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ICT NETWORK SOLUTION FOR THE EFFICIENT TRANSNATIONAL TRANSPORT

ROLA SIECI TELEINFORMATYCZNEJ DLA SPRAWNEGO TRANSPORTU MIĘDZYNARODOWEGO

Streszczenie: Europejskie małe i średnie przedsiębiorstwa mają niewielki dostęp do zoptymalizowanych rozwiązań transportowych. Niniejszy artykuł pokazuje w jaki sposób zaproponowane scenariusze w ramach projektu KASSETTS rozwinęły się w Centralnej Europie i pozwoliły na dynamiczne tworzenie skutecznych rozwiązań w transporcie dla małych i średnich przedsiębiorstw za pomocą wiedzy, inteligentnych usług IT dostarczanych przez organizacje Unii Europejskiej, które funkcjonują jako koordynatorzy logistyki. Zaproponowana koncepcja okazała się mieć pozytywny wpływ na efektywność w działaniach transportowych.

Słowa kluczowe: ICT, sieci, transport, logistyka

Abstrakt. European SMEs can hardly access optimized transport solutions and normally generate a scattered demand producing a large number of transport means. The paper shows how the approach taken within the KASSETTS project based on proposed operational scenarios, developed in the Central Europe and enabled Central Europe manufacturing SMEs to jointly and effectively participate in the dynamic construction of efficient transnational transport solutions by means of knowledge and intelligent ICT services provided by the EU wide network of intermediary organizations acting as logistic coordinators. The proposed concept proved to have a positive impact on the effectiveness of transport routes.

Key words: ICT, network, transport, logistics

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INTRODUCTION

The Institute for Transport and Logistics Foundation, together with seven European partners belonging to the Central Europe territories, have launched an initiative to establish European ICT network to optimize and improve transnational logistic traffics of manufacturing companies within the project KASSETTS. This project is implemented through the CENTRAL EUROPE Programme co-financed by the ERDF with duration from 2008-2012. The paper presents some results from the project outputs and concepts.

Transport and logistics belong to critical components of a successful economy. The transport and logistics sector and modern infrastructure play a major role in national economies and is a significant contributor to competitiveness at both the national and local level. The transport sector currently generates 7% of European Union gross domestic product (GDP) and for around 5 % of employment in the EU. The growth of goods transport within the EU, at a rate of 2.8 % per year since1995–2004, was broadly in line with economic growth, which was 2.3 % on average in the same period. The fast growth of freight transport – driven to a large extent by economic decisions – contributes to growth and employment but also causes congestion, accidents, noise, pollution, increased reliance on imported fossil fuels, and energy loss. Road congestion, the increased costs and environmental negative impacts are pushing on the need of modern environmental friendly and efficient logistics and transport systems.

The importance of the above mentioned issues is underlined also by the global logistics industry growth, which is estimated at roughly EUR 5.4 trillion, or 13.8% of the global EU GDP. On average, logistics costs account for 10-15% of the final cost of the finished product. Also in this field, a lack of reliable statistical information on the situation exists. Co-modality and high efficiency in the transport system are indispensable for Europe to manage the increasing flows of goods. However, globalisation and a wider Europe create new challenges. In June 2006, a communication from the EC (2006) outlined the main problems faced by the organisation and operation of the European Transport system.

"The organisation and operation of the European transport system are not optimal. The efficiency of the system and its integration are not as advanced as they could be. Rapid growth of freight transport with consequential congestion, accidents, noise and pollution are amongst the economic, social and environmental problems that need to be addressed. Furthermore, effective planning, management and control of unimodal and multimodal transport chains through logistics solutions are not sufficiently developed for the objectives of co-modality to fully materialise. Freight transport needs to do more to maintain and increase European competitiveness."

In the field of European transport policy, the Commission announced further measures to reach the 2001 proposed goals (COMM 2006). These include amongst others: (a) a plan of action for goods transport logistics, (b) the promotion of intelligent transport systems and new technologies for a more environmentally friendly and efficient mobility and, (c) European approaches to mobility in Urban areas.

Aside from this communication and measure and because of not sufficient results of Lisbon Strategy, another strategy „Europe strategy 2020" emphasizes the needs of digital society development, where information and communication technology should play a crucial role in achieving higher competitiveness and in increasing the productivity and efficiency of business processes esp. in SMEs.

Therefore, advanced quality solutions supported by intelligent ICT, knowledge and network solutions are needed for Europe to improve its transport and logistics position in the world market. Being a centre of transport and logistics excellence, with the appropriate measures and incentives in place, would help economic, social and environmental sustainability in Europe and attenuate negative trends, such as relocation of business activities and employment away from Europe.

