

## ELECTRONIC FREIGHT EXCHANGE IN THE EXECUTION OF LOGISTICS SERVICES

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**Purpose:** An analysis of the of electronic transport exchanges functioning and the prospects for their development regarding the development of IT technology and the development of transport needs.

**Design/methodology/approach:** An extensive literature and functional analysis of electronic transport exchanges was carried out. Based on this prospective directions of further development for this form of contracting services were identified.

**Findings:** Electronic freight exchanges promote the efficient and effective exchange of information, increase the quality of services and shape logistical cooperation and partnerships throughout the supply chain. The key factors determining the introduction of freight exchanges were identified. Also crucial aspect of the functioning of electronic freight exchanges were set out and they are to ensure the security of transactions and reliability of cooperating partners.

**Research limitations/implications:** The analyses carried out are still ongoing and require further research among users of electronic transport exchanges.

**Practical implications:** The presented results may affect further research on the use of electronic transport exchanges, especially in the activity of freight forwarders. At the same time, they indicate the main limitations related to participation in electronic platforms.

**Originality/value** The article presents the mechanisms of functioning of electronic transport exchanges and indicates the main challenges related to their use in business.

**Keywords:** electronic freight exchanges, logistics service, e-logistics.

**Category of the paper:** technical paper.

## 1. Introduction

Road transport, due to its advantages, is one of the most frequently chosen branches of freight transport. Its advantage over other modes of transport is primarily due to its high flexibility, accessibility and capacity used in combination with other modes of transport – combined transport. The large number of companies that make profit from road transport is a result of the complex and multi-level structure of the Polish TSL market, where larger logistics operators cooperate with smaller freight forwarders who outsource transport services to small businesses (Kawa, 2014). The development of transport activity has influenced the dynamic development of freight forwarding services, which are now becoming an essential solution due to building packages of logistics services. The expectations of customers regarding the complexity of services and the wide range of carriers' offerings make the freight forwarding business rely on information technology, as exemplified by the use of electronic freight exchanges, which since 2006 have enabled transport companies to obtain orders from their customers only via an online platform, which greatly saves time throughout the supply chain. The aim of the article is to analyse the principles of operation and benefits of using electronic freight exchanges and their future. In order to achieve this goal, the functionality of one of the largest electronic freight exchanges in Poland was presented.

## 2. The concept and essence of electronic freight exchanges

The first TimoCom electronic exchange created in 1997 and the online version of the exchange was launched in 2006, enabling offers to be made and transactions to be concluded in real time via the Internet. Currently, these exchanges are regarded as a virtual market in which freight forwarders, hauliers and production companies can report missing or redundant freight offers and search for each other (Borycka, Kempa, 2012; TimoCom, 2019). The concept of electronic exchanges is complex, often understood as "Internet platforms for searching for and reporting free spaces and free cargo. Through them, on a similar basis to an auction, you can find the most advantageous solution for your company to move your own cargo or find employment for your own rolling stock. In addition, the freight and vehicle exchanges offer their users a number of facilities to speed up and secure the conclusion of transactions, such as the definition of a road map, text messengers and the possibility of debt collection. They often help in marketing, advertising and win new markets, they allow you to meet your future business partner" (Dziechciarz, Lewandowski, 2011). The freight forwarders have the greatest possibilities in the exchange, as they can put up the cargo for which they need to find transport and look for the cargo, if they have free space on the means of transport under their

responsibility. The carrier offers the cargo space, while a manufacturing or commercial company offers the cargo they have to transport on a given section. The exchange is based on a brokerage model, i.e. it creates opportunities for both parties to enter into transactions and benefits from this through subscriptions paid by users (Kawa, 2014). 24-hour availability of electronic freight exchanges based on information and communication technologies is the basis for using their potential and development perspectives (Nowakowski, Sosnowski, 2015). The basic assumptions of functioning of electronic exchanges are similar to those used in online shops or electronic auctions. The principle is also the elimination of traditional document circulation in favour of electronic documents and communication that does not require real meetings of participants with extensive automation and the possibility of virtual contact of many network users simultaneously (Ciesielski, 2009).

