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Ecological incentives as a component of rail freight's expansion potential

Abstract: The aim of this article is to present the results of a survey, conducted among entrepreneurs and managers responsible for transport and logistics, relating to the role of environmental factors in shaping the transport market. Analysis of the results allows for an assessment of the current and future importance of environmental issues affecting the transport market. The text includes a brief introduction, a description of the research methodology and a presentation of the results and observed trends. It concludes with a summary, indicating the evolution of the elements determining transport contracting and the resulting growing development potential for rail transport.

Keywords: Sustainable Transport; Green Supply Chains; Climate Policy; Freight Rail Development

Introduction

Sustainable development policy is interdisciplinary and requires the involvement of various sectors of the economy, stakeholder groups, and management levels. This process cannot be carried out only by the public sector; it also needs the involvement of society and entrepreneurs. This is also true for logistics and transport [1].

In Polish conditions, the only commonly available alternative to car transport is the railway. Thanks to its high transport capacity and technology characterized by low specific energy demand, it helps reduce air pollution and related climate change. At the same time, it also contributes to reducing the number of accidents, noise, and congestion, and as a result, it burdens the natural environment and society to the smallest extent. Therefore, the development of railways is becoming an increasingly important element of the policy of decarbonization of the economy and energy transformation [2].

In connection with the above, it is worth noting that the role of public authorities in creating sustainable transport systems is a fairly common topic in professional and scientific literature. This issue, from the perspective of international, national, regional, and local policy, is the subject of regular analysis. They refer, among others, to K. Nowicka 2020 [3], A. Pomykała and J. Raczyński 2020 [4], B. Przybylski 2021 [5], Majewski and Zych-Lewandowska 2021 [6]. At the same time, the literature on the subject develops the concepts of building new models of logistics businesses and designing them in terms of reducing the negative impact on the environment. In this case, we talk about "green," "sustainable," "responsible, or "ecological" supply chains [7]. Relatively few publications and studies include the assessment of the expectations of transport recipients, i.e., entrepreneurs. The empirical material developed and described in this article may help, at least partially, to fill the indicated gap.

