Kazakhstan shows, platform integration between industrial and transport corporations, the banking sector, and the government will allow the world economy in the next five years to become a “low-carbon” economy, despite the oil and gas crisis that intensified during pandemics.

### 2. Materials and methods

The proposed conceptual foundations of economic and information support for technological integration with the use of “green” traffic flows include generalized methods of scientific research, tested by the practice of functioning of domestic and foreign integrated industrial complexes; principles of reliability, objectivity, causality of economic phenomena. Methods of economic and statistical

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\* Corresponding author. Tel.: +7-913-969-0204.

E-mail address: millerma@yandex.ru

analysis (time series, structural analysis), the method of graphical illustration of data, and sample observation are used to study trends in the development of a “green” economy. The development of the concept of economic and information support of technological integration with the use of “green” traffic flows is facilitated by the systematization of scientific approaches and measures of influence on technological integration

### 3. Results

The transition to the use of “green” transport flows is associated with the need to inject capital into projects for the modernization of transport routes, which, in the context of global partnership, affect the interests of individual companies and countries. Global practice offers a form of green finance for technological growth to ensure better environmental outcomes. This form of finance is a collection of debt and investment vehicles that are used to encourage the development of green projects or minimize the climate impact of traditional projects; these include investment projects in the areas of renewable energy and energy efficiency, pollution prevention and control, biodiversity conservation, maintaining a circular economy, sustainable use of natural resources. “Green” financing of investment projects is an innovation, therefore statistics of countries that open access to national “green” credit lines show that only 5–10% of the total volume of issued bank loans belongs to the class “green” finance (World Economic Forum, 2020.)

Industrial companies are connecting centers and major players in the development of logistics routes. The instability of the external environment, growing consumer demands on environmental issues, the economic crisis in certain industries, the consequences of economic sanctions do not allow to fully recover and increase the rate of industrial production in the world's leading countries, which have the highest potential for technological growth (Fig. 1).

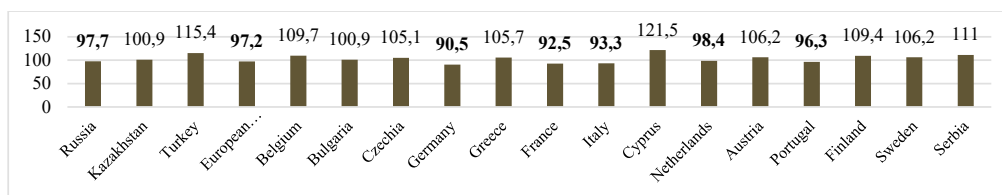


Fig. 1. Volume Index of Production in 2020, percent's. Index, 2015=100. Source - Authors using (Eurostat, 2021a; Federal State Statistics Service of the Russian Federation, 2021; Agency for Strategic planning and reforms of the Republic of Kazakhstan Bureau of National statistics, 2021).

The experience of European companies shows that economic entities are the main initiators of environmental payments to the budget; in some cases, fees reach about 10%, which also stimulates the development of “green” projects, including the production of “clean” industrial and passenger transport, “smart” infrastructure (Fig. 2).

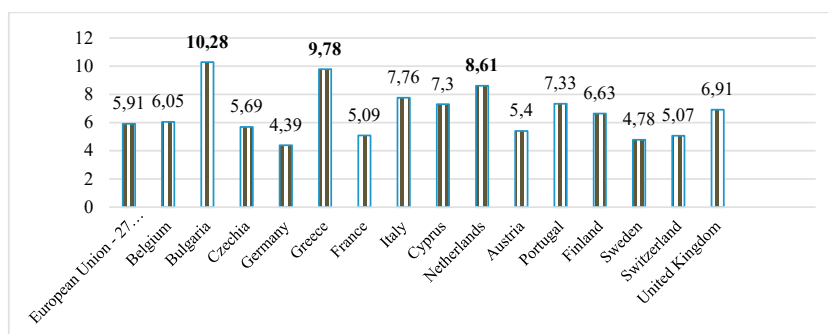


Fig. 2. Share of environmental taxes in total tax revenues in 2019, percent's. Source - Authors using (Eurostat, 2021b).