This requirement was one of the important issues for an Action Plan for Freight Logistics in 2007 formulated by the European Commission (2007a). Potential measures include actions in relation to research and the use of information and communication technologies (ICT), infrastructure planning, service performance, and multimodal supply chains. It presents a number of short- to medium-term actions that will help Europe address its current and

future challenges and ensure a competitive and sustainable freight transport system in Europe.

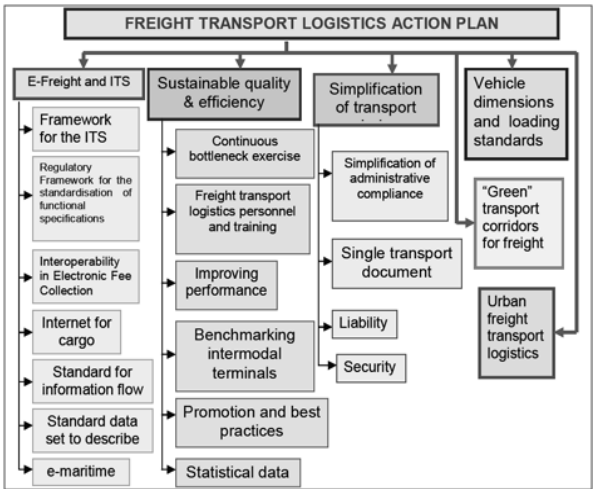

Figure 1. Action Plan for Freight Logistics in 2007
Source: (European Commission 2007a)

ELECTRONIC SERVICES DEVELOPMENT IN TRANSPORT AND LOGISTICS INDUSTRY

There are a vast number of trends and challenges in the transport and logistics industry (TLS) (Šebo 2009). Visible development was achieved also in the field of information and communication technology adoption for the transport and logistic processes. The eBusiness watch study „eBusiness in the transport & logistics industry" from 2008 shows that 97% of companies in the sector have the Internet Access (eBusiness watch 2008). Together, within the last years e-business has increasingly gained importance. E-business presents both opportunities and challenges for the TLS sector: opportunities to improve service, increase productivity and reduce cost, and challenges as it creates new supply chain requirements and capabilities and new marketplaces with particular demands.

Transportation has a significant influence on the speed and reliability of the order cycle and the quality of customer experience. As critical supply chain members, transportation suppliers must be able to function as partners, to produce, share and manage information and to provide higher levels

of service in terms of speed and reliability. They have to be able to trace and track shipments under their control and make the information readily accessible to customers or supply chain partners. Transportation or logistics services companies, providing real-time information in a customized way, can become an integral part of their customers' supply chains, creating the opportunity to secure long-term business by embedding their processes in those of their customers and adding value beyond traditional transportation and logistics offerings (CT Act Review 2001). e-Business technology enables logistics and supply chain managers to meet these demands by integrating systems, collaborating within and across firms, and sharing information throughout the supply chain, enabling supply chain participants to plan and synchronize their processes. One of the key role in the process improvements play process automation, which means the integration of business applications and data with the global network solutions or with the systems of the company's trading partners. Integration with global networks multiplies the effect of the specific solution for electronic negotiation and planning which can bring efficiency in cost reduction and effectivity (Antlová 2004, Doucek 2005).

According to eBusiness watch study, about a fifth of firms in the TLS industry reported the use of software solutions or internet-based services for electronic procurement. This shows that there is a gap between the percentage of companies placing at least some orders online (41%) and those that use special software for this (20%). It can be assumed that companies without such software place orders mainly through websites or extranets of suppliers, which does not require any special e-procurement system. The digital back-office integration of procurement related processes (all the way from ordering to the receipt of goods/services) is probably not in advanced state in these cases. It is interesting to observe that the percentage of firms with special ICT systems for e-procurement is more than three times (20%) than those firms with an ERP system (6%).

Together, supply chain management software can help companies from the TLS industry to match supply and demand through integrated and collaborative interaction tools. SCM provides an oversight of the flows of products/materials, information and finances, as they move in a process from

supplier to manufacturer to wholesaler to retailer to consumer. SCM coordinates and integrates these flows both within and among companies. However, in the TLS industry 6% of enterprises say they have an SCM system. The use of SCM systems is clearly a domain of the large firms: while only about 6% of SMEs said they had adopted a SCM system, about 36% of large firms did so. More advanced systems, for example for cargo handling and fleet control are used by SMEs only between 5-10%. From some interviews realized within KASSETTS projects, the low level of international or cross-border electronic cooperation between manufacturing SMEs and logistic operators was identified. We also need to take into account that companies from the TLS cooperate with international partners generally in less than 20%. If examined e-solution adoption between these companies, the result would be considerably lower. For example, ICT based on fleet control is used for international market only in half of cases against regional market.

