AIR CARGO E-PLATFORM

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Abstract

   E-platforms has become standard tool for freight forwarders in their day-to-day activities. Most of current platforms focus on road transport as it is the most widely used mode of transport. Air Cargo has gained very little attention and opportunities to enhance air cargo transport using e-platform exist. The scope of this article is to investigate possibilities of implementing air cargo e-platform and propose its architecture for air cargo business.

   Keywords: Air Cargo, Logistics, e-platform, Supply Chain Management, Information and Communication Technologies

NOMENCLATURE

DSS – Decision Support System
ICT – Information and Communication Technology
IT – Information Technology
RFID – Radio Frequency IDentification
SCM – Supply Chain Management

1. INTRODUCTION

   Driven by rapid development of information technologies and infrastructure, e-business has changed the economy, altered and introduced new ways of doing business. Changes affected also transportation industry, notably in the area of trading transport services and operational management, and major changes are yet to be seen as new technologies and concepts of taking advantage of increased information availability are introduced. Modern ICT enable companies to [9]:
• take advantage of new supply and distribution channels,
• reduce cost of distribution system through integration and optimisation of business
   processes,
• easily exchange information and knowledge,
• increase quality and range of added value services.

   Benefits from taking advantage of information technologies force competing companies to include e-business in their business models.

Since the early nineties, the World Wide Web has evolved from a merely information resource to a virtual place of commercial activity [3]. The internet provides the easiest common and inexpensive communication of worldwide range. Common communication provided by World Wide Web and computing capabilities provided by IT create opportunity to create new quality in logistic services and considerably reduce costs of business activity in the supply chain, which exists, among others, in improved collaboration, integration and optimization of activities on a cross company level. While many existing IT solutions offer effective means of managing business processes within companies, a cross-company management of the business processes require different stakeholders cooperation. An e-platform is a solution to facilitate such any-2-any collaboration [3].

1.1. Current transport E-platforms

E-platforms facilitating transport operations has become standard tool for freight forwarders and transport carriers in road transport. There are over 100 platforms operating in Europe, ranging from small specialised exchange freight platforms to large platforms with multiple services supporting everyday work to hundreds of thousands of registered customers who can choose from over million offers [9]. Over the past decade, this number has increased considerably and this trend continues. The most popular Freight Exchange platforms contain offers catalogue to match available vehicle space with available freight to maximise vehicle utilisation and reduce empty legs. Tender platforms provide e-bidding procedures.

Currently, there are about 26 e-platforms operating in Poland. Most of them is focused on truck transport, but some also offer services for maritime transport.

Table 1. Major e-platforms. Source: own elaboration based on [9] and websites of listed platforms.

Name	Web address	Transport modes	Geographical range	Users	Offers (daily)
TimoCom	www.timocom.pl	Road	Europe	85000	300000
Teleroute	www.teleroute.pl	Road	Europe	70000	250000
Trans	www.logintrans.com.pl	Road	Europe	200000	100000
Logipeo	logipeo.pl	Road	Europe		
eSpedytor	www.espedytor.pl	Road	Poland	20000	60
CargoGlob	www.cargoglob.com	Road	Europe		
Benelog	www.benelog.com	Road	Europe		
Cargo.lt	www.cargo.lt	Road	Europe		
Ati	www.ati.su	Road	Europe	112000	90000
Raal	www.raal.cz	Road	Europe	17000	100000
Freight Tender	www.freighttender.com	Air, Sea, Road	World	5000	30
Cargo X	www.cargox.in	Air	India		

Air Cargo plays an important but small, in terms of tonnage and volumes, role in the transport industry and has found little attention so far. Very small number of air transport dedicated platforms (e.g. Cargo X, GFX) operate so far. In 2010, a EU co-funded project (Baltic Sea Region programme 2007-2013), Baltic.AirCargo.Net started. The goal of the project is to build an information platform for multimodal transport, including air cargo, road and maritime industry in the Baltic Sea Region. Project partnership include 14 partners from 9 countries led by Wismar University of Applied Sciences: Technology, Business and Design. Baltic.AirCargi.Net will be based on IMOTRIS (InterModal Transport Routing Information System) platform that

has been developed to support maritime, truck and rail freight transport operations. IMOTRIS platforms includes, among others, optimization and routing services, tracking cargo using RFID and GPS technologies is supported.

The scope of this article is to investigate possibilities of facilitating air cargo e-business, what might be target group of air cargo e-platform users and what functionality is needed while taking advantage of experiences of current road transport freight exchange platforms.