According to experts, the cheapest and relatively “green” modes of transport include railway and water transport, which are able to ensure uninterrupted supply of goods with minimal carbon dioxide emissions. At the same time, the main factors in choosing the elements of industrial logistics are geographical advantages and the degree of development of digital traffic management. As statistics show, about a third of European countries use railway and port routes in the total volume of freight traffic (Fig. 3).

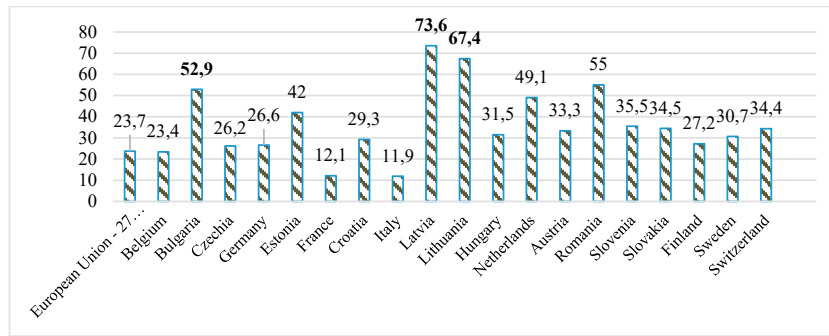


Fig. 3. Share of rail and inland waterways in total freight transport in 2019, percent's. Source - Authors using (Eurostat, 2021c).

#### 4. Discussion

Despite the differences in the level of technological development, accessibility to funding sources, it is possible to give a generalized picture of the economic and information support of technological integration with the use of “green” transport flows. Fundamental differences are found in the definition of “centers of responsibility”, while the direction of information flows can be characterized as a multilateral connection between all participants of the integration (Table 1).

Table 1. Conceptual approaches to economic and information support of technological integration using “green” traffic flows. Source – Authors.

Scientific approach of Authors	Object, partners	Authors
Combination of values related to technological, organizational and environmental factors in the adoption of “green” practices	Resource support, internal business processes of companies	Ali Erbas, Gokhan Akandere (Erbas and Akandere, 2020)
Development of low-carbon transport systems based on information technologies in transport in the context of international cooperation	Transport routes in international logistics	Quansheng Huang (Huang, 2017); Luka Vukic, Tanja Poletan Jugovic, Giambattista Guidi, Renato Oblak (Vukic et al., 2020)
Continuous maintenance of the life cycle of “green” systems	Financial, economic and socio-environmental aspects of transport infrastructure	Catarina Melo, Ines Teotonio, Cristina Matos Silva, Carlos Oliveira Cruz (Melo et al., 2020)
Optimization based on the analysis of “green transport chains” (GTCs)	Information system of environmental control between cargo owners and transport companies (fixing the level of greenhouse gas emissions and energy efficiency)	Bojan Beskovnik, Marina Zanne, Tatjana Dlabac, Spiro Ivosevic (Beskovnik et al., 2020)
Ensuring sustainability in freight and logistics	Strategic vision for “green” traffic flows by establishing sustainable development leadership through “green” governance	Piera Centobelli, Roberto Cerchione, Emilio Esposito, Shashi (Centobelli et al., 2020)

#### 5. Conclusions

The modern economic situation has specific features that are inherent in complex economic systems during the transition period:

- Volatility of the main commodity markets, a drop in effective demand for hydrocarbons and metals;
- Destruction of old and formation of new ties between participants in economic activity that go beyond industries, regions, countries;
- A shift in priorities from achieving the parameters of economic security of individual participants in economic processes to ensuring global economic and environmental security on a planetary scale.

It is undeniable that effective management of integrated economic structures is impossible without taking into account the general

ties in the process of production and sales of products. Making the transition to a sustainable management system for technological integration, we consider it necessary to regularly study the issues of environmental sustainability in the field of industrial production and logistics, “green” transport flows, which are caused by the global challenges of the economic crisis in the oil sector of the world economy, a sharp deterioration of the ecological situation on a planetary scale, as well as restrictions on foreign financing of innovative ideas, technologies and developments.

It can be stated that the emerging trends represent a response from the population, government agencies, business entities to the challenges of a socio-economic nature, including the “green” economy, which, like global economic development projects, has spread throughout all countries.

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