REGIONAL DISPARITIES IN ICT OR NETWORK SOLUTION ADOPTION

According to the results of KASSETTS project, the analysis of practices and experiences (interviews with more than on the use of ICT for logistics cooperation revealed that there are big differences between EU regions logistic systems and different ongoing types experiences in ICT logistics cooperation. In Slovakia for instance the status of logistics has specific characteristics, different from other European regions. In Slovakia we cannot speak about logistic centres or clusters with territorial vocations like in Italy. Even if there are associations representing the transportation sector, logistics is still decentralized and spread all over the country. A very similar situation occurs in Slovenia. However the Slovakian situation changed a bit in the last 3 years and new logistic halls were built in Western Slovakia, which are used mainly for trans-shipment purposes. In the country the conservative approach to IT solutions in logistics still dominates, so SMEs mostly rely on their own experience-based databases and own “logistic brokers”. They do not use external ICT solutions very often and privilege internal customised solutions. However, we have to say that in these days, when the crisis is lowering the level of transport demand and the number of companies with unused fleet capacity is rising, there are more companies looking toward new solutions and possi-

bilities on how to fully utilize their logistics capacities. The Slovakian and Slovenian situations show that a cooperative approach is far from being used daily, since the scattered demand of transport is spread on the whole country instead than being more concentrated on districts or clusters, as on the other hand it happens for example in Emilia Romagna region (Italy). In both Slovakia and Slovenia logistics solutions implementing up to date algorithms for transport missions calculation are not a perceived value nowadays.

In Hungary, the concept of Logistics is quite young but the new opportunities are not to be ignored since a strategic aim at national level is to become a logistic centre and intercontinental cargo hub in Middle-East Europe by 2013. This situation lacks of an adequate existing spirit of real collaboration and transport optimization experiences. In addition, the delay in the availability of web based technologies (still existing digital divide) may have caused the delay in the networking logistics approach (collaboration, and cooperation with an optimisation goal).

A different situation is depicted by the analysis of experiences in some Polish and German regions where the logistics approaches are up to date. In both cases advanced logistics is a matter of fact, even if at the moment the use of ICT solutions for logistics do not totally match with the KASSETTS collaborative proposed solution to create new fields for the cooperation, optimization of logistic affairs as well as for the improvement of competiveness of SMEs through logistics cooperation.

The situation in the Czech Republic depicts that efforts have been made in logistics, but the interest in providing better solutions for SMEs is quite young, since the interest has been more focused on the transport supply side.

Emilia Romagna region (Italy) represents an advanced example of collaboration in logistics and implementation of practices & perspectives on broker experiences, as well as in the ICT logistics cooperation. The territory of the region is in fact homogeneously characterized by many industrial districts and clusters that require better solutions aimed to the cooperation and optimisation of logistic traffics.

The analysis on the ICT approaches presently used in the Central Europe area are not all at the same level of maturity and implementation and some-

times they present very different IT functionalities. We can start from simple catalogue based services offering tools for searching logistics services (simple information on logistics operators' profiles), to GPS or Mobile vehicle tracking services, to better networking services for the transport offer and demand that calculate and organize transport missions. But generally the background of all these ICT experiences clearly shows that cases in which the ICT tools include network and ICT based intermediary functions are very poor

SOLUTION FOR ICT BASED EFFICIENT TRANSNATIONAL TRANSPORT

Because of small volumes and frequency of SMEs transports, and then of their limited contractual power with logistic operators, SMEs can hardly access optimised transport solutions. Rather, they normally generate a scattered demand producing a large number of nonsaturated transport means. This is particularly critical in Central Europe because of the strong prevalence of small companies and their habit to trade with partners in other countries (long supply chain). The objective of reaching a high saturation of trucks, and possibly of multimodal containers, is twofold: (a) finding a sufficiently large number of collaborating companies located in the same territory to aggregate their payloads, and (b) combining these with the payloads of companies in other territories to complete the routes and avoid empty tracts. Then, when addressing transnational transports the optimised crossborder use of saturated means involves user SMEs located in different countries and their demand to aggregate. The paper is aimed at describing concept and technological approach of the Central Europe Programme KASSETTS project. KASSETTS aims at enabling Central Europe manufacturing SMEs to jointly participate in the dynamic construction of efficient transnational transport solutions by means of knowledge and intelligent ICT services provided by an EU wide network of intermediary organisations (logistic coordinators). To this purpose, every logistic coordinator is put in condition to daily collect and aggregate the scattered demand coming from its associated SMEs, compare this demand with offers by logistic operators, find online synergies with other logistic coordinators located in different countries, and submit the identified transport solutions to the user SMEs. The intended ICT services provided

by every logistic coordinators are intelligent since they define optimal routes by combining the demand from local SMEs and from other logistic coordinators; identify the most suited transport means and the most convenient operators; support the preparation of transport related documents, and assure their automatic format conversion and contents translation.