1.2. Literature review

In literature, air cargo is overshadowed by passenger transport, and hence there are relatively little works. Rolf Hellermann in his doctoral thesis "Capacity options for revenue management. Theory and applications in the air cargo industry" (2006) presented concept of using capacity options contract to as an alternative to currently used long term contracts between carriers and shippers or freight forwarders and selling capacity in spot market. Current air cargo market and supply chain were also overviewed.

Information Technologies in Logistics had found considerable interest and there is a rich literature on the role of IT in logistics. An examples is "Technologie informatyczne w logistyce" (2010) by Andrzej Szymoniuk, where role of IT in logistics and SCM, security issues and IT systems cost are investigated. Another example is "Informatyczne narzędzia procesów logistycznych" (2010) by Mirosław Chaberek, Andrzej Jezierski et al., where cargo tracking in SCM, IT role in rail and maritime transport, ECR role, security issues are investigated.

Freight exchange platforms find increasing amount of attention in literature on logistics. Examples are "Usługi Logistyczne. Teoria i praktyka" (2011) by Włodzimierz Rydzykowski et al., and "Instrumenty zarządzania łańcuchem dostaw" (2009) by Marek Ciesielski et al., where current freight exchange platforms are overviewed. Main e-platforms, market shares, technologies used and services offered are described in both abovementioned works. While there are many works on road transport freight exchange transport, works on other transport modes platforms are scarce which reflects small number of actual platforms supporting with air cargo operations.

Air cargo e-platform concept has been proposed in "4th party cyber logistics for air cargo" (2004) by Sung-Chi Chu, Lawrence C. Leung and Yer Van Hui. The authors overviewed eras of web development and its evolving role in business, proposed platform design and implementation issues, potential stakeholders, risk, cost and benefits from using e-platforms. Key technologies were also overviewed and example calculations of optimisation of shipment by a decision support system was presented.

1.3. Platform overview

The e-platform discussed in this article is a virtual environment that facilitates business activity of freight forwarders, transport and logistics service providers and shippers. Improvement of supply chain performance is achieved by e-platform through [4].
- reduction of empty space and maximisation of load factors (especially on return trips),
- integration of business processes,
- optimisation of shipments at a cross company level,
- reduction of distribution system cost,
- increased quality and range of added value services (e.g. cargo tracking),
- quick access to vast knowledge on companies and goods (data mining),
- simplified and reduced time of ordering and distribution,

• expand activity area to wider market.

One of important challenges present in air cargo industry is smaller load factor on return trips.[2] Amount of cargo transported to and from regions (e.g. China and Europe) is uneven and while e-platform will not change the export balance, it will facilitate selling existing free transport capacity, improving profit of air cargo operations.

Theoretically, number of intermediary companies could be reduced. Shippers might choose best transport themselves more easily using offers on e-platforms with aid of advanced software tools in DSS. However, taking advantage of advanced software tools also requires considerable knowledge and freight forwarders are more efficient in this task. In practice, on freight exchange platforms, something opposite happens – number of intermediary companies multiplies. More orders means more revenue for freight forwarders and it is profitable to take as much orders as possible and simply resell some of them. In practice, transport carriers can get orders through few intermediary companies[3].

The e-platform provides means of trading services across supply chain and allows to optimize its design. Standardization of data (data interfacing) provided by service providers enables not only to compare offers on single routes, but also to compare different variants of supply chain with different routes, modes of transport, times of delivery, etc. Integrating transactions allows to consolidate shipment and facilitates use of miscellaneous added value services, e.g. cargo tracking. Routing and shipment consolidation reduces transport cost and increase vehicle usage. Optimization tools use parameters to model different business drivers (vehicle capacities, time windows) that can be used to run different what-if scenarios to gain better insight and develop business strategies.

Credibility of companies taking part in e-platform community is of major importance to the users. Internet create tremendous possibilities of fraudulent activities which needs to be addressed to prevent financial losses.

It is reasonable to consider an e-platform supporting multimodal transport. Positive effects of integration, optimisation can be fully exploited, when all transport modes and transportation legs present in a supply chain are available in one virtual place. A door to door service requires using road transport at some stage. Finally, air transport volumes are relatively small and it is easier to attract large number of users by implementing other transport modes.

2. PLATFORM STRUCTURE

Platform structure has been divided into components with functionality as a criterion. The following platform components are discussed:
• Transactions.
• Communication.
• Data bases.
• Decision support systems (GIS, optimisation).
• Miscellaneous added value services.
• Security.

Facilitation of transactions is the core of discussed e-platform. All the other components are built around transactions facilitation and their purpose is to enhance the main activity: trade.