Purpose and scope of the analysis

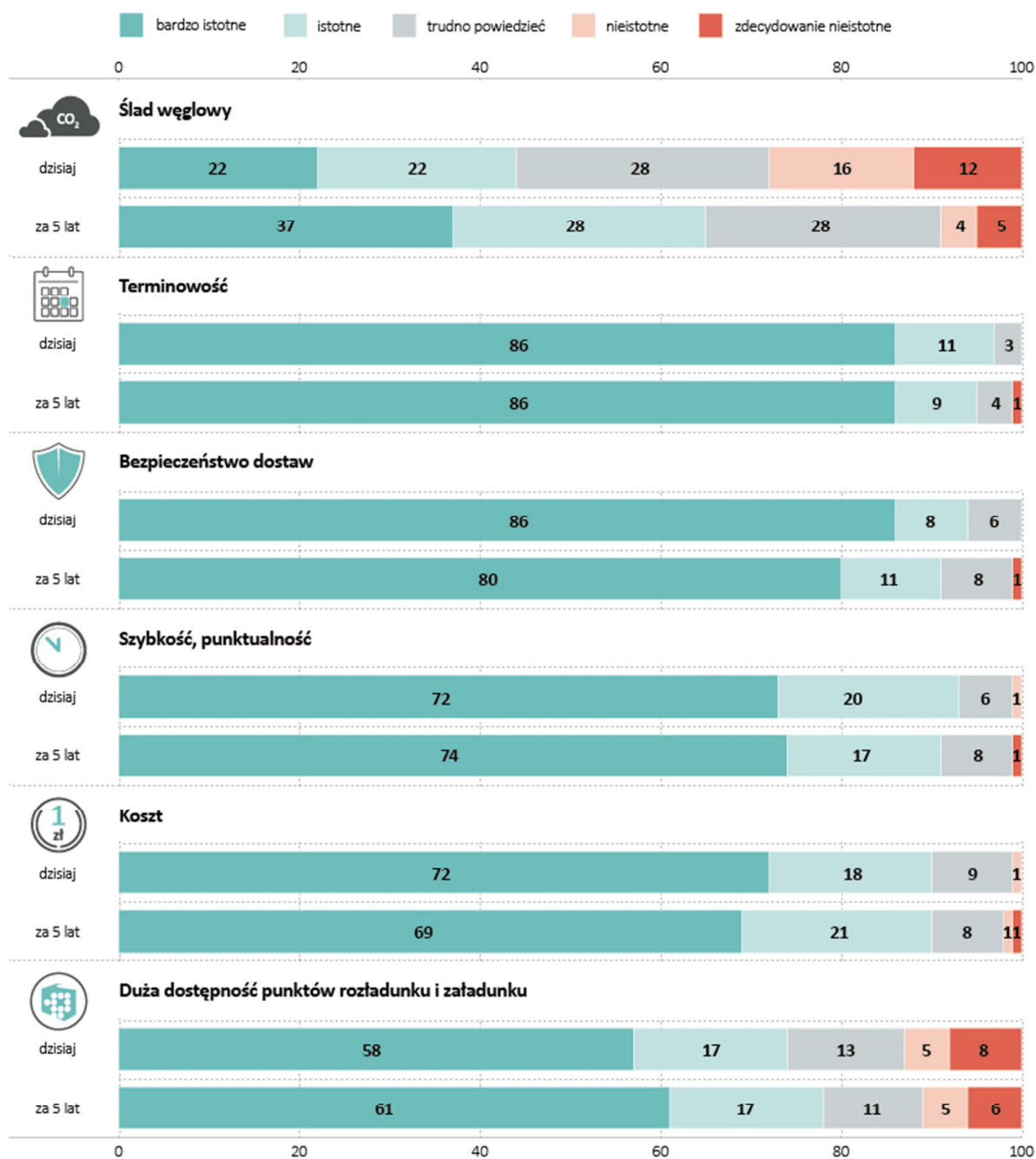
The majority of modern economic activity involves the need to move loads and people, which has a negative impact on the surroundings and the natural environment. For this reason, transportation is perceived not only as a growth stimulator but also as a generator of many

problems and threats. Hence, more and more attention is paid to the links between transport and the quality of life, the state of the environment, or the level of traffic safety [5].

The main objective of this article is to assess to what extent ecological incentives are currently and will be in the future an element promoting the choice of rail freight transport. The results of research carried out on a nationwide sample of over 100 large enterprises, i.e., business entities employing at least 250 employees and generating turnover exceeding PLN 200 million per year, were used for the analysis. The data was obtained by means of questionnaire interviews conducted among persons sitting on management boards or managers of logistics departments.

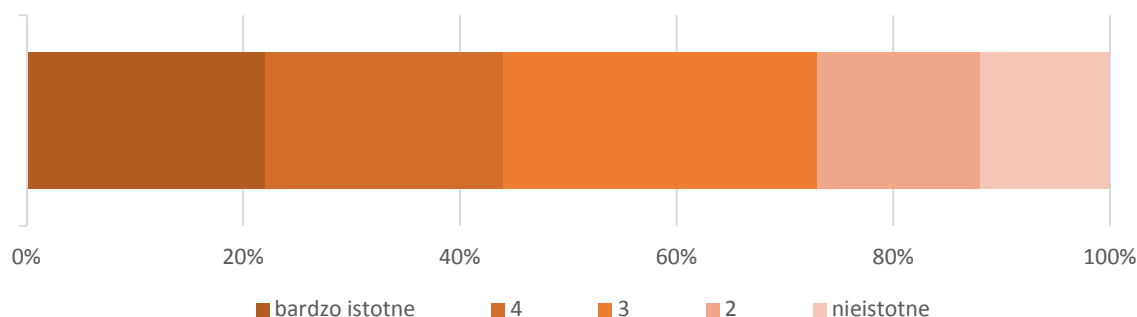
Entrepreneurs' expectations

Almost all industrial enterprises operating in the modern economy use transport services, including freight transport, to a greater or lesser extent. Most of them use transport to supply raw materials, materials, and components and to handle deliveries and shipments. Research shows that for the vast majority of companies ordering transport services, timeliness and security of delivery are the most important criteria for choosing an offer. These two key elements were indicated as very important by as many as 86% of respondents. The speed and punctuality of order execution and their cost are also of great importance (72% of the answers were marked as "very important"), as are the high availability of unloading and loading points (58%). These factors are indicated as significant now and in the horizon of 5 years.