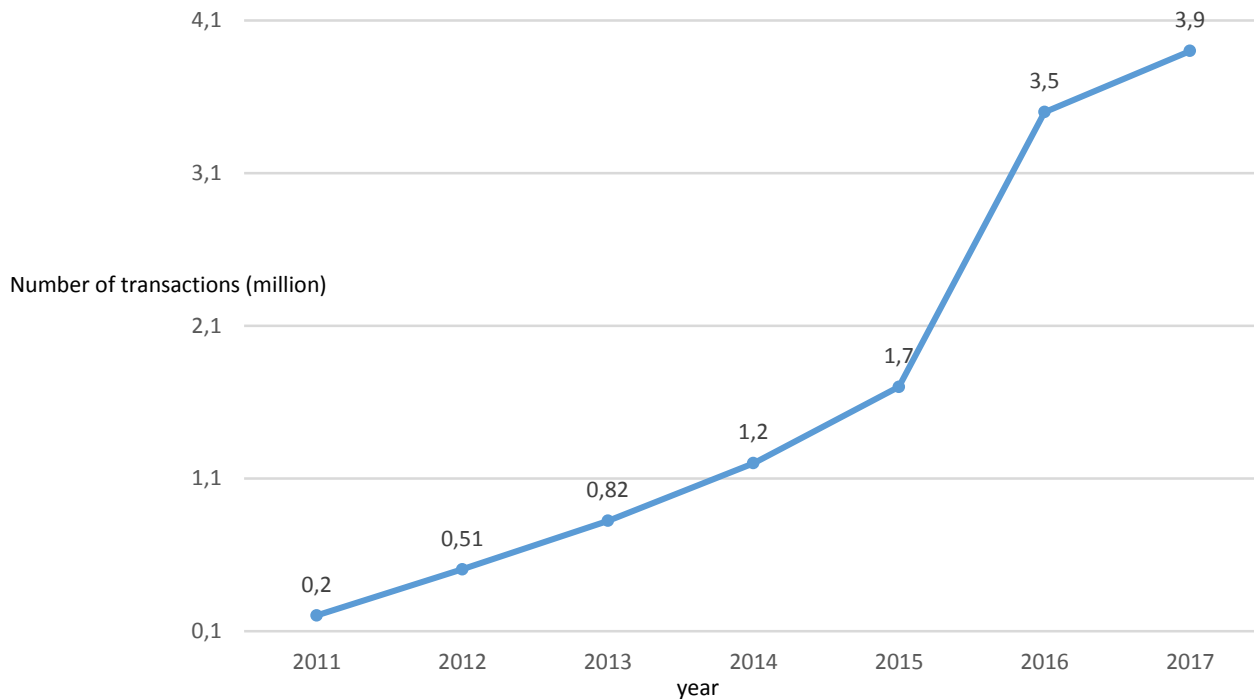
The most desired efficiency by the users of transport exchanges is their effectiveness expressed as the ratio of the work done by the companies to the activities that were planned. The efficiency of the exchange is influenced by the number of users, as it contributes to the possibility of obtaining orders more quickly. The exchange should also act quickly and optimise customer service. Simple and intuitive operation of the transaction portal is also vital for users. The simpler and clearer the interface, the easier it is to operate the exchange. The company setting up the stock exchange must invest in an appropriate IT infrastructure that will enable short processing times and reliability and continuity of operation. Large platforms face failure due to the large number of offers created, and each system failure generates problems for the users — customers, and, consequently, a loss of credibility (Kisielewski, Leśniakiewicz, 2016). The benefits of the freight exchanges are as follows (Leończyk, 2013):

- collecting multiple offers on the platform,
- fast communication with business partners using built-in communicators,
- easier opportunities to negotiate the terms of the agreement,
- verification of companies' credibility on the freight exchange,
- access to additional functions that provide route planning, vehicle tracking, telephone alerts and reminders about payment dates,
- reduction of empty mileage.

Electronic freight exchanges are one of the many tools for creating and implementing modern technologies for the execution of logistics processes. One of the solutions that are associated with the introduction of such technologies is the map module (e.g. the eMap application developed by the TimoCom exchange), which shows the route between the points concerned, the estimated travel time and the shortest connection between the points and also enables the calculation of travel costs. This solution improves the forwarder's decision-making process by providing the necessary route information and initial cost calculation in a short time (Sobańska, 2013).

