ELECTRONIC FREIGHT EXCHANGE AND LOGISTICS PLATFORMS IN BUILDING OF SUPPLY CHAINS

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Abstract

One of the most important and popular tool of contemporary e-logistics in supply chains are the different types of electronic freight exchanges. In the paper the main types of open and closed electronic freight exchanges as well as their advantages and disadvantages are presented. In particular history and the scope of the services offered by biggest open electronic freight exchanges in Europe, such as: Teleroute, Timo,com, Trans.eu and Wtransnet, are described. The main aim of the paper is the analyses of business models of electronic freight exchangers and the identification of their tasks in building of integrated supply chains. Furthermore, the basic strategic assumptions are presented in order to change the role of open electronic freight exchanges towards logistics platforms, which plays the significant role as an initiators and central coordinators of flows in international supply chains.

Keywords: Electronic freight exchange, electronic logistics platforms

1. INTRODUCTION

The dynamic development of electronic economy has not left untouched the logistic activity of enterprises, which caused a revolution in creating supply chains and in their operation. Different types of electronic freight exchange became one of the most significant and commonly used tools in modern e-logistics in supply chains. Electronic freight exchanges were initially used by relatively few users, the number of which steadily grew along with spreading the access to internet network in the second half of the 90s of the 20c. Although the number of their users is still increasing, it is estimated that the amount of transactions conducted there, in the European Union countries, is the equivalent of just 10 % to 20 % of the total tonnage of cargo carried [1]. Therefore, the electronic freight exchanges are still seen as one of the innovative and forward-looking solutions for e-commerce in B2B relationships. It is worth noting that modern electronic freight exchanges are based on business models that evolved in Europe many years prior to popularization of the internet. In the 1970s, the German organization SVG started to build a database of cargoes and carriers, which via telephone lines was made available to economic entities interested in these data [2]. However, the first freight exchange, which was established before the popularization of internet technology and has still a significant market share, has been the French freight exchange *Teleroute.* Its founder was the company *Teleroute and Wolters Kluwer Business*, which in 1985 commercialized the service supporting transactions between the providers of transport and forwarding services and the companies ordering cargo transport. The shippers' offers sent via fax were grouped by an operator collecting the information and were sent once a day at noon to potential carriers [3]. Numerous benefits of the access to electronic freight exchanges have led to the appearance of many competing freight exchange operators, that choose different business models, offer a diversified package of services addressed to different groups of customers. The purpose of this article is to make a typology of business models of the most important European operators of electronic freight exchanges and logistic platforms with an indication of their tasks in building and functioning of supply chains.

2. THE ESSENCE, THE ADVANTAGES AND DISADVANTAGES OF ELECTRONIC FREIGHT EXCHANGES AND LOGISTICS PLATFORMS

By the electronic freight exchange one should understood an intermediary service with the use of internet technology, which supports communication and transactions between carriers, forwarders and shippers ordering loads to be transported and other supporting services. This is a special form of electronic commerce in the market for transport, freight forwarding and logistics services in B2B relationships. At the same time among ICT solutions within electronic freight exchanges, off-line databases and mailing lists are used less frequently, and the majority of transactions are carried out in real time by websites and communicators [4]. Electronic freight exchanges systematically expand the service package, which results in their evolution towards electronic logistic platforms, offering a comprehensive package of services which due to the integration with users' IT systems support their logistic processes and encourage to build long-term relationships between participants in supply chains.

Electronic freight exchanges, as a tool for obtaining information on the current supply and demand for services and facilitating transactions, bring many benefits, both for the transport, freight forwarding and logistics companies, as well as for shippers. From the perspective of transport companies, the most important advantage of electronic freight exchanges is the reduction of empty runs and a fuller use of capacity (e.g. the consolidation of the cargo), in particular on the way back. Easy communication and making transactions directly by drivers of vehicles allows to reduce the employment and administrative costs. Carriers using electronic freight exchanges also have the possibility to use additional accompanying services, such as:

- the vehicles insurance services,
- the optimization of routes and transport costs,
- vehicle leasing services,
- factoring services consisting in pre-financing of the purchase of fuel or shortening the date of payment for transport, which allows to solve problems with financial liquidity,
- job placement services in the shortage of heavy goods vehicles drivers.

