

THE ROLE OF TSL SECTOR IN PROVISION OF SERVICES TO THE AUTOMOTIVE SUPPLY CHAINS/NETWORKS

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Abstract

This paper points out the problems connected with the entry of SMEs from the automotive sector to the global supply chains/networks. It emphasizes the role of major logistics service providers which configure and coordinate the flows of goods produced by SMEs. Also, the article highlights the need for launching cluster initiatives in the automotive and TSL sectors so as to gain bargaining power in cooperation with the global automotive companies.

Key words: automotive sector, TSL sector, management in supply chains /networks.

Introduction

The leading automotive sectors in Poland and Europe are developing thanks to globalization. Even a small or medium-sized manufacturing enterprise may change its status from a local to international supplier. This is made possible by signing long-term agreements and functioning as a link in an integrated supply chain. This means of internationalization is becoming more and more difficult for SMEs due to both the increasing bargaining power of the global concerns and the changing paradigms of management. There already appear dynamic networks that organize themselves around innovative projects in the automotive industry. Alternatively, SMEs can also internationalize their business activities by creating cluster initiatives. These facilitate the establishment of joint R&D projects and the attainment of 'innovative' status in the databases. The companies from TSL sector that provide services to the SMEs/automotive industry subcontractors are of great importance to their development. The distribution services are usually commissioned by buyers/producers of complex components or

cars, and coordinated by major logistics service providers. The latter's role takes on particular importance as they become the organizers of complex processes in the logistics networks and may become the dealers of the products made by SMEs in the future. The supply systems in SMEs are not complex. Transport is left to local vendors and storage is managed on individual basis. However, it would often be welcomed if these activities could be outsourced as well. This creates an opportunity for the cluster initiatives of TSL sector that provide services to the cluster initiatives of the automotive industry. Therefore, the primary purpose of the article was to emphasize the need for clustering TSL for increased innovatio/SME flexibility in the automotive sector and their appearance in logistics networks. The specific objectives are:

- identifying cells that function as a logistics management in the automotive sector network,
- recognizing computer tools that support the TSL integration,
- examining the conditions of SME clustering in the TSL sector,

It was hypothesized that only through cluster initiatives automotive parts market and the market of logistics services for the automotive industry will evolve towards a more partnership, based on the “win-win” principle between the parties of the network.

1. Logistics management in a supply chain/network

It is more and more often the case that the Logistics Service Providers (LSP) take leadership within the supply chains/logistics networks. Their role in the supply chain has also evolved from 3PL (Third Party Logistics) to 4PL (Fourth Party Logistics). 3PL is a firm that provides comprehensive logistics-related services and manages the flows of information and money between the providers and consignees of its client. Its cooperation with clients is long-term and is based on both partnership and an agreement whereby the 3PL undertakes to maintain standards for timeliness, safety, flexibility of supply, availability of stocks etc. In the late 1990s in the United States there appeared 4PL companies – virtual logistics service providers who offered their clients services whose scope extends beyond traditional logistics and which draw on production and create added value for products during their flow within the logistics chains. All this is based on 3PLs' and other companies' resources (Książkiewicz 2003). Another definition of 4PL describes the companies as integrators who amass their own and other organizations' resources, opportunities and technology in order to design, work out and implement complete solutions for the supply chains created (Maternowska 2002). As seen from the above, it is 4PLs that select 3PL

partners and control the execution of the tasks entrusted to them. This, in turn, is just one step to building the supply chains/networks in the strategic sense. 4PLs organize and coordinate the logistics networks since they possess information on the available market resources, knowledge, experience and information technology. A logistics network is formed by independent enterprises that are interrelated by transport infrastructure and that are capable of using this infrastructure by means of the organizational, technical and information solutions. A 4PL may be the network leader, it creates a strategic map which serves as the basis for a stable or dynamic organization of the collaborating shippers and 3PL, including the companies from the IT sector. The development of the logistics networks is based on the global network of computers – the Internet and the innovative IT companies. It is by means of the Internet and IT applications that dynamic logistics networks (where partners are found on e-marketplaces or e-exchanges) are configured. Such business associations (which are once shaped and are optimal in a given place and time) also form a supply network and, more broadly, a logistics network.

3PL companies conduct their business remotely. Nowadays, almost each 4PL forwarding company possesses a more or less developed subcontractor management system which facilitates the management of documentation, verification, certification and subcontractors' assessment with regard to both costs and the capacity to meet the client's requirements. The e-platforms' main task is to enable the business entities that participate in the logistics networks to achieve savings. This is to be accomplished by the provision of access to information on: the logistics offers, the product and service descriptions and the company profiles. The platforms both facilitate the transmission of data and the exchange of documentation as well as offer the procedures for handling business processes. Furthermore, they allow for the performance of such functions as:

- fleet management,
- tracking shipment progress, order management,
- the exchange of information and documentation between the parties involved in the logistics processes,
- gathering information about transportation routes, logistics and distribution centres, storage facilities, transport terminals, customs agencies, border crossing points, customs procedures etc.