Wide range of services helps attract users, and leading e-platforms with highest market share, like Teleroute, TimoCom or Trans try to create a feature rich environment with everything a customer might ever need (route planners, translators, legal consultations,

vindication services etc.). Operators of small e-platforms with little features try to attract SMEs by low or no subscription fees. Barriers of entry are low. Cargo & Truck administrator Robert Bajkowski, said freight exchange is company's extra service that exists, because it does not generate cost. Ms. Bożena Wyciślok, who purchased eSpedytor, said she invested money worth "a good personal car"[13]. Feature rich e-platform does not guarantee success. In 2007, Prago.eu has started a feature rich platform, announcing to be the first platform to integrate postal coding with the online map which facilitate forwarders work as traditional code maps were still in use. After 2 years, Prago.eu was gone. Quality of a e-platform, from user perspective, depends on:

- number of offers posted on the platform every day to choose from,
- number of registered users,
- efficient security measures to combat frauds,
- user friendly user interface,
- range of services.
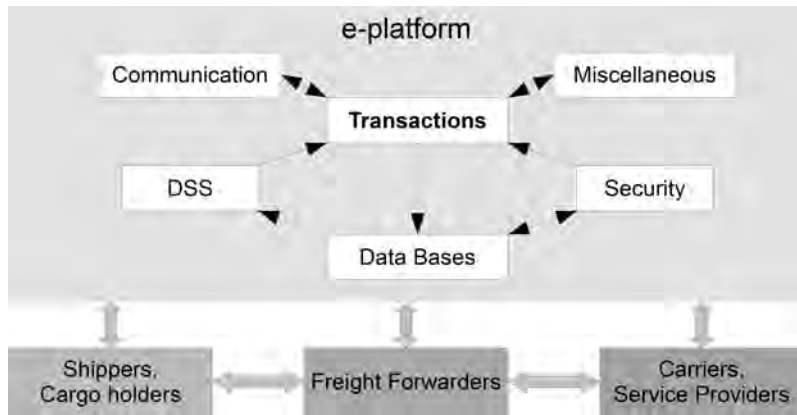
Picture 1. E-platform scheme

Clear, user friendly user interface is an important feature and many users on the forums said they gave up subscription on some e-platforms because of unclear GUI [9].

2.1. Users

E-platform users can be divided into 3 main groups:
- Freight holders – seeking to ship their cargo.
- Forwarders/agents/brokers – middlemen.
- Service providers – air carriers, truck operators cargo handling companies offering their services.

Shippers use intermediary companies to send majority (90-95% volume [2]) of air freight, hence freight forwarders are the most important target group of potential e-platform users. Most of miscellaneous services on the e-platform and DSS need to facilitate freight forwarder activities. Integrators offer door-to-door service and have good SCM systems of their own, and can take advantage of additional distribution channel of their services.

Size of companies, which are potential platform users, range from small firms offering logistic services to large companies operating fleets of vehicles and possibly integrators. User

definitions vary from platform to platform as companies want to advertise their products as possibly largest and most successful on the market. Number of posted offers reflects actual platform use, while registered accounts may be stored for a long time to improve statistics showing market share. Starting or smaller platforms tend to allow registration without limits, while more established platforms (Timocom, Trans) tend to verify user credibility and require to submit licence for transport services number, NIP (tax id number) and other company data during registration process. Some platforms limit users posting offers to companies providing transport only. Credibility is very important to combat frauds, which are especially difficult to combat in international trade and exclusion of incredible companies is necessary.

In terms of size, the most important group of companies that may benefit from platform use are SMEs. Small companies are the largest in number. A large number of users means large number of paid subscriptions for many e-platforms and variety of actions are taken to attract SMEs. Leading e-platforms are not just a distribution channel but a work environment with many functions facilitating day-to-day activities. Small companies are the least computerised[6] and might take advantage of tools like shipment planners with visualisation of important infrastructure (warehouses, logistic centres etc.), companies data bases, user forums for verification of partners or vindication services. Software tools like DSS are especially useful for SMEs that cannot invest enough money in advanced software tools specifically developed to meet company processes needs. Attracting this group is necessary if a platform operator wants to have a high ranking among e-platforms, which is measured in number of users and offers. Small firms also pose the biggest challenge for security reasons. Verification of small companies that has existed for only a short time, in a foreign country, is difficult or sometimes not possible. E-platforms excel at quickly finding new customers which is especially important for smaller and younger companies trading services on spot market. Cargo capacity sold on spot market is 15% to 20% [19]. E-platforms are often considered as an additional tool by service providers, secondary to long term business contacts for the following reasons [11]:

• transport fares are low,
• middlemen (freight forwarders) decrease profit even further,
• risk is high as companies often do not pay for transport (e.g. successful fraudsters manage to operate on a platform for years under a few company names11),
• offers are often far from precise, especially in terms of price (company tell different prices when it comes to make a deal).