On the other hand, from the point of view of the shippers using the electronic freight exchanges allows the access to current offers of carriers or freight forwarders at the lowest cost for a given volume and the dimensions of the cargo and the preferred route, the specification of rolling stock and the additional requirements related to the implementation of the transport service.

With the new functional and task-oriented modules within the framework of the electronic freight exchanges, both parties to the transaction have the ability to use more and more transparency of information in the field of:

- the improvement of transaction security by access to recommendations and documents testifying to the integrity of the users of the exchange, including its payment credibility,
- the ongoing monitoring of the transport process and cargo security control [5] (Methods of monitoring and control of cargo on the example of liquid fuels are described, for example, in the article.),
- the availability of free warehouse space,
- prosperity and predictions in the logistics services market thanks to industry reports, stock indicators or the European index of transport companies.

Although open electronic freight exchanges create conditions for establishing cooperation with new partners, the vast majority of transactions concluded through them is incidental and does not transform into long-term business relationships. According to the results of a survey on a sample of 3,456 regular users of Trans.eu with the use of the Social Networks Analysis (SNA) method only 19 % of respondents indicate that they establish long-term business relationships with stock market users, and as many as 44 % claim the specifics of freight exchange transactions contribute to one-off transactions [6] (Detailed results of research on the

relations between the participants of the Trans.eu exchange are presented in the article.). The dominance of spot transactions negatively affects the security of transactions and the quality of the services offered, which is manifested in:

- high losses and natural losses in the transport process (whereas there are also the cases of a loss, theft or a total destruction of the cargo),
- the late pickup or delivery of cargo,
- the prolonged periods of payment for rendered services and the need for judicial review of claims,
- no or difficult contact with the contractor.

On the other hand, the access to the electronic freight exchange involves fees in the form of a monthly subscription or a commission for transactions, which further reduces prices of transport services and carries' profits, which the already calculated at borderline of profitability. Some of these profits are taken over by intermediaries acting as forwarders, who obtain an above-average profit margin by moving offers and contacting users of various freight exchanges. An additional threat to carriers and freight forwarders is also the loss of control over sensitive information about the performed transactions, especially on contractors and trading prices for specific freight-forwarding services. The acquisition of such information by the operators of electronic fright exchanges increases their bargaining power and puts them in a privileged position of a potential leader of supply chains created by the exchange.

The list of benefits and disadvantages of electronic freight exchanges from the perspective of transport and forwarding companies and shippers is presented in **Table 1**.

Table 1 The advantages and disadvantages of electronic freight exchanges for freight forwarding and transport companies and shippers [own elaboration]

Specification / Prospects	Advantages	Disadvantages
Carriers and forwarders	• Reduction of empty runs and utilization of transport capacities • Optimizing routes and transport costs • Additional insurance, leasing, factoring, job placement services, etc.	• Low prices of services and price competition (even below costs) • Domination of one-off transactions, which creates problems with payments and communication
Shippers	• Access to a wide range of service providers • Reduction of shipping and forwarding costs	• Poor quality of incidental services • Risk of losing the load
All users	• Monitoring of the transport process and reservation of warehouse space • Access to information about contractors, business climate and forecasts on the TSL market	• A threat to the position of a leader in the supply chain by the loss of control over information about transactions and contractors • Fees for using the exchange

3. TYPES AND BUSINESS MODELS OF ELECTRONIC FREIGHT EXCHANGES

In the 1990's along with the popularization of the internet, more and more electronic freight exchanges were created, which, according to e.Logisics Magazine of 2001, were as many as 236 [7]. With such a fragmented structure of the sector, not all entities managed to obtain the critical number of customers or transactions that

would ensure that the break-even point on the sale of the product offered is exceeded. Therefore, for several years on the market of electronic freight exchanges there is noticeable tendency to consolidate and focus on particular groups of customers, industries or regions.

According to T, Skjot-Larsen and his colleagues, two basic types of electronic transport fright exchanges can be distinguished [8]:

- open markets, which are available to all interested shippers, forwarders and carriers, on which one-off transactions for transport services and price competition prevail,
- closed exchanges, which are dedicated to specific companies or supply chains, within which long-term relationships are developed and comprehensive logistics services are offered.

At the same time, closed exchanges can be used by a specific shipper or logistics company to build a strategic partnership under long-term contracts.