The ultimate aim of the KASSETTS project is optimising the transnational physical mobility of goods generated by manufacturing SMEs by creating and fostering the adoption of ICT tools and services, so as to reduce environmental impacts of transport at the regional and transnational levels. This approach is based on the creation of a stable EU operational network of logistics coordinators (also called logistic Brokers) supplying ICT services, which support the involved manufacturing SMEs to better organise their transport demand and better exploit logistics supply, in order to make transnational transport chains more efficient and reduce transnational traffic volumes through transport demand aggregation (critical and optimised mass of transport demand). Each logistics coordinator aggregates and optimises the transport demand of the associated SMEs, defines optimal routes and transport means used at regional and at transnational level in dynamic combination with other logistics coordinators, matches SMEs demand to the logistics supply offer, manages the transnational exchange of transport documents. The expected result is improving transport efficiency by setting up an open transnational ICT network among manufacturing companies and between them and logistics operators as cornerstone to improve logistics management at the transnational level.

An integrated and competitive internal market is essential to face the global challenge, and the mass adoption of ICT services is considered a condition to raise productivity levels in the EU. On the other hand the project mainly focuses on medium long distance routes, on which the task assignment by logistic coordinators is expected to introduce rationalisation elements in the freight traffic generated by SMEs, which are hardly in condition to reach alone a good efficiency level. The final goal is moving the same quantity of goods with the same quality of service but with a smaller number of trucks and a higher percentage of rail transport. The KASSETTS contribution to the environmental dimension is an expected +23% of the average

saturation index (up to 75%) and +12% of the rail traffic, for the transports managed by logistic coordinators. The project is intend to contribute to Lisbon and Gothenburg objectives by providing an increasing number of SMEs (and logistic operators) with easy but effective information, advice and planning services for efficient transport organisation, so as to help overcoming the traditional resistance to change. The innovation potential of the devised approach is dramatic and can lead to a huge impact on cohesion, integration and competitiveness, but SMEs cannot afford it alone.

OPERATIONAL SCENARIOS FOR THE TRANSNATIONAL LOGISTIC BROKER

To meet the mentioned objectives the functional architecture should be built around the logistic services of each Broker provided to the associated user companies, and the collaboration that is established between Brokers constituting the logistic network. The following figure depicts the devised situation, to be taken as reference (comprehensive) framework for the analysis of the operational scenarios.

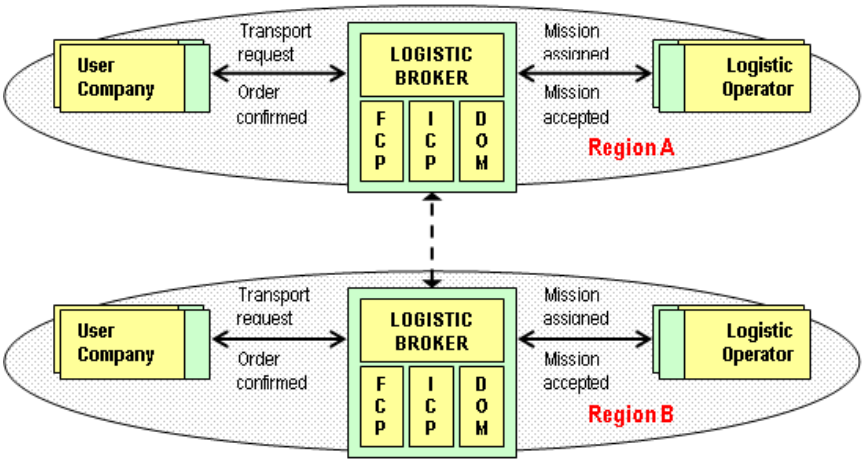

Figure 2. Transnational model of logistic broker

According to the scheme, every user company uses the Broker client to submit transport requests (issued manually or extracted from its legacy system). In the next step, the Broker computes the best transport missions meeting the needs of the community of users, and assigns them to the most convenient logistic operators. To do this the Broker uses three main func-

tions, namely finite-capacity planning (FCP), infinite-capacity planning (ICP), and demand-offer matching (DOM). The involved logistic operators accept or reject the assigned missions. If accepted the order is confirmed to the single company, if rejected a new computation is performed by the Broker. When the Broker in Region A computes a transport mission reaching Region B, it can ask the corresponding Broker a support to complete or optimise it.

