The principle of the extended responsibility in the formation of multimodal transportation attractiveness

Abstract. It has been proved that the principle implementation of the enhanced liability in the activity of the industrial enterprises of Ukraine covers its implementation in the supply chain that protects the manufacturer’s responsibility for the entire product life cycle. It has been justified that one of the ways to increase responsibility of supply chain is to use multimodal transportation, which provides an effective combination of multiple transport types, optimises the delivery time, reduces storage costs, the total cost of transportation and provides a reduction of the amount of harmful emissions into the air. It has been proved that the internalisation of environmental costs in the final cost of the product or service reduces the negative impact on the environment and promotes the use of environmentally friendlier modes of transport in the supply chains. In the second half of 2015 the authors conducted an online survey among service managers of 30 transportation services enterprises. The survey showed that 45±3% of the respondents provide transportation outside Ukraine; only 30±2.5% give priority to compliance with European emission standards, while 40±3% of the respondents consider it necessary to develop the market of multimodal transportation in Ukraine.

Keywords: Principle of Responsibility; Multimodal Transportation; EU Standards; Externalisation; Internalisation; Environmental costs

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Принцип розширеної відповідальності у формуванні привабливості мультимодальних перевезень

Анотація. У статті доведено, що впровадження принципу розширеної відповідальності в діяльність промислових підприємств України передбачає імплементацію його в ланцюг постачань, що забезпечує відповідальність виробника за весь життєвий цикл продукту. Обґрунтовано, що одним із напрямів підвищення відповідальності ланцюг постачань є використання мультимодальних перевезень, які забезпечують ефективне поєднання декількох видів транспорту, оптимізують час поставки, знижують складські витрати, загальні витрати транспортування та забезпечують скорочення шкідливих викидів у відкриту атмосферу. З метою аналізу ринку вантажних перевезень автотранспортом України проводяться дослідження, що показують, що перевезення поза межами України здійснюють 45±3% від опитаних підприємств; тільки 30±2,5% надають пріоритет критерію «Відповідність транспортного парку європейським стандартам екологічності», а 40±3% респондентів вважають необхідним розвиток в Україні ринку мультимодальних перевезень за своїми перевагами.

Ключові слова: принцип відповідальності; мультимодальні перевезення; стандарти ЄС; екстернализація; інтернализація; екологічні витрати.
1. Introduction and Brief Literature Review

The analysis conducted by the National Institute for Strategic Studies [3] indicates a decrease in Ukraine’s transit potential and the possibility of Ukraine’s exclusion from the global market of multimodal transportation. Public Joint Stock Company «Ukrainian Railway», which is the basis of transit potential of Ukraine lost 70.5 million tonnes of the annual volume of transit goods in 2014) [19]. In order to compensate these costs, the price of transport services increased by 25% in Ukraine in 2014. In the early 2016-2017, there will be a full separation of responsibilities and authorities according to the key areas of work. The formation of the ultimate structure of PJSC «Ukrainian Railway» should be completed in 2020.

2. The purpose of the article is to analyze development prospects of the multimodal transport market in Ukraine and introduce the principle of responsibility in this field.

3. Results

Consumption models could not be effective without externalisation of costs, namely reimbursement of costs of manufacturers or service providers by other institutions. The hidden costs may include the costs for pollution, diseases of population, construction of roads, bridges, parking lots, gas stations; maintenance of traffic lights and traffic control systems, the cost for reconstruction of buildings and monuments damaged due to smog; the fight with noise and creation of sound-absorbing barriers; support for emergency services, congestion (estimated more than 1% of GDP), treatment of persons with accident-related traumas (financial losses of the state make up approximately 7% of GDP in 2014) [19]. In order to compensate these costs, the price of energy should be increased by 20-60% [20]. As for the transportation sector, the user pays only 25% of the actual costs (fuel, including taxes and excise taxes; insurance; maintenance).

Thus, the externalisation of ecological costs arising in the production process and consumption of goods leads to the economic choices that really are not economically viable. When taxpayers (the funding of environmental protection is carried out by the state) or future generations (cleaning the land, farmland, environment, etc) should bear the cost of non-renewable resources, improving of the functioning of the ecosystem due to the loss of biodiversity) pay costs for the environment, it not only does not allow an efficient use of natural resources but also creates excess demand, because goods are sold at low prices due to incorrect allocation. Therefore, internalisation of environmental costs in the final cost of a product or service, which pertains to the copy. For the government of the future,
improve the country’s ecology, make the producer use natural resources carefully, improve production technology, and use environmentally friendly vehicles in the supply chains. It goes without saying that some activities will reduce the competitive level of carriers and, perhaps, will never be involved.