### 3. Mechanism of functioning of electronic freight exchanges

The electronic freight exchange that is currently the most widely used in Poland is Trans.eu, which was established in 2004. Nowadays, its operation has expanded to 45 European countries and the average number of daily offers for cargo is 448 thousand. The growth of Trans.eu from 2011 to 2017 is shown in Figure 1 (Trans, 2019).

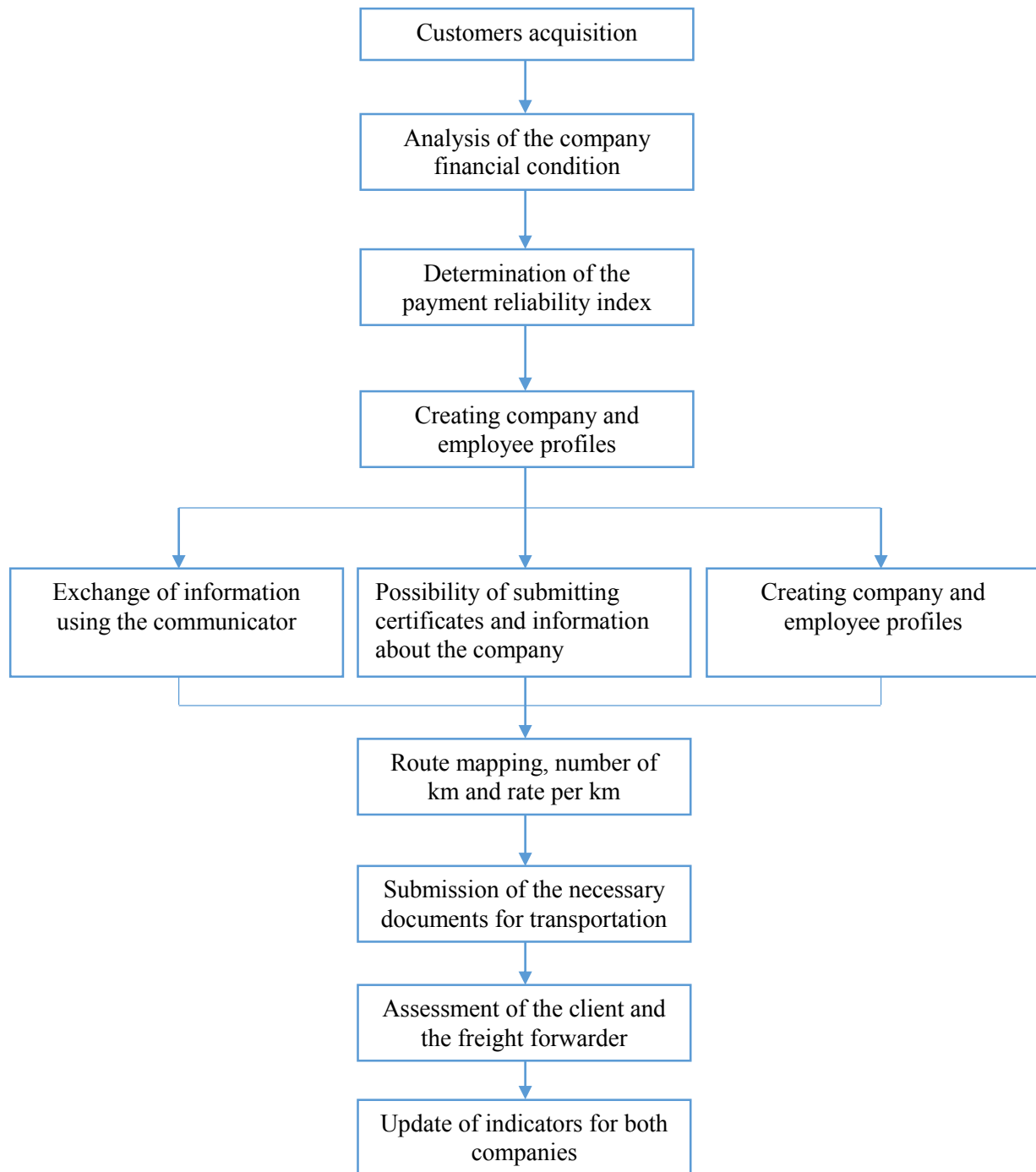


**Figure 1.** Annual number of transactions on the Trans.eu freight exchange between 2011 and 2017 [million]. Adapted from: Trans.eu, <https://www.trans.eu>, 23.03.2019.