REGIONAL SCENARIOS

Regional operational scenarios are those involving a single Broker acting in its region to meet the requests from the associated user companies. At this point in time, and taking into account the experience gained in collaboration with ITL, we foresee a suite of five basic operational scenarios justifying the devised Logistic Broker functionality.

User company fleet planning

This scenario refers to those user companies owning an internal fleet of lorries (or hiring it in exclusive) to cover, even partially, their transport needs. It happens that the internal fleet is not used optimally especially in case of complex transport requirements. The Broker provides an optimal run computation service thus relieving the user company from a task that does not belong to its core business.

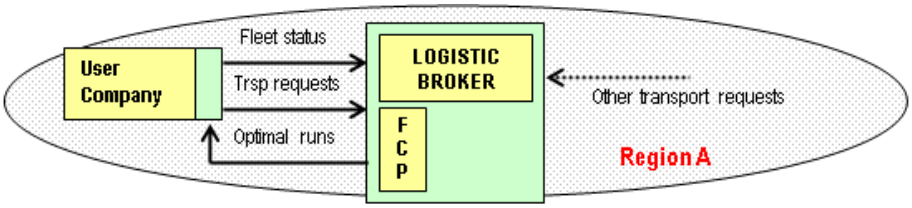

Figure 3. Fleet planning model of user company

In the first step the user company uses the Broker client to communicate the current fleet status (availability of lorries) and submit the transport requests to be satisfied. Then, the Broker computes the corresponding optimal runs (missions) by the FCP function, and communicates them to the user company for execution. In case the lorries are hired in exclusive the user company can ask the Broker to include loads from other companies so as to saturate the fleet capacity.

Logistic operator fleet planning

A similar scenario may occur in case of small-medium sized logistic operators not provided with advanced fleet planning functions. It is possible normally to have one or two persons who define missions on the basis of their only experience and intuition. Although, the problem can emerge in risk to define non-optimal runs and very long training of newcomers to replace those persons.

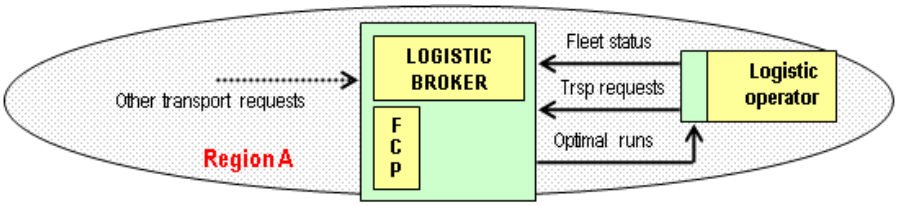

Figure 4. Fleet planning model of logistic operator

The Broker service is perfectly symmetric with the previous one, since it uses the FCP function to compute optimal runs (missions) on the basis of fleet status and transport requests, and communicates them to the logistic operator for execution. Even in this case the operator can ask the Broker to include loads from other companies (i.e. to enrich the demand) so as to saturate the fleet capacity.

Demand aggregation and planning

This is the most effective scenario to show the benefits, in terms of traffic and cost reduction that the Broker can assure to the user companies. A quite large number of experiments have proved that the reduction of transport cost overcomes in the average the 20%, with peaks of 30-40% for small companies and 10-15% for companies spending more than 1.5 million Euro per year. In this case, the user companies submit periodically (daily, twice a day) their transport requests to the Broker that aggregates them per date, type of material, origin, destination and so on. The Broker computes the optimal missions by the FCP function to saturate first the lorries made available by the user companies provided with an internal fleet. Then the Broker computes the further optimal runs that are necessary to fulfil the remaining transport requests by using the ICP function that also identifies the most convenient lorry types. After that, the Broker computes the costs of these

missions according to the price lists of the qualified logistic operators, and selects the most convenient ones. If one of the selected operators does not accept a proposed run another operator is selected in its place according to cost estimation, and finally the run is confirmed to the user companies.

Offer matching

This scenario refers to the possibility, for user companies and logistic operators, to offer logistic services as a form of neighbours' collaboration. It happens, when an organisation has already decided about the mission but the run might be already completed or the load saturated by serving another partner. This is particularly useful in case of infrequent or far destinations, being the demand aggregation not effective. In this case, the offer can be submitted by a user company working with its internal fleet as well as by a logistic operator performing its core business. The Broker compares their offer with the known demand of neighbours collaboration (see the next scenario) and identifies the degree of matching. The offer submitter is informed of the found collaboration opportunities, and of their cost, and can book the most interesting (or reject all).