1. Elements determining the choice of means of transport of goods [% of answers]

The described expectations of entrepreneurs do not fit into the concepts of managing supply chains sustainably and respecting environmental resources [3]. Research shows that the approach to the impact of transport on the environment, and specifically the carbon footprint generated by its branches, is gradually starting to change. For two-thirds of companies, the issue of reducing the carbon footprint will be more important in the future than it is now. While today it is very important only for 22% of entrepreneurs, in five years, 65% of the surveyed entities declare a strong or increased interest in the subject



2. Answers to the question about the importance of ecological criteria when choosing a means of transport [% of answers]

It is worth noting that significant differences appear in this case between the answers given by representatives of individual industries. Companies from the plastics and metals sector turned out to be particularly interested in reducing the negative impact of transportation. For as many as 78% of them, the carbon footprint in the future will be more important than it is now. The explanation for this phenomenon may be the fact that the plastics industry is perceived as one of the main emitters of pollution, and, among others, for this reason, it intensively promotes regulations aimed at intensifying the recycling of plastic. Its representatives, more than those in other sectors, are aware of the need to increase activity in the field of broadly understood environmental protection.

The characteristics of the results for the FMCG industry and the machine and vehicle construction sector were similar. In both cases, respondents' responses indicate that the carbon footprint of the future will matter more than it does today for 67% and 65% of respondents respectively.

The growing role of ecological incentives

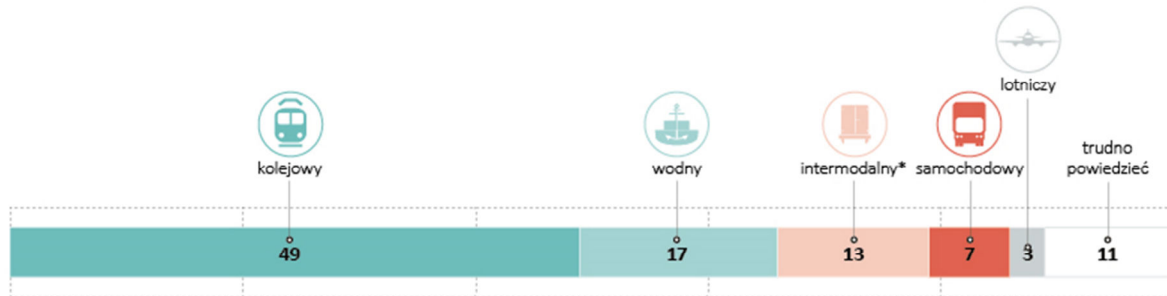
Motivations to reduce the environmental impact at the level of enterprises and their transport operations have two main sources: external (resulting from general regulations and laws) and internal (reflecting the company's policy and values). Interest in implementing environmentally friendly transport solutions may be a derivative not only of public regulations but also of one's policy, e.g., in the field of corporate social responsibility (CSR). An additional stimulus may be the desire to achieve a competitive advantage in the eyes of consumers or business partners interested in ecology.

In the surveyed group, 43% of enterprises reported carrying out ecological activities in the area of transportation, but the same percentage did not. By far the largest number of companies, i.e., 65%, fulfilled this obligation due to international or national regulations. Customer-imposed requirements, indicated by 27% of respondents, were ranked next. At the same time, half of the respondents declared that they were not obliged to comply with the requirements regarding ecology in the field of transport of goods, raw materials, and production components.