The use of the mechanisms of the exchange in the implementation of logistics services begins with the acquisition of customers, these are, on the one hand, manufacturing companies that show a demand for the transport of their own goods, and on the other hand, they are freight forwarding and transport companies that offer cargo transportation. The exchange is a place where representatives of both groups can meet virtually in order to execute an order and often to establish more permanent cooperation. A schematic representation of the mechanism of the exchange's operation is presented in Figure 2. Once a customer is acquired, the customer's financial standing is analysed and the payment reliability index is determined. This is a very crucial stage, because often the company's reputation and financial credibility influence its presence on the freight exchange and its choice by its counterparties. After that, the profiles of the company and all the employees who will use the exchange are created. The company profile can be accompanied by files with quality certificates and information about the business activity.

The registration process determines the level of trust and security in the use of services of the exchange (Czaja, Zimon, 2014). The security of transactions on the platform is built primarily on the basis of the credibility of exchange participants. The Trans.eu platform additionally uses the TransRisk indicator, which determines the timeliness of payments made and is calculated on the basis of data obtained by Creditreform and Dun & Bradstreet business intelligence agencies, such as financial condition, payment delays, activity as a payer in the Trans.eu system, business history and the feedback and reviews of counterparties. Depending on the result, one of the TransRisk categories is assigned: super payer, very good payer, good payer, medium payer, weak payer or very weak payer. The history of changes in the indicator is available on the profile of each company and includes the last six months. It is also possible to obtain the Reliable Carrier Certificate, which is awarded to the best transport companies registered in the system. This certificate is a guarantee of high quality service and reliability for contractors. The certificate is awarded to companies existing on the market for at least 3 years, having at least 80% positive ratings, minimum 50 accepted offers in the system, updated data on the company's profile, a set of documents required and a good financial standing (i.e. the user cannot be listed as a debtor) (Kos, 2011; Czaja, Zimon, 2014; Kostek, Maziarczyk, 2014).

At the same time, it is possible for users to add offers on the exchange that are processed and made available to other users of the exchange. When creating offers, users include information about the demand for transport, such as: date and place of loading and unloading, weight, dimensions and type of cargo, type of semi-trailer, possibly freight price and additional information about loading and payment date. When searching for orders for particular sets, forwarders have information about the location of a particular set and can, among other things, search for those sets that are available at a specific time. The forwarder has the possibility to communicate with the creator of the offer not only through the exchange of messages, but also through the use of an Internet communicator, conducting a conversation with other users (Załoga, 2006; Barańska, Bartczak, 2016). For the selected offer, the exchange system determines the route of transport between the designated points with a calculation of the number of kilometres and the rate per 1 km. Often, clients do not specify the freight price for a given carriage, negotiations begin only during the conversation and the final amount depends primarily on the length of the route, the type of the vehicle body, the length of the empty vehicle's route to the loading place and the countries through which the route passes.



**Figure 2.** Mechanism of operation of an electronic freight exchange on the example of the Trans.eu. Adapted from: Barańska A., Bartczak K., *Wpływ giełd transportu na funkcjonowanie przedsiębiorstwa z branży logistycznej*, *Logistyka* 1/2016 s. 164-165 [*The impact of transport exchanges on the functioning of companies in the logistics sector*, *Logistics* 1/2016, p. 164-165].