Demand matching

This scenario considers the possibility, for user companies and logistic operators, to ask for logistic services as a form of neighbours collaboration. It happens when an organisation has loads the planning phase did not include in the defined missions because of incompatible time or space constraints. This is particularly important in case of infrequent or far destinations, being the demand aggregation less effective. In this case, the demand will be submitted by a user company searching for special conditions to solve a certain transport need (sometimes a logistic operator could do the same) and the Broker compares it with the known offer of neighbours collaboration (see the previous scenario) and identifies the degree of matching. The demand submitter is informed of the found collaboration opportunities, and of their cost, and can book the most interesting one(or reject all).

TRANSNATIONAL SCENARIOS

Transnational operational scenarios are those involving two or more Brokers, each acting in its region, that collaborate to find optimal solutions for long-distance transport needs. At this point in time, and taking into account the experience gained in collaboration with Institute for Transport and Logistics Foundation in Italy, we foresee at least three operational scenarios requiring further Logistic Broker networking functions.

Joint mission computation

This scenario refers to the case of a Broker planning a long-distance transport, that is, a transport crossing the border of its region and, possibly, those of other regions. In principle, the Broker is able to calculate efficient missions in its region while its knowledge of regions far away is not equally good, then a precious help could come from the collaboration with other Brokers established in those regions.

With reference to the figure below imagine that the Broker of Region A is planning a mission to transport good to Region B. In other words, the picking run is basically carried out in the former regions while the distribution run is carried out in the latter. According to its competence, the Broker A can very well define most of the mission, with the probable exception of the distribution run.

A practical solution is Broker A sending to Broker B details of the distribution plan and receiving back an accurate definition of the distribution run. To this purpose Broker B processes the request coming from Broker A as if it was coming from one of its user companies. The used planning functions are the same, specific networking functions are need to support the implied communications between brokers.

Clearly, this is just a trivial example of what could happen in practice. The contribution from Broker B will be more complex if, for instance, the picking and distribution runs are carried out in both regions. Moreover, if they are also carried out in further regions C and D this will call for involving the respective Broker C and Broker D. A deeper analysis of joint mission computation cases is indeed required.

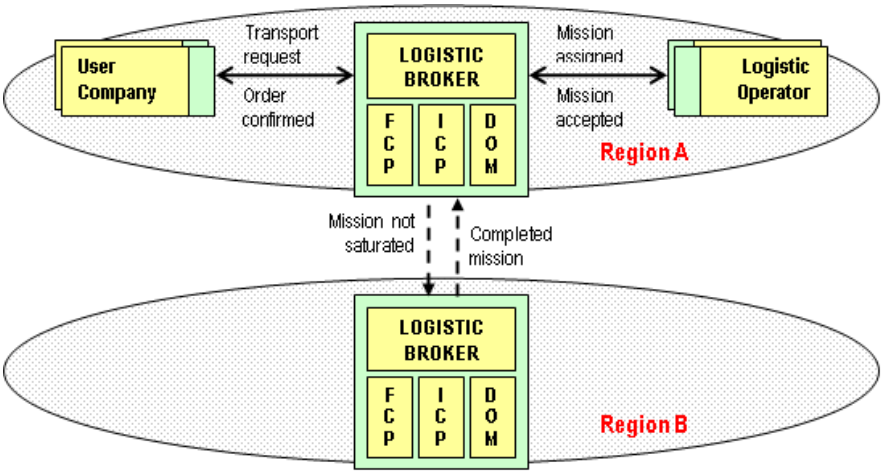

Figure 5. Joint mission computation model

The needed networking ICT services are to communicate transport requests by the applying Broker platform and to return transport missions by the collaborating Broker platform, as detailed in the following chapters of this document.

Joint mission completion

This scenario is likely representing the most complex situation that can occur in the Broker network. Not only the Brokers can collaborate in the definition of an optimal transnational transport, it can also happen that, say, Broker A has planned that mission but it is not complete in terms of lorry saturation. Then it could be convenient to ascertain if further loads can be taken in the origin or destination regions, or in crossed regions.

This will activate all the possible Broker functions, for instance: (i) FCP to decide which loads can added to the mission to reach the best saturation, (ii) to plan local transports feeding the transnational mission, (iii) DOM to check for demands that are consistent with the mission journey. This involves in turn user companies and possibly logistic operators in the other(s) region(s).

The needed networking ICT services are to communicate transport requests and demands by the applying Broker platform and to return transport missions and matching offers by the collaborating Broker platform, as detailed in the following chapters of this document.

MULTILINGUAL DOCUMENT EXCHANGE

The Broker works in an application context populated by user companies, logistic operators, public authorities, control functions and so on. Moreover, through the Broker network it can reach the homologous organisations in other regions. An intense flow of documents moves between these actors being affected by with multi-coding, multi-standard and multi-lingual problems.