As one forum user put it: „Freight Exchange is a lottery, you may hit well or bad, you never know how, you usually talk to 3rd middlemen an you never know who really drive to you"[11]. Users often register and post their offers on a few platforms to increase chances to find good offer and find business contact for long term cooperation. Number of offers and user credibility are the most important factors taken into account while choosing platform [11].

Medium sized companies, being more computerised than small ones [6] may benefit from the broadest variety of supporting tools, including more advanced ones such as fleet routing DSS, or e-documents facilitation while vindication services might still be very useful for them. Medium companies are easier to verify.

Larger companies, especially integrators, with organised planning departments, distribution systems and necessary software tools of their own, may find e-platform a distribution channel for their services.

Air carriers are medium and large companies (above 250 employees), but freight forwarders and shippers range from small to large companies. Implementing other transport modes, especially road transport, on the platform helps to attract large enough user base. Road

transport carriers range from individuals carrying cargo in an owned or leased truck to large companies operating fleets of trucks.

2.2. Transactions

Transactions on e-platforms are implemented in two forms: catalogue of offers and e-bids. Most current e-platforms use catalogue of offers. E-bid tools are often added as an alternative to list of offers, few platforms use bids only. With many users registered on the platform, bidding enables to achieve a better price and trading process might be controlled by setting rules of bidding. Agent technology can be used (e.g. on Teleroute) to automate bidding, user can automatically bid for tender matching selected criteria. Communicators may be integrated with transaction module to increase functionality or ensure paying transaction fee. If e-platform charges transaction fee, there is a possibility that freight forwarder might use the platform to get contacts and make deals by direct contact with carrier to avoid paying transaction fee so displaying contact data may be restricted and a intermediation of integrated communicator might be used instead. Offer catalogue provides convenient input data for DSS enabling to optimise multi-leg shipment. Extra charge can be collected for first place on the list or using bright colour to distinguish offers on the list. Both offers catalogue and e-bids have its pluses and can be implemented to meet different companies expectations.

Picture 2. Offer list on freight exchange platform cargo.lt.

Table 2. Major e-platforms and air freight e-platform types. Source: own elaboration based on [9] and websites of listed platforms.

Name	Trait
TimoCom	Offers catalogue, e-tenders
Teleroute	Offers catalogue, e-tenders
Trans	Offers catalogue, e-tenders
Logipeo	Offers catalogue, e-tenders
eSpedytor	Offers catalogue
CargoGlob	Offers catalogue
Benelog	Offers catalogue, e-tenders
Cargo.lt	Offers catalogue
Ati	Offers catalogue
Raal	Offers catalogue
Freight Tender	Offers catalogue
Cargo X	e-tenders

Picture 3. Auction tutorial on Cargo X e-platform.

2.3. Communication

Communicators are standard in today's platforms. While there are many standalone communicators like Gadu Gadu, Kadu, WTW or Skype, integrating communicator with platform software yields added value by tying interlocutor with information about company one represents (name, location, possible warning about debts) from platform database and facilitation of negotiating and acceptance of offers online. Translation service is an important option while making deals with foreign partners and can be implemented easily in text communicators. VoIP technology enhances communication (e.g. Trans), at the cost of increased connection bandwidth. According to a 2008 study [6], 21% of 7 EU countries (DE, ES, FR, IT, PL, SE, UK) 21% of companies in TSL industry sector were using VoIP which makes it an optional enhancement. Little attention is paid to integration of business processes between companies. Electronic documents, e.g. e-invoices or transport documents (AWB, CMR) might considerably streamline making deals, save costs and accelerate document flow, especially in international trade.

Table 3. Major e-platforms and air freight e-platforms. Source: own elaboration based on [9] and websites of listed platforms.

Name	Communication tools
TimoCom	Text communicator, mobile access.
Teleroute	Text communicator with translator (11 languages), Automated making offers with agent technology. SMS messages to driver.
Trans	Text and voice communicator (VoIP) with contact list.
Logipeo	Text communicator, EDI, FAX/SMS sent from website, e-bids.
eSpedytor	Text communicator
CargoGlob	Text communicator
Benelog	e-bids
Cargo.lt	Text communicator, List of invoices, SMS sent from website.
Ati	
Raal	
Freight Tender	N/A
Cargo X	Tender platform – e-bid form.