In the group of internal motivations supporting emission reduction, an important group was the financial benefits resulting from savings and reduced resource consumption. Only one in five companies was also interested in factors such as CSR, goals of its development strategy, or requirements imposed by the headquarters or corporation. Both external requirements, especially those relating to national and EU legal regulations, and internal requirements were much more often indicated in the case of enterprises already using rail transport.

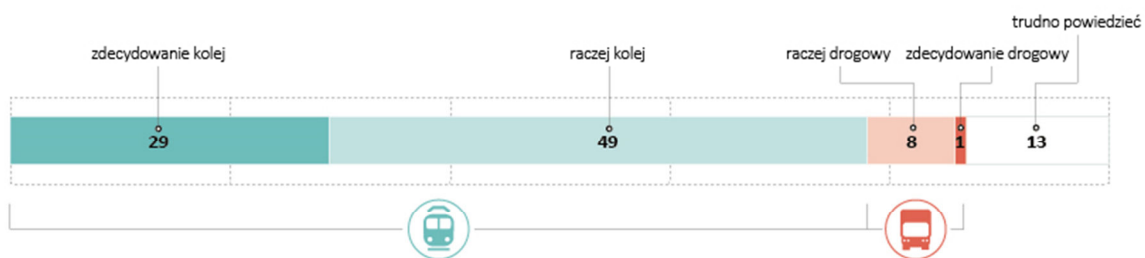
Railway as a tool for reducing the carbon footprint

The responses of almost half of the surveyed companies showed that the railway is already perceived as the most ecological and least polluting means of transport. 49% of respondents indicated that it has an advantage over other forms of transport in this respect.



3. Answers to the question about the most ecological form of transport [%]

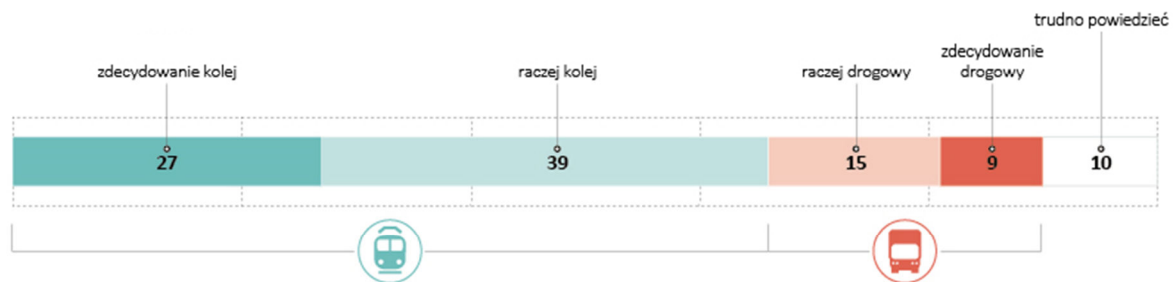
The surveyed entrepreneurs also assessed that rail, not road transport, will achieve a zero carbon footprint faster. This scenario was strongly favored by 29% of respondents, and the probability that it would be rather so was indicated by 49% of respondents.



4. Answers to the question of which type of transport will reach zero emissions faster [%]

These proportions were even clearer among companies that already outsource rail transport. The answers "definitely railway" and "rather railway" were selected by a total of 85% of respondents. What's more, the railway was indicated as a leader in the emission reduction process by as many as 90% of companies from the plastics and metals industry, 78% of respondents involved in the production of wood, paper, and furniture, and 70% of entrepreneurs representing the construction industry.

As a result, entrepreneurs expected a priority approach to the development and promotion of rail transport, which was indicated by 66% of respondents.



5. Answers to the question of which type of transport should be developed and promoted in the first place [%]

As in the previous answers, the situation is slightly different among companies ordering rail transport but not using its services. The former is much more often postulated: rail transport in Poland should be developed and promoted more than road transport. The answers “definitely railway” and “rather railway” were given in individual groups in 74% and 58% of cases, respectively.