At the first glance, the documents to exchange include supply orders, exchanged by user companies, possibly located in different regions, belonging to the same supply chain; shipping notices, exchanged between user companies and the logistic operators transporting materials of their interest, international consign notes, exchanged by logistic operators covering fractions of a long-distance transport crossing national borders, and pro-forma invoices, generated by the Broker and sent to the user companies and logistic operators that have used its services.

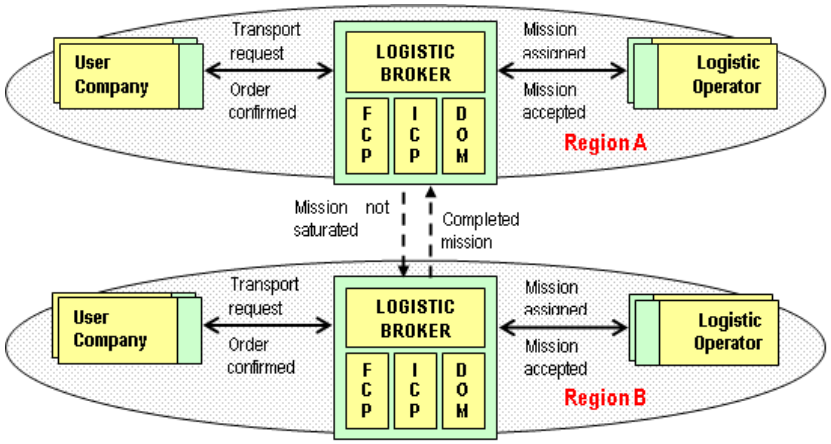

Figure 6. Joint mission completion model

As a matter of fact the Broker network is a powerful communication channel to facilitate document exchange provided that the sender and receiver organisations are registered as users of one or the other Brokers. This scenario asks only for networking ICT services, as detailed in the following chapters of this document.

CONCLUSION

The approach is already partially tested in isolated implementations of the broker experience (e.g. in the province of Modena IT), very important to measure in practice the added value brought by the network. Using such logistics solutions provided benefits in terms of savings and helped companies to reduce traffic's negative effects on the environment. These benefits were proved by using presented approach with great initial success, where at local level following indicators were estimated: cost saving over 20% by user SMEs, 30% less kilometres run by vehicles and number of transport routes reduced by 37%.

As presented, the aim of the proposal is to optimise the transnational mobility of goods produced by manufacturing SMEs by creating and fostering the adoption of ICT tools and services, so as to reduce environmental impacts of transport at the regional and transnational levels. The efficiency of presented approach is conditioned by the creation of a stable EU operational network of logistics coordinators (also called logistic Brokers) supplying ICT services, which support the associated and involved manufacturing SMEs to better organise their transport demand and better exploit logistics supply, in order to make transnational transport chains more efficient and reduce transnational traffic volumes through transport demand aggregation (critical and optimised mass of transport demand).

As each logistics coordinator would be able to aggregate and optimise the transport demand of the associated SMEs, define optimal routes and transport means used at regional and at transnational level in dynamic combination with other logistics coordinators, match SMEs demand to the logistics supply offer and manage the transnational exchange of transport documents, it can bring the opportunity to support of meeting the objectives in strategies mentioned on the beginning of the paper. Of course, we need to examine and reduce risks, which are emerging with all new concepts or ideas potentially implemented into commercial sector. First, the low awareness and readiness of ICT impact, which is still visible, can cause slow uptake of these services. The risk can be reduced by better promotion based esp. on presentation of good practices and trusted scenarios based on security is-

sues (Doucek 2008) and trust building scenarios (Delina et all 2007). Second risk is low eSkills of relevant employers, which can cause low willingness to adopt and manage such solutions. According to new eSkills initiative of European Commission, the emphasis on the eSkills improvement should be given in all European regions to avoid obstacles of using the benefits of Digital Society for better competitiveness.

Generally, aggregation of demand and offer in all sectors in the form of electronic business networks, not only in transport and logistics, can provide substantial benefits. Additional services, naturally attracted on saturated marketplaces, as trust building mechanisms, contract execution support or financial services will bring new additional value into the supply chains of each sector.

REFERENCES

Antlová K., *Elektronický obchod, příležitosti a hodnocení*. In: E+M, 1/2004, TU Liberec. ISSN 1212-3609.