2.4. Business Intelligence

An e-platform provides opportunities to get valuable information for business intelligence. Gathered standardized statistical information on transactions is an input that allow to perform market analyses, develop business strategies and more accurately estimate demand for services traded on the platform. Implementation of semantic web technology will further increase analytical capabilities. Platform user activity provide wide range of information on demand, customers interest in available services, desired transport routes, destinations etc. Actual demand for a given service is more accurate information than interview results. These information is valuable for service providers planning their business and can be easily obtained by platform operator.

Most platforms provide, usually free of charge, databases of companies registered on the e-platform or companies willing to advertise their services. These data bases are useful not only to find a company providing certain services, the but also to validate credibility of potential

partners through external sources once contact information is known, e.g. tax registry number can be verified, or debt registry. Credibility of companies making offers through e-platform is an issue addressed on almost all the existing platforms. In addition to ranking systems, monitoring of debt registry and risk index are used. Currently logipeo.eu offers advanced tools to perform analyses and statistics based on user activity, while Teleroute provide statistics.

Any-2-any operation of e-platform makes actors of supply chain use unitized standards and interfaces which facilitate operation of services such as product tracking and facilitate information exchange. Unitised data can be effectively processed.
Input data may be collected from the following sources:
- User registration forms,
- Surveys,
- User search records (desired transport destinations, services, good types etc.),
- Transaction records.

Anonymous data is sufficient for the purpose of carrying out market research and privacy policy permitting data collection should not raise any concerns regarding privacy.

Table 4. Major e-platforms and air freight e-platforms. Source: own elaboration based on [9] and websites of listed platforms.

Name	Data base
TimoCom	Companies data base.
Teleroute	Companies data base. Usage statistics (VIP service).
Trans	Free transport companies and freight forwarders data base.
Logipeo	Companies data bases with possibility to carry out analyses or create statistics.
eSpedytor	Companies data base
CargoGlob	
Benelog	
Cargo.lt	Companies data base with tax id and registration numbers
Ati	Paid companies data base
Raal	Companies data base.
Freight Tender	
Cargo X	Freight Forwarders data base.

2.5. Decision Support System

Decision Support System comprises optimisation and geographical information which are commonly integrated to provide useful presentation of optimisation calculations.

Geographical information plays an important role in many business decisions. GIS is a basis for other services provided by the platform: optimisation, cargo tracking which output need to be presented in reference to geographical location. It provides tools and visual feedback to gain better insight by tying relevant aspects of business activities with its location. GIS service helps to find new trends, patterns and prospects. Visualization should include:
- logistic infrastructure localisation (roads, airports, warehouses, logistic centres, rail stations etc.) with selected information (e.g. air strip length, airport class, warehouse area, road class)
- points of interest, e.g. specific company localisation,
- visualisation of a route in another user offer,
- planned routes visualisation and selected information (route length, time etc.),

- information on possible hurdles (curfews in airports, strikes);
- goods tracking visualisation,
- location search using postal codes.

Table 5. Major e-platforms and air freight e-platforms. Source: own elaboration based on [9] and websites of listed platforms.

Name	Geographical Information Service
TimoCom	Route visualisation.
Teleroute	Route visualisation. Address search. Finding offers along planned routes. Graphical interface for offer search (criteria set using visual interface).
Trans	Route visualisation. Detailed information about route, including cost, road hurdles (truck type dependent). Available freight is shown on a map to easily find opportunities to increase load factor.
Logipeo	Route visualisation
eSpedytor	N/A
CargoGlob	Route visualisation
Benelog	N/A
Cargo.lt	Map facilitates collecting customer oriented information on current threats (closed roads, police radar control, weight control, mobile customs etc.)
Ati	Route visualisation
Raal	Graphic milestone
Freight Tender	N/A
Cargo X	N/A

Air carriers, especially large, have good planning departments of their own, as they are key to airlines success and flight schedules are planned for months ahead. Freight forwarders, however could benefit from optimisation of planned shipment.

The goal of freight forwarder decision support system is to aid construction of shipment from different offers on e-platform. The e-platform provides means of trading different services across supply chain and allows to optimize its design. Standardization of data (data interfacing) provided by service providers enables not only to compare various offers on single routes, but also to compare different variants of supply chain with different routes, modes of transport, times of delivery, etc. Integrating transactions allows to consolidate shipment which reduces transport cost and increase vehicle usage. Using set of parameters modelling transport (vehicle capacities, time windows, limit risk, cost etc.) user can run different what-if scenarios to gain better insight and develop business strategies. Single or multi objective optimisation allows to minimise time, cost or risk of delivery. The shipment is constructed on the basis of offers made on the platform by service providers. The offers may include transport, handling and other services required to construct a shipment. The constraints include type of cargo (dangerous goods, oversized cargo, normal cargo, etc.) limit time, cost, risk level ecological pollution etc. A lot of methodologies has been developed that can be used to effectively improve shipment design which is an area that deserves another article. Optimisation has been used in an increasing scale in variety of real-world applications in past few decades, yielding a significant 5% to 20% savings in costs [5].