According to the indicator for competitiveness [4, 34], with an increase in the rate of freight tariffs, road transport has come out on top in Ukraine. This explains why it is so common, especially at a distance of 500 km. Transport tariffs of freight traffic by automobile transport include primarily compensation of operating costs, financing of investments, reimbursement to the state budget of funds for staff training, health and education which are not included in the cost of transportation, formation of economic incentive funds (fund of financial incentive, fund of social development, etc.); payments from the state budget for the basic production assets, normalised working capital, human resources, received bank loans [11], not to mention the environmental costs in the system of tariffs.

In the Association Agreement between Ukraine and the EU, it is said about the introduction of European standards and norms in Ukraine in the field of environmental and technical protection, involving the implementation of 20 acts of European legislation [7]. These decisions will have a positive impact on Ukraine’s output in the European freight market regarding the use of multimodal transportation, such as transportation of standardized loading units (containers, swap bodies, semi-trailers adapted to vertical processing) by different modes of transport (railway cars, ships or trucks) through at least two countries on the basis of a single transport document, where the responsibility for the execution of the contract of transportation belongs to the multimodal transportation operator.

In the case of multi-modal transportation, it will be possible to improve environmental aspect of transportation by reducing the share of road transport. In addition, certificates permitting road transportation in the EU will require a compliance of certain characteristics of vehicles to the EU standards with regard to the quality of fuel use by them.

For example, the General Inspectorate of Road Transport (GITD) has been operating in Poland since 2001. Its mission is to control traffic law enforcement, eliminate any negative phenomena in the area of transport and to implement the principles of environmental protection [18]. Only in 2014, the GITD of Poland issued 4,427 permits for cargo transportation in the country to Ukrainian carriers, and the total number of issued certificates for international carriage of goods by road for their own needs was 7,474, compared to 15,787 permits in 2013. The GITD issues also environmental permits for cargo transportation (Table 1) with regard to the use of high-quality fuel.

<table>
<thead>
<tr>
<th>Type of the transport</th>
<th>EURO0</th>
<th>EURO1</th>
<th>EURO2</th>
<th>EURO3</th>
<th>EURO4</th>
<th>EURO5</th>
<th>EURO6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freight / %</td>
<td>86.8 / 0.51</td>
<td>1.542 / 0.91</td>
<td>0.936 / 5.35</td>
<td>43.596 / 25.85</td>
<td>25.824 / 15.31</td>
<td>79.515 / 47.15</td>
<td>8.270 / 4.90</td>
<td>168.645 / 100</td>
</tr>
<tr>
<td>Source: [17]</td>
<td></td>
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</table>

As an example, we consider the results of the comparative analysis of the two transportation models: using only transportation by road and multimodal transportation using vehicles and rail transport [19].

Hence, the Container Transport System of Russia - Warsaw is a multimodal transportation system. It works according to such a scheme: a container terminal as a point of consolidation - railway - container terminal as a point of deconsolidation and radial trucking system in Poland with the providing of supplies on a «door to door» principle. Models are analyzed in terms of cost, time, transportation, risk of cargo damage and environmental factors of influence on the environment, which has led to a conclusion that multimodal transportation increases the efficiency of the supply chain. Firstly, even without the additional discounts offered during the transportation by carriers, transport costs for multimodal transportation are smaller than for transportation by road. Secondly the transportation time is two times less. Thirdly, goods that cross the border of the two countries are better protected against damage. Fourthly, the analysis of the rules suggests that multimodal transportation is more environmentally friendly.

In the study of costs for transportation with the use of the 20-foot container by road or rail, reflected in [12, 475], it has been proved that the cost for rail transportation, even taking into account the costs associated with loading and unloading of the container is lower, which is shown in Figure 1.

![Fig. 1: The cost of transportation by road and multimodal transport](image)

Regarding temporal characteristics, the duration of transportation by road is lower on the analysed routes and varies from 3 to 4.4 hours. [12, 475].

In Poland, the multimodal transportation business has been consistently developing for several years and is believed to be highly profitable.