Basl J., Šimková E.,*Business value of IT. In: System integration 2006.* Praha, VŠE 2006, s. 421-427. ISBN 80-245-1050-2

CT Act Review. *The Impact of E-Business on Transportation.* Canada Transportation Act Review, Final Report. 2001. Accessible from: http://www.reviewcta-examenltc.gc.ca/english/pages/final/ch16e.htm

COM (2006) 314 final - Communication: Keep Europe moving - Sustainable mobility for our continent: Mid-term review of the European Commission's 2001 Transport White Paper (Energy and Transport DG)

Delina R., Vajda, V., Bednár, P. (2007). *Trusted operational scenarios: trust building mechanisms and strategy for electronic marketplaces* [on-line]. August 2007. Kranj: Moderna organizacija, 2007. 78 p. ISBN 978-961-232-205-2 Accessible from: http://ideas.repec.org/p/pra/mprapa/20243.html

Douček P., *European integration viribus unitis – back to ideas of the —K & K|| traditions in new dimensions,* IDIMT-2005 Book Series: Schriftenreihe Informatik, Volume: 16, Pages: 13-29, Trauner 2005, ISBN 3-85487-835-4

Douček P., *Applied information management – Management reference model – Security metrics*. Jindřichův Hradec 10.09.2008 – 12.09.2008. In: IDIMT – 2008. Linz : Universität Linz, 2008, s. 81–106. ISBN 978-3-85499-448-0

eBusiness w@tch. ICT and e-Business Impact in the Transport and Logistics Services Industry. Study report No. 05/2008. EC. Accessible from: http://www.ebusiness-watch.org/studies/sectors/transport_services/documents/Study_04-2008_Transport.pdf

Europan Commision (2007a). Freight Transport Logistics Action Plan. Accessible from: http://ec.europa.eu/transport/logistics/freight_logistics_action_plan/action_plan_en.htm

European Commision (2006). Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. "Freight Transport Logistics in Europe – the key to sustainable mobility" Summary of the Impact Assessment - Points for Reflection, Brussels, 28.06.2006 SEC (2006) 820.

European Commission (2007b). Information Society and Transport: Policy Link. http://ec.europa.eu/information_society/newsroom/cf/itemlongdetail.cfm?item_id=3307

Bonfatti F., P.D. Monari "*Digital Ecosystems of small companies in the enlarged Europe*", eChallenges e2006, Barcelona (SP), October 2006.

Bonfatti F., P.D. Monari "*Putting semantic interoperability between small and micro companies into practice*", eChallenges e2007, The Hague (NL), October 2007.

Hopodka, J., *External Costs of Air Transport.* In: Workshop 2010. Praha: České vysoké učení technické v Praze, 2010, p. 404-405. ISBN 978-80-01-04513-8.

Piľ, J., Szabo, S., Piľa, M. *ICT in aviation engineering education* In: Zeszyty Naukowe Politechniki Śląskiej : seria : Transport z. 70. No. 1848 (2011), p. 75-82. - ISSN 0209-3324

Szbo, S., Gavurová, B., *Význam metód uplatňovaných v ekonomike informačných systémov a informačných technológií* In: Journal of innovations and applied statistics : vedecký internetový časopis. Roč. 2, č. 1 (2012), s. 25-35. - ISSN 1338-5224 Spôsob prístupu: http://jias.euke.sk/wp-content/uploads/2012/06/1-2012.pdf...

Šála, J., Němec, V., *Information Basis of Operational Ragulations in Ci* In: Increasing Safety and Quality inCivil and Military Air Transport. Žilina: ŽU Žilina - EDIS, 2012, p. 68-74. ISBN 978-80-554-0519-3.

Šebo, J., Šebová, M.: *Využitie logistických modelov pri zabezpečovaní verejných služieb na lokálnej úrovni. (CD-ROM).* In: Regióny v pohybe, priestor a čas : zborník prác z medzinárodnej vedeckej konferencie, Bratislava, 19.11.2009. - Bratislava : Ekonomická univerzita, 2009. - ISBN 978-80-225-2842-9. - S. 16-1-16-8.

UNTE project — Final report. Environmental costs cover air pollution, noise and global warming costs. Unification of accounts and marginal costs for transport efficiency. Fifth framework — Transport RTD. November 2003 (www.its.leeds.ac.uk/unite/).

Vadová, I., Szabo, S. E*konomické aspekty charakterizujúce hodnotový reťazec leteckej dopravy* In: Marketing manažment, obchod a sociálne aspekty podnikania : zborník recenzovaných príspevkov z 2. ročníka medzinárodnej vedeckej konferencie : Košice, 23.-24. október 2014. - Košice : Podnikovohospodáska fakulta so sídlom v Košiciach, Ekonomická univerzita v Bratislave, 2014 S. 148-154. - ISBN 978-80-225-3982-1