In many existing freight exchange platforms (see Table 6.), a route planner is provided for use by truck operators. Sometimes platform operator avoid spending their money on software

development or purchase and they just post links to Google maps, Bing or Interia maps, which provide rudimentary functionality enabling to find more or less optimal point to point road route. The leading companies (Trans, Teleroute, TimoCom) pay more attention to provide customers with useful information on possible offers location in the proximity of route (Teleroute), road hurdles even including avoiding the law enforcement (e.g. police radar or weight control). In Logipeo, a module optimising routing of a vehicle fleet is offered. Vehicle Routing Problem with its variations (time windows, line hauls, heterogeneous fleet, etc.) has been researched extensively for many years with good results (e.g. [7]). In a transport study[6], 36% of companies stated that ITC will have high impact on traffic system optimisation in the future, while 40% acknowledged medium impact, which shows acceptance of DSS importance. Network of scheduled air connections is much less dense than road or even rail connections, however finding a direct connection from a long and minimising number of stops yields considerable amount of saved cost and time, similar to what is achieved by services such as http://www.lataj.pl/ which optimises passenger air travel. Optimisation of shipment can be fully utilised when a complete shipment with multimodal air and road transport legs is designed using e-platform's DSS.

Table 6. Major e-platforms and air freight e-platforms. Source: own elaboration based on [9] and websites of listed platforms.

Name	Decision support module
TimoCom	Route planner with length and time optimisation, tolls and alternative routes taken into account.
Teleroute	Route planner
Trans	Route planner
Logipeo	Cost optimisation of single vehicles and vehicle fleet.
eSpedytor	N/A
CargoGlob	N/A
Benelog	N/A
Cargo.lt	Route planner
Ati	Route planner, time and length optimisation.
Raal	N/A
Freight Tender	N/A
Cargo X	N/A

2.6. Other services

A number of miscellaneous services can improve user benefits from using the platform and gain competitive advantage over competing platforms. This is area where creativity comes into play. It is possible to extend range of features of a e-platform without investing money by just providing link to or cooperation with a partner company providing a useful service. Some services on e-platforms, are "provided" by simply posting a link to a website or contact data to external firms. A good example is espedytor.pl offering variety of useful information:
• exchange rates,
• fuel prices in various countries,
• information on hurdles (strikes, accidents),
• news releases, esp. on legal and economy issues.

Services that are useful to customers, outside of platform operator core competence are:
• insurance,

- factoring,
- vindication,
- legal consultations.

Given large number of platform customers, providing services on a platform is an opportunity to boost revenue for partner companies while platform operator may secure proper service quality through partnership. Air transport is largely an international business which poses a challenge to provide legal consultation and vindication service in different countries and an opportunity to provide such service as it may be otherwise difficult to obtain by a foreign company. Cooperation with local companies in each country may be necessary to obtain companies with good expertise on local realities. Leading platforms provide translation service in a text communicator or by phone.

Integration of supply chain provided by e-platform enables freight forwarders to compete with integrators, which provide quality added value services. Any-to-any nature of a e-platform provides feasible means of managing information flow among users, unitized standards and interfaces to facilitate operation of services such as product tracking and to facilitate information exchange. Tracking a package is especially challenging when many companies need to cooperate to deliver goods. Taking full advantage of RFID and GPS technology requires standardization of information infrastructure. To meet the requirement to achieve near real time information, there is a need to improve most airports information infrastructure to exchange data on aircraft schedules, parking stand and real time updates. Companies are increasingly pressing the airport authorities to install RFID detection equipment.

Table 7. Major e-platforms and air freight e-platforms. Source: own elaboration based on [9] and websites of listed platforms.