They can also be used as a common IT solution for enterprises and their supply chains in a given industry or enterprises operating in a given region. The use of closed online exchanges promotes the optimization of cargo flows and information not only through the cooperation of shippers with logistic companies with consolidation centers, but also through the possibility of their impact on the coordination of carriers. The milestone in the transformation of both types of electronic freight exchanges into logistics platforms is the implementation of loading time management service TSM (Time Slot Management), which allows to agree on preferred time windows at a specific loading location and consequently leads to a significant reduction of losses associated with many hours of waiting for loading and unloading operations.

The largest logistics operators striving to maintain the role of initiator and central coordinator of flows in supply chains are very active in digitizing their business processes. According to experts of the BCG consulting company, the current leaders of the logistics market are undertaking such efforts as [9]:

- automation and digitization of own processes, including the improvement of transaction processes through its own portal for clients, an example of which is the KN FreightNet portal founded by Kuehne & Nagel,
- building online platforms in cooperation with startups from the IT industry, as in the case of the Drive4Schenker platform developed by DB Schenker and the uShip company
- creating portals through own start-ups from the IT industry, such as online platform Saloodo! implemented on the initiative of DHL and used by about 6 thousand carriers.

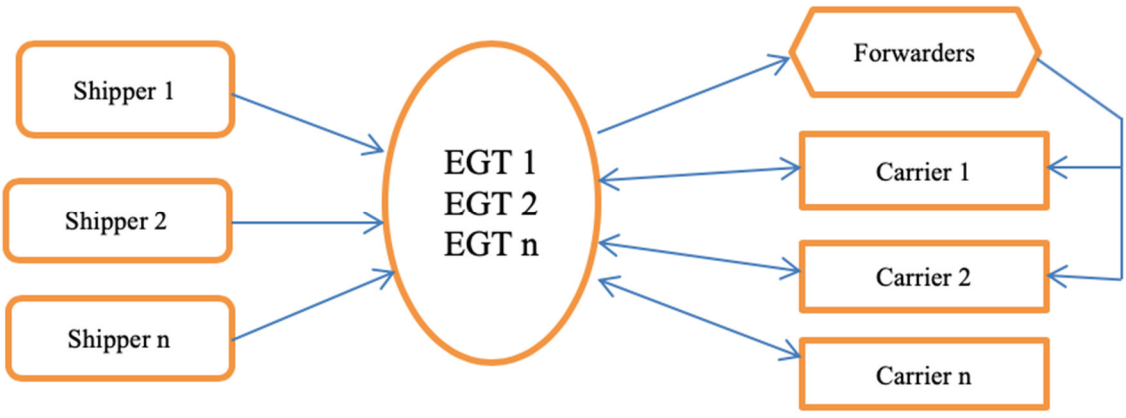

Figure 1 An open electronic fright exchange model

European logistics operators integrate their fleet management systems also with open electronic freight exchanges. An example is the agreement of the logistics company Dachser pursuant to which a computerized carrier management system Connect was integrated with the freight exchange Teleroute.

The ideogram of the operation of open and closed electronic freight exchanges is presented in **Figures 1 and 2**.