The company known as PKP Cargo, which was established in the 2000s as a result of restructuring and privatisation of part of the Polish State Railways and entered the Warsaw Stock Exchange in 2013, is another example. January through June 2014, the company increased its net profit by 67% to 128 million PLN compared to the same period in 2013 and became a leader in the Polish market in the segment of carriage of goods by rail [2]. In the first quarter of 2015, the company decided to increase intermodal transportation (more than 16%) believing that container transportation is the most promising segment of the transportation market by rail. In addition, the company has been investing both in infrastructure and rolling stock, having established a network of intermodal transportation from the East to the West and from the North to the South. By purchasing 80% of shares of Advanced World Transport (AWT), one of the largest Czech freight carriers by rail in Europe, and by signing a strategic agreement with the national carrier of Croatia, which is HZ Cargo, the company gained access to the new markets, European terminals and sea ports in southern Europe. The access to Paskov container terminal, which is located near the border of Poland and Slovakia and is close to the industrial areas of Poland and the Czech Republic, is especially important for PKP CARGO. On the other hand, due to its mutual activity with the Croatian company, RKP CARGO has got quick access to modernised ports and a cargo terminal with a relatively dense network of railways, which allowed the company to increase the volume of multimodal traffic in the north-south direction.

Today, the PKP CARGO Group owns five active container terminals in Poland and one in the Czech Republic. In the first
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half of 2015, PKP CARGO issued several contracts with three Chinese carriers on integrated logistics services and multimodal transportation from China to the Netherlands, which excels Ukraine and is competitive to transport giants like Deutsche Bahn. As part of the 2016-2020 strategy, PKP CARGO has identified targets for its leadership in the market of intermodal operators in Central and Eastern Europe. Nowadays, the largest Polish transportation carrier is focusing on the development of international transport services and is going to provide within the entire supply chain. PKP CARGO will invest in the sector of multimodal services which, in their opinion, is the most promising segment of the transport market. Furthermore, PKP CARGO plans to offer transportation by road at the final stage of the supply chain.

To analyze the market of freight transportation by road in Ukraine, a survey of 30 companies providing transportation services both in Ukraine and in European countries was conducted. In the second half of 2015, the authors conducted an online survey which was carried out among customer service managers of 30 enterprises from all regions of Ukraine providing transportation services not only in Ukraine but also in European countries. The survey aimed to analyze the market of cargo transportation of the Ukrainian road transport.

The sample is representative for the given probability $P = 0.9$, which corresponds to the table-valued $t$-test equal to 1.645, the coefficient of variation features $-V = 0.33$ and the level of inaccuracy of survey results $\Delta V < 0.1$. The analysis of the survey results by the known methods $[5]$ with a probability of 95% helped to identify the following features of the general totality of freight traffic carriers by automobile transport in Ukraine:

1) transportation outside Ukraine is done by 45+3% of the surveyed enterprises;
2) ranking in terms of the importance criteria shows that 70+2.5% of respondents give priority to compliance with European emission standards;
3) 80+2% of the respondents were ranked high by the criterion of established partnerships with clients;
4) the proposal of logistics products adapted to individual customer needs was reported by 60+2% of the respondents;
5) provision of logistics services based on the price-quality ratio was done by 80+1.5% of the surveyed companies;
6) 40+3% of the surveyed companies consider it necessary to develop the market of multimodal transportation in Ukraine;
7) the conducted studies have shown that companies providing transportation services feel no pressure from the part of their customers concerning environmentally friendly transportation.

5. Conclusions
The conducted analysis allows drawing the following conclusions:
1. Ukraine’s accession to the EU markets from 1 January 2016 envisages development of certain activities at the state level concerning the development of the market of multimodal transportation due to liberalisation of the rail transport market, changes in the system of transportation tariff setting. It will improve the investment attractiveness of the industry, raise its competitiveness and provide opportunities to attract investments for its modernisation, which, in turn, will affect the development of multimodal services and increase the profitability of transportation, as well as the possibility to implement the principle of responsibility in the supply chain. Also, it will reduce the share of road freight transportation and improve the ecological situation in Ukraine.

2. Motor transportation, which is considered to be one of the sources of air pollution the greenhouse effect, is outdated. Thus, it is difficult for the state to oblige carriers to reduce emissions in the environment. Nevertheless, the companies can be influenced via the extended responsibility by the supply chains and producers ordering the relevant multimodal transportation. The transport enterprises that provide multimodal transportation will be competitive.

3. Implementation of the European experience in the field of multimodal transportation will allow accelerating these processes and creating efficient supply chains that can work in the EU, where the problem of ecological compatibility of freight transportation is being solved.

References


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