Name	Added value and miscellaneous services
TimoCom	Consultation on legal, software and technical issues.
Teleroute	Current fuel prices. Adverts of user company. Insurance service.
Trans	User forum. Transport informer with practical information about road hurdles. Paid translation on the phone. Factoring services provided by partner company. Information about company user is making business with (Security).
Logipeo	Document management system facilitating invoice, CMR exchange, report generation.
eSpedytor	FMS (Freight Monitoring System) – monitoring of truck fleet: fuel consumption, tracking, event handling, SMS notification. RFID and CAN support. Various: shop, credit, exchange rate, free days in Europe, fuel prices etc. User Forum.
CargoGlob	N/A
Benelog	N/A
Cargo.lt	Notice board with jobs, cars for sale and other. User forum.
Ati	User forum.
Raal	N/A
Freight Tender	N/A
Cargo X	N/A

2.7. Security

Reliability of internet user identification is an inherent weakness of e-business. Operating on a global market just makes things much worse. On the positive side, companies may meet stricter security requirements than individuals. Credibility of offers and companies is of major

importance to platform users. Main concern are companies that pay late for services or not at all. Shippers on the other hand, are concerned with timely carried out service without losses and don't want to pay for bad service. Another problem is activity of criminal organisations, e.g. con artists claiming to be legitimate freight receiver, who intercept shipment. As an illustration of the scale of problem, only a quarter of submitted registration forms (675 of 2862) were accepted by Trans in one month[12]. Platform operators are aware of this and offer wide range of security measures to enhance possibilities to verify companies making offers. Truck operators are often SMEs, sometimes with brief history of operation and hence much more difficult to verify. Starting up an airline requires to get many national and international permissions (IATA, domestic aviation office e.g. ULC in Poland) hence airline credibility is easy to verify. It is, however also easy to obtain enough information to act as a known company. Internet allows a con artists to forfeit their identity online easily and some form of physical evidence (e.g. scan of employee passport) or verification in state regulatory office is needed for verification to be reasonably credible. Many approaches, preventive and active, need to be taken to ensure credibility:

1. Detailed information on represented company is submitted by users during registration, including transport licence, tax id number (NIP in Poland), company address, registration number (KRS and REGON in Poland), company's manager id document scan, civil liability insurance (OCP in Poland) etc. Submitted information is verified (e.g. KRS, REGON, etc. are publicly available and easy to verify). Variety of submitted information is enough to verify company existence with reasonable reliability, but fraudulent activities of legally existing companies are possible, hence some form of activity is needed. Identity theft is another vulnerability, information about especially large companies are publicly available.

2. User ranking systems are in common use. Both transaction parties submit their mutual evaluation with positive or negative marks (or integer numbers, e.g. 0 to 10) and comments. Companies with many negative marks have little chance of finding customers. Such systems are recognised to be effective (at least by platform operators). On the down side, it takes time to gain enough positive marks to start getting more deals.

3. User forum, maintained by the platform allow to find information from posted opinions and to directly ask other users about a company. User forum is one of primary sources of information about potential business partners[3].

4. Risk evaluation, based on information from business intelligence companies and company performance on e-platform. National debt registry (e.g. Krajowy Rejestr Dłużników in Poland) is monitored to find dishonest companies and individuals. Such service is provided, e. g. on TimoCom platform (TransRisk). As using intelligence company services cost money, such service is offered for extra charge.

5. Certificates are granted to firms who have good operating record (e.g. 4 years in business and clean history are required for Trans certificate).

6. Debt registry is maintained on the platform to warn other users.

7. Risky companies are excluded. E.g. TimoCom requires that a company exists for at least 6 months. Companies outside of the industry cannot post offers on some platforms, e.g. companies not providing transport (without appropriate licence) cannot post offer of transport services. Companies previously banned for fraud are often not permitted to register again.

8. Help in dealing with not paying companies is offered, which may be in the form of mediation between parties before taking legal action in a court, posting a company on a debt list (see also 6), vindication services (e.g. Inkaso service on TimoCom or Trans) or banning a company

from using a platform, which might be more effective than vindication. The most effective companies report vindication efficiency in the range from 55% to over 85%10.

It is possible that, especially starting, platform operators pay no attention to user credibility and responsibility for partner verification is left completely to the users. It might be tempting to allow as many users as possible to get a market share quickly, but companies screening is of major concern to the users. Whether platform is considered safe or not, the users often want to have possibility to get information on potential business partners. Ranking systems and user forums are the primary sources of information that can be provided by the platform [11].

Table 8. Major e-platforms and air freight e-platforms. Source: own elaboration based on [9] and websites of listed platforms.