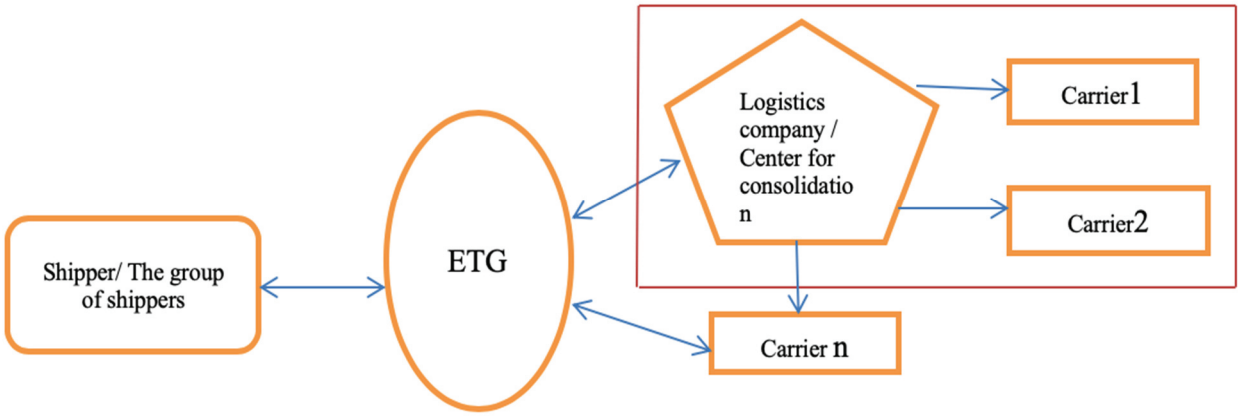

Figure 2 Model of a closed electronic freight exchange

The largest electronic freight exchanges operating on the European market are open markets, which are usually oriented at meeting the needs of carriers looking for loads on the way back. Before a specific transport order reaches the carrier, it is very often intercepted by more active and experienced forwarders who accept offers from loaders and act as intermediaries in transactions between users. Aiming at maximizing commission, shippers often practice transferring offers and intermediate in transactions between users of competitive freight exchanges.

4. LEADERS OF THE MARKET OF ELECTRONIC FREIGHT EXCHANGES IN EUROPE

In addition to the first European freight exchange *Teleroute,* most frequently used by road hauliers and forwarders are: German system *TimoCom,* Polish freight exchange *Trans.eu* and Spanish exchange *Wtransnet.* Among the transport and forwarding companies in Europe there are also the Eurasian freight exchange *ATI* and other European freight exchanges, such as: *123 Cargo*, *CargoCore*, *EuroFreight Exchange*, *Euroloads.net*, *Express-online, Haulage Exchange, LoadsToday, Raal* or the dominant freight exchange in the United Kingdom *Return Loads.* The entity structure of electronic freight exchanges on the European market is very dispersed, which results in an increase in the intensity of price competition. In addition, new electronic platforms are still emerging that specialize in handling specific loads and transport relations. This phenomenon is observed even on markets dominated by domestic leaders, which may be exemplified by the creation of new freight exchanges in recent years, such as: *LoadFox* in Germany or *Infracht* in Poland [10]. According to estimates, only 4 % of the volume of freight is handled through the largest European exchange *Timo.com* [1]. Although in the last several years the number of users and the value of revenues of open electronic freight exchanges has been dynamically increasing, the pace of these increases recorded by the leaders of this market is getting lower. There are also free electronic freight exchanges on the market, such as *LoadsToday*, where the revenue source is not a subscription fee, but the sale of accompanying factoring services (e.g. fuel cards). Therefore, striving to maintain the position on the market of electronic transport exchanges requires current leaders to take intensive actions related to the increase of transaction security and to expand the offer of services provided while maintaining the current level of prices. Basic information about the history, terms of use and the scope and safety of the largest open freight exchanges for forwarders and carriers in Europe is presented in **Table 2**.

Table 2 Characteristics of the largest electronic freight exchanges in Europe [own elaboration pursuant: [11], [12], [13], [14], [15]]

The Exchange Specification	Teleroute	TimoCom	Trans.eu	Wtransnet
The year and place of creation	1985 France	1997 Germany	2004 Poland	1996 Spain
Number of regular users	Over 70,000	About 110,000	About 40,000	28 thousand
Conditions of entry	Entry in the National Court Register, NIP (tax identification number), OC (civil liability insurance), carrier's license	Entry in the business register or National Court Register, NIP (tax identification number), OC (civil liability insurance), scanned identity card	Entry in the National Court Register, NIP (tax identification number), OC (civil liability insurance), carrier's license	Entry in the National Court Register, NIP (tax identification number), OC (civil liability insurance), carrier's license, copies of vehicle registration documents, certificate of professional competence
Conditions of departure	Written notification min 3 months before the end of the contract period	Notice two weeks in advance	Notice two weeks in advance	No information provided
The scope of additional services	• route and cost planning system • transport safety assessment • mediation of receivables • insurance	• warehouse space exchange • tender platform • calculation and tracking program • TSL market barometer • debt collection	• calculation and tracking program, • factoring services • fuel cards • debt collection • insurance • job placement for drivers • logistic education	• calculation and tracking program • Doc & Data's subcontracting and document management system • advertising and payment guarantee • insurance • automatic searching for offers • private exchange • simultaneous interpretation
Safety	Secure login. STAR security indicator, or algorithmic evaluation of: profiles, acceptance of the "Code of Conduct", e-confirmations and user opinions	TC login. TimoCom Secure Package: • access control (at least 6 months of operation) • Cash Care (support in pursuing claims) • TimoCom Profile (company index)	TransRisk index - payer index Certification of carriers - TCC Transaction review system	QAP System Filters: • logging • solvency assessment • fraud reports • removal by the Audit Committee
Specialization	France, Benelux countries	German-speaking countries and other countries of Western Europe	Central and Eastern Europe	Spain and Portugal