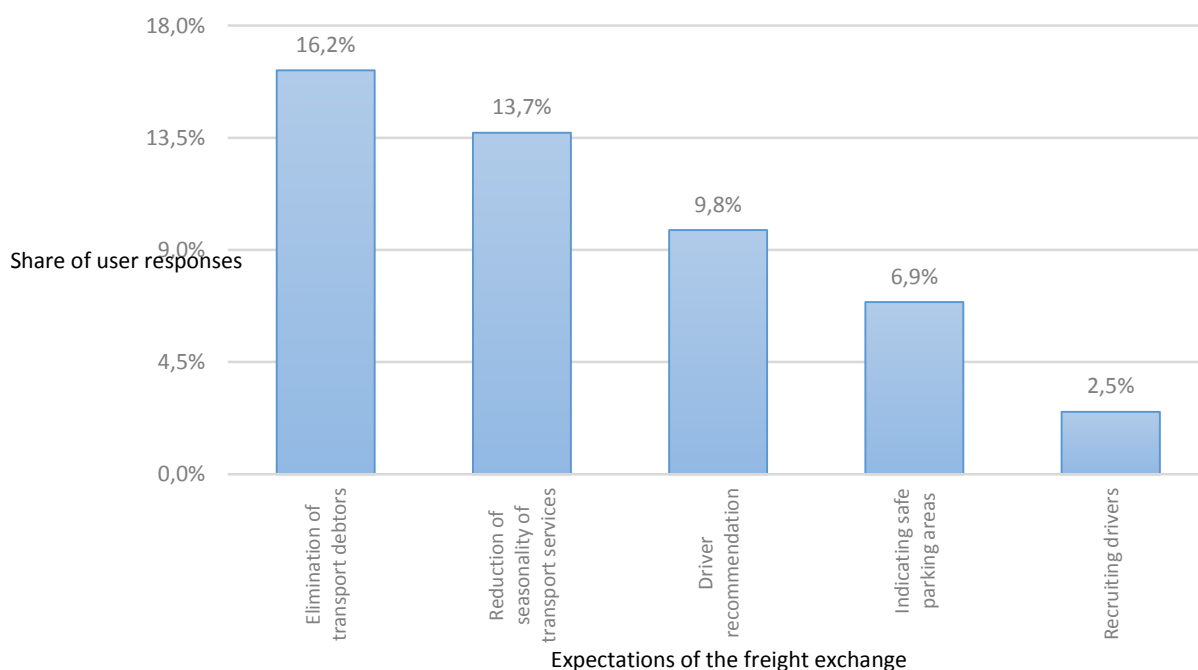
In case of an agreement between two parties, the exchange system shall allow for the transfer of the necessary transport documents and, after the performance of the service, the assessment of the quality of its performance and the contact between the parties.

#### 4. Prospects for development of electronic freight exchanges

Extensive development of the logistics services market is made possible, in particular, by introducing the best available and new, innovative solutions into the practice of business operations. The main objectives of implementing innovative solutions by logistic service companies are (Chwiećko, Dziekoński, 2013):

- increasing the efficiency of the services offered,
- increasing customer satisfaction,
- improving strategic planning,
- better flexibility and ability to adapt the company's operations to market changes,
- optimising the decision-making process,
- increasing the innovative capacity of the enterprise.

These solutions allow to improve logistic processes so that they run smoothly and reliably (Kawa, 2013). The market is oriented towards continuous development, and electronic freight exchanges strive to continuously improve the quality of the offered functionalities and services. The research conducted among the users of electronic exchanges (Kisielewski, Leśniakiewicz, 2016) intended to determine the desired qualities and functionalities allowed to identify prospective challenges faced by their administrators (Figure 3).



**Figure 3.** Users' expectations of electronic freight exchanges. Adapted from: Kisielewski P., Leśniakiewicz M., *Charakterystyka i analiza porównawcza europejskich elektronicznych giełd transportowych*, *Autobusy: technika, eksploatacja, systemy transportowe* 6/2016, s. 1371. [*Characteristics and comparative analysis of European electronic freight exchanges, Buses: technology, operation, transport systems* 6/2016, p. 1371].

The most essential functionality postulated by the users is to further improve the mechanisms of verification of credibility of the exchange participants and to eliminate those entities that are characterised by low financial credibility. Users would like the exchange to take on some of the responsibility for eliminating companies that have created payment problems in the past. As for now, the exchanges only create indicators and company ratings on the basis of analyses, which help users to select a commissioning party or commissioned party. This expectation is connected with further extension of the scope of information flows between contractors, e.g. payment for services, insurance, sales and financial-accounting processes (e.g. preparation of sales reports, issuing invoices to contractors and sending prompt notes). (Kawa, 2014). Further expectations concerning the development of electronic freight exchanges are related to minimising the issue of seasonality in the provision of transport services by improving solutions for forecasting the demand for transport services, but also for the planning and execution of transports. In this study, there were also postulates made by drivers carrying out transport operations, who expect the functionality of the exchanges to be extended to include the possibility of posting driver recommendations. Such a solution would affect the quality of customer service (ordering transport), who at the stage of negotiations with the forwarder could additionally select drivers on the basis of recommendations. However, this solution would obstruct the work of freight forwarders, who cannot always provide a service by a particular carrier.