Name	Security measures
TimoCom	Detailed information required during registration, data are verified. Company must have existed for 6 months prior to registration. Platform debtor list. Reliability index. Ranking system with comments. User forum. Vindication services.
Teleroute	Detailed information required during registration, data are verified. Partner verification. Reliability index "STAR". Vindication services.
Trans	Detailed information required during registration, data are verified. Platform debtor list. Monitoring of transport debt registry. Reliability index. Ranking system with comments. User forum. Optional certificate for reliable companies. Vindication and factoring services.
Logipeo	Contact data and Tax Id required and verified. Ranking system.
eSpedytor	Contact data and Tax Id required.
CargoGlob	Contact data and Tax Id required. Ranking. Debtor list. Removal of debtors accounts.
Benelog	Company registry number, tax Id number, address, civil liability number are required during registration and verified before acceptance. Rating system for every transaction.
Cargo.lt	Company registry number (REGON) submitted during registration. Black list of debtors and opinions on companies. Vindication service. User Forum.
Ati	Ranking system. Risk index "Reliability passport"
Raal	Detailed information required during registration, including tax and company registration number.
Freight Tender	Registration info
Cargo X	Registration info, Income Tax PAN number required, scan of Pan card, IEC certificate, user agreement sent to platform operator for verification. Ranking system. Money have to be deposited before bid.

CONCLUSION

Developing a successful integrative platform is a challenging task. In order to get the benefits of supply chain management, it is necessary to attract large enough number of users. The software standards change very often and it is needed to keep up to date with newly introduced standards (operating systems, databases, interfaces, etc.) while maintaining backward compatibility with previous ones. Platform architecture design needs to be reliable, scalable and modular to allow further platform development during its operation.

Integrators, such as UPS or FedEx offer complex door to door delivery including added value services, such as cargo tracking which let them achieve most of the market share. Other cargo carriers lack behind the integrators in terms of service quality that has not improved. Platform lets freight forwarders organize competitive quality delivery with added value services.

Though most technologies necessary to start a platform already exist, its operation will require g a common IT interfaces at different airports. Decision support system in the platform owing to integration of input data will allow to decrease operating costs through optimization. Airlines and airports might and should benefit from the platform by taking active role as stakeholder in the e-platform community to attract customers and increase its market share. Regional airports may benefit from having possibility to offer flights at more convenient times and frequencies than overcrowded hubs. Airports are aggregating product and services that can be used to create business opportunities. Many airports use mostly obsolete "Reactive web era" internet web sites, without transactional capability, which can make the website direct source of profit, not cost. Because the entry costs are low, it is likely that other companies will take advantage of the situation and secure income from trading services. Giving up involvement in e-business leads to risk of losing revenue to competitors. As technologies that used to be revolutionary become common, customers turn more demanding. While buying habits shift to expect product at the door after purchase, the shippers, air cargo carriers and freight forwarders need to have transaction models that integrate with their sources which is key to their success in the emerging e-economy.

Acknowledgments

REFERENCES

Books:
[1]   Ciesielski et al., Instrumenty zarządzania łańcuchami dostaw, Polskie Wydawnictwo Eko-nomiczne, Warszawa, 2009, pp. 145-155.
[2]   Hellrmann Rolf, Capacity options for revenue management. Theory and applications in the air cargo industry, Springer, Detmold 2004, pp. 5.
[3]   Sung-Chi Chu, Lawrence C. Leung, Yer Van Hui, 4th Party Cyber Logistics for Air Cargo, Kluwer Academic Publishers, Boston/Dordrecht/London, 2004, Chaps. 1, 2, 4.

[4] Szymoniuk Andrzej, Technologie informatyczne w logistyce, Placet, Warszawa, 2010, pp 150.

[5] Toth, P., and Vigo, D., The Vehicle Routing Problem, SIAM Monographs on Discrete Mathematics and Applications, Philadelphia, 2002, PP1.

[6] ICT and e-Business Impact in the Transport and Logistics Services Industry, Study report No. 05/2008, e-Business Watch, Bonn / Brussels, September 2008, pp 43.

Newspapers and magazines:
[7] Robert Przybylski, Baza danych na złodziei, LTS Logistyka Transport Spedycja 4/2011.
[8] Marek Loos, Giełdy wychodzą z kryzysu, Truck & Business Polska numer 19 (April – May 2010).

Web sources:
[9] http://www.spedycje.pl/logistyka/produkty_dla_tsl/23957/gieldy_transportowe_jak_wy-brac.html
[10] http://www.trans.info/message/view/13319.html
[11] http://www.goldenline.pl/forum/szukaj?q=gie%C5%82dy%20transportowe
[12] http://www-cfd.spedycje.pl/logistyka/produkty_dla_tsl/11638/teleroute_dobrze_oce-niane_przez_klientow.html
[13] http://www.truck.pl/pl/article/678/coraz-g%C4%99stsza-sie%C4%87-gie%C5%82d,mb_3479