Due to the dispersed entity structure and increasing price competition the further expansion of open European freight exchanges requires a strategic turn consisting of the creation of logistics platforms as a comprehensive product for shippers. The current leader of IT solutions in the European market of logistics platforms, oriented at the needs of large shippers is *Transporeon* which was established in the German city of Ulm in the 1999, and since 2006 it has also been present in Poland. Unlike the leaders of the open European freight exchanges it serves only about 1,200 European industrial and commercial enterprises, which however, generate traffic needs significantly exceeding the required volume by weight of cargo to ensure the achievement of profitability. IT solutions offered by *Transporeon*are are conducive to establishing long-term relationships with users as a result of the possibility of integration with their ERP-class computer systems (*Enterprise Resource Planning*). Particularly important for users is the possibility of integration with their TMS modules (*Transport Management System*), in particular the support module for time and place of vehicle loading management (*Time Slot Management*) offered by *Transporeon*. Basic differences in the business models of European Freight Exchanges operators oriented at the needs of carriers and forwarders and logistics platform, oriented at the satisfaction of the expectations of large shippers are presented in **Table 3**.

Table 3 Differences in the business models of open electronic freight exchanges and logistic platforms [own elaboration]

Type of product / **Feature**	**Freight exchange for carriers, forwarders and shippers**	**Logistic platform for shippers and other participants of the supply chain**
Number of regular users	A few thousand to over 100,000	From a few to over a thousand
Duration and nature of cooperation	Short / Majority of one-off transactions	Long/ Strategic Partnership
Quality of service	Uncertain	High
Transaction security and payment deadline	Uncertain	Guaranteed in contracts
Integration with users' information systems	Occasional	Common
The main theme of cooperation	Reducing costs by using the payload of vehicles on the way back	Improving the quality of logistics services
The role of the exchange operator in the construction and functioning of the supply chain	Passive as a transaction broker	Active as a central coordinator of flows

5. CONCLUSIONS

Large market dispersion, falling revenue growth rate, image-related problems related to risk or low profitability of one-off transactions, and growing price competition necessitate significant changes in the development strategy of leaders of the open electronic freight exchanges in Europe. The existing business model consisting in extending the offer of services for carriers, reducing the risk and costs of random transactions and the expansion of the same product to new geographic markets in the long run will not provide them with a growth in profits and a dynamic development. Therefore, a strategic turnaround is necessary, consisting of:

- firstly, the implementation of a new product ensuring comprehensive service in accordance with the expectations and needs of large shippers who are looking for strategic partners in building integrated supply chains and a high quality logistic service,
- secondly, the diversification of the product offers and prices for the use for various user groups (shippers, forwarders and carriers),
- thirdly, striving to digitize processes in accordance with the idea of Industry 4.0 by providing support in the process of integrating the electronic freight exchange with users' computer systems,

- fourthly, the adaptation of IT solutions verified on the market of road transport services for the needs of other modes of transport, including in the first place railway carriers as the main operators of the growing intermodal transport market,
- fifth, the geographical expansion of the product in the Eurasia countries in connection with the prospects for the development of transport along the New Silk Road,
- sixth, building, with the help of the exchange, a community of reliable carriers and drivers, maintaining and disseminating the principles of the concept of corporate social responsibility.

The implementation of the above-mentioned strategic assumptions will allow the leaders of open electronic freight exchanges to transform their products into electronic logistic platforms and gradually shift from one-time mediation in making transactions to the role of active initiators and central flow coordinators in international supply chains. Orientation on long-term forms of cooperation with a limited group of shippers and companies from the TSL industry means, however, giving up the products offered so far to meet the needs of thousands of carriers looking for loads on the way back and for support in making spot transactions.

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