Specific needs identified in the field of electronic freight exchanges also refer to the further development of databases, e.g. a database of secure car parks especially for valuable shipments, information shown on maps. Specific needs identified in the field of electronic freight exchanges also refer to the further development of databases, e.g. a database of secure car parks especially for valuable shipments, information shown on maps. Besides, the future goal is to create 'active' exchanges, which would be the opposite of the current 'passive' exchanges, where the main role in decision making is played by people. The 'active' exchanges would be prepared in such a way that they would automatically be able to generate the most advantageous and optimal solution for the client, taking into account their capabilities and expectations. The users of the platform would then only need to provide information on the criteria and requirements for a given transport operation. This will include, firstly, data from the company holding the cargo to be carried and will mainly include such data as type of cargo, quantity, dimensions, places of loading and unloading, freight price and other necessary information, and, secondly, the forwarding company will enter the data concerning available cargo spaces at a given time and place. The freight forwarder would prepare information about the type of means of transport at their disposal, available loading space, time availability of the means of transport. On the basis of this information, the system would be able to match the offer of companies that show a demand for transport with those that report loads to be transported (Ciesielski, 2009; Tuominen, 2019).



The development of IT technology continuously increases the capabilities of electronic freight exchanges (Kos, 2011). At present, a highly popular solution is cloud computing, which enables the replacement of existing hardware, software, servers, data storage devices and applications by cloud services. This solution is also addressed to logistics companies, which have very limited financial resources to purchase IT hardware, specialised software and to employ IT specialists who would be responsible for programs and devices operating in the company (Tuominen, 2019). An example of cloud computing implementation in logistics is the LogBase on Demand application available in the LOGICAL cloud, which was created by SALT Solutions from Dresden. The application provides the basic functions that are necessary to manage a logistics company (Korczak, 2014):

- maintaining a database containing company customer data,
- warehouse management,
- management of means of transport,
- monitoring orders,
- document management,
- register of orders and settlements.

Regarding information exchange and document flow, LogBase on Demand is compliant with European standards. It may also operate in the LOGICAL cloud or in the company's cloud.

Figure 4 shows the LogBase on Demand interface screen. The window in the upper part of the screen allows access to system functions, while the window in the lower part of the screen shows a specific function for document flow management. The LOGICAL portal currently provides many applications to handle logistics processes, and their number will grow with the increasing number of customers using cloud computing.

The freight forwarding industry has undergone dynamic growth in recent years and will continue to grow in the future owing to the growing demand for specialised services. Nevertheless, in order for this development to be possible, it is crucial to take actions supported by innovative solutions, which will contribute to building new standards of service and improving the quality of logistics services and allow for the cost reduction associated with their implementation (Barańska, Bartczak, 2016). External factors connected with increasing the level of security and achieving high ecological standards are also of significance (Przybylska, 2014).



**Figure 4.** LogBase on Demand cloud computing application interface. Adapted from: Korczak J., *Chmura obliczeniowa dla logistyki - projekt LOGICAL*, Informatyka Ekonomiczna, no. 2 (32), 2014, p. 102 [Cloud computing for logistics - LOGICAL project, Economic IT].

## 5. Conclusions

The evolution and further improvement of the logistics service provision process requires the use of innovative solutions, which are most often supported by IT technologies. These solutions are electronic freight exchanges, which significantly facilitate the execution of forwarding services by improving and optimising the planning and organisation of logistics processes. Electronic freight exchanges promote the efficient and effective exchange of information, increase the quality of services and shape logistical cooperation and partnerships throughout the supply chain. The key factors determining the introduction of freight exchanges by companies are to increase the speed and efficiency of transaction execution, increase access

to specialised services and rolling stock used for shipment execution. A crucial aspect of the functioning of electronic freight exchanges is the need to ensure the security of transactions and reliability of cooperating partners. In order to secure the interests of the parties cooperating on the platform, administrators have developed and introduced mechanisms for verification and evaluation of entities operating on the exchange. The solutions offered by the electronic freight exchanges will be further expanded due to the high demand for logistics services, and the exchanges will be an essential link in the supply chain due to their functionality.

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