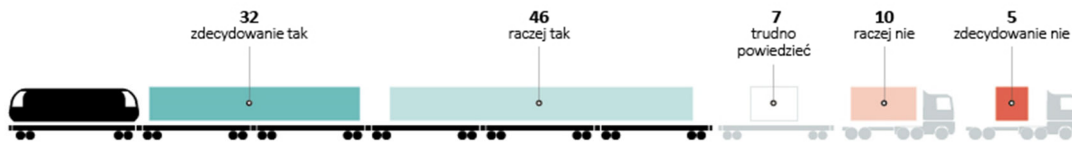
The mining, energy, and fuel industries strongly supported the development of the railway. 75% of representatives of these sectors gave it priority over road transport. The support of companies representing the construction, machinery, and vehicle industries as well as plastics and metals looked similar.

The potential of railways in creating ecological value

Given the growing interest in solutions reducing the negative impact on the environment, in the second stage of the research, it was verified to what extent the choice of railways can be an element of building sustainable logistics chains. The respondents unanimously pointed out that the railway needs to strive for climate neutrality. According to 32% of companies, the implementation of this goal will improve the attractiveness and competitiveness of the industry, and according to 46%, it will “probably” improve it.

Equal opinions on this subject were also indicated by the answers to the question of whether companies would be interested in increasing the transport of goods based on rail if this sector was mostly powered by renewable energy sources. In this case, positive indications were 42% and negative indications were 43%.

At the same time, it is worth noting that the group of respondents who have doubts in this matter does not mean that the carbon footprint of transport is not important to them. Among the reasons for the lack of interest in railways, objective factors were mentioned, including limited access to the appropriate infrastructure. As many as 34% of the respondents who are not interested in increasing the transport of goods by rail indicated a lack of access to stations and sidings as well as problems with the organization and handling of transshipment. Further, the fragmentation of customers, the characteristics of cargo, too small scale of operations, the limited volumes of shipments, as well as conditions on the side of the customer and suppliers who use other means of transport and possible changes, would require coordination of many entities, were also mentioned. Although taking into account the above factors, it can be assumed that with the development of infrastructure and improved access to transport services, the interest in this most ecological means of transport should increase.



6. Answers to the question of whether achieving climate neutrality will improve the attractiveness and competitiveness of railways [percent]

In the opinion of entrepreneurs, achieving climate neutrality by the railway, while maintaining the same transport costs, will be an incentive to transfer more cargo to the tracks. Among the companies that already use rail transport, such a declaration was indicated by as many as 46% of the respondents.

The construction industry and the machine and vehicle construction industry turned out to be sectors particularly awaiting such a change. As many as 61% of the companies representing them would be willing to transfer a larger volume of their transport to the tracks.

Summary

When analyzing the opinions of entrepreneurs collected in the survey, it is worth referring them to a broader context, including statistics on greenhouse gas emissions by individual types of transport. According to the most recent one, which was conducted in 2018 and covered all of the European Union's member states, only 0.5% of the greenhouse gas emissions produced by the transportation industry in the Community are attributable to railways. For comparison, road transportation produced 71% of CO₂, civil aviation 14.4%, and sea and inland shipping 13.5%.

As a result, many companies view the railway as an environmentally friendly mode of transportation with a chance to be the first to achieve complete climate neutrality and compete with high-emission road transportation.

It is essential to keep in mind that private companies and households will make the majority of sustainable investments during the decade to come.

Therefore, the changes cannot only concern the public sphere but must also involve private investors [4].

The future business model, based on green supply chains, must be characterized by low emission of pollutants and thus take into account environmental protection in the entire economic process, starting from the acquisition of material, linking individual production chains, and ending with the delivery of the final product. Sustainable logistics will require a new look at the processes carried out by enterprises and taking into account all costs: financial, social, and environmental. This means including the environment among the key production factors that need to be managed rationally [8].

The results of the study presented in the article indicate that managers making decisions in the field of logistics are aware of the potential offered by the railway in the context of reducing environmental pressure and building green logistics chains. As a result, entrepreneurs expect wider support for this form of transport and predict that they will use it more often than at present. This means that thanks to the environmental policy, the railway gains additional development stimuli, becoming not only in Europe but also in Poland, an important element on the way to sustainable logistics.

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