Electronic logistics platforms, which support the functioning of the logistics networks, are formed by four basic modules (Bendkowski 2013: 260):

- e-marketplace – an online platform that allows buyers and logistics service providers to conduct business electronically; virtual logistics exchange,

- e-procurement – a module supporting the management of the logistics services ordering process; the conclusion of transactions,
- e-fulfilment – the processing of orders for logistics services, their execution and monitoring of their progress,
- e-exchanges – a module that integrates the logistics platform management system with the ERP systems of the consignors, consignees and the logistics service providers.

GEFCO, which operates GM's synergic network, is an example of a 4PL company. It hires 3PL service providers (who represent the logistics centers and various modes of transport) via the electronic logistics platform in order to support the supply system of all nine GM factories in Europe. Thanks to the platform, the costs of 3PL service providers were optimized, the logistics processes were improved and safety was enhanced. The work with the use of the platform improves the flows within the distribution system. In 2012, GM sold 9,2 million cars, 1,6 million of which were sold in Europe.

There are processes that take place within a logistics network. Those that take place in stable logistics networks can be subject to systematic re-engineering with the aim of their integration. The level of process integration depends not only on the possibilities of the electronic platform, but above all, on the relations between the network participants. Specialized IT solutions contribute to the increased work automation. However, the quality of service primarily depends on the human factor. Even the best systems will not replace direct and rapid communication with the shippers and subcontractors (e.g. informing about the obstacles or problems in the provision of the service), a swift response to unforeseen events and, more importantly, the modeling of the processes that will be consistent with the expectations (i.e. with regards to quality, cost and time). The processes which form the basis of the logistics networks management include (Brdulak 2004: 54):

- customer relationship management (CRM),
- management of customer services,
- demand management,
- order fulfilment,
- production management,
- supplier relationship management (SRM),
- product development,
- returns management.

The IT tools for process management are set in accordance with the individual needs after identification of the kind of the supply chain/network. The acquisition of innovative IT solutions takes place by way of purchase or acquisition of a license. Furthermore, it can also be the network leader's own IT solution. More and more frequently, it is a 4PL that becomes the network leader.

2. Innovative TSL solutions for the automotive industry

Innovativeness in the TSL sector consists in the activities aiming at either perfecting the already existing or implementing brand new solutions for all aspects of the changes which contribute to the increase in economic, financial, technical and technological efficiency of the logistics networks for the purpose of maximizing the effects of the results of the supply chains/networks management. The OECD terminology (which is used in selection of the projects eligible for European funding), indicates that innovativeness encompasses a variety of activities of research (scientific), technical, organizational, financial and commercial nature that are aimed at developing and implementing some new or substantively improved products and processes. The Centre for Analyses in Transport and Infrastructure (CATI) lists the following types of innovation:

- technical and technological innovations,
- innovations for organization and management,
- innovations for marketing and transport services sales, the infrastructure and fleet,
- financial innovations that pertain to the process of obtaining funding for the development of transport and logistics with reference to both private and public sectors,
- transactional innovations that are connected with the organization, preparation and implementation of transport projects.

The supply chains/networks, together with their service providers, are seeking new opportunities and innovative solutions for transport, shipping and logistics. These can be divided into:

- technological solutions (i.e. the supply chains/networks and their service providers implement new and improved services e.g. just in time, cross docking, tracking & tracking, pack & ride, where telematic technologies are applied),
- process solutions (i.e. they make use of: intermodal transport services in the movement of goods and persons, new methods of transshipment, bar codes, radio frequency identification (RFID) of the flow of goods, GPS, IT systems that model and optimize the transport flows, all of which support the management of a supply chain/network, documentation etc.),
- organizational solutions (i.e. they operate in consortia and clusters, they use electronic logistics platforms, submit to integration led by the operators of logistics services 4PL and accept accounting within the integrated city transport tickets or electronic city cards while providing transportation services),

- marketing solutions (i.e. they sell their services via freight and vehicle exchanges, the Internet, possess loyalty programs for ship-pers/passengers, examine customer needs and monitor client satis-faction, participate in trade fairs),
- financial solutions (i.e. they seek financing for the development of transport infrastructure and logistics from the Structural Funds and find public partners for activities in the aforementioned areas).

The classification of innovation in TSL sector is presented in Table 1.

Table 1. The classification of innovations for transport, shipping, logistics, TSL sector as a whole, depending on the type of the consignee

Innovations for Transport, Shipping, Logistics, TSL sector																			
Technical and technological				Organizational and management				Process				Marketing and sales				Financial + PPP-related			
T	L	S	TSL	T	L	S	TSL	T	L	S	TSL	T	L	S	TSL	T	L	S	TSL
multinational corporations and organisations				multinational corporations and organisations				multinational corporations and organisations				multinational corporations and organisations				multinational corporations and organisations			
organizations responsible for national/regional infrastructure				organizations responsible for national/regional infrastructure				organizations responsible for national/regional infrastructure				organizations responsible for national/regional infrastructure				organizations responsible for national/regional infrastructure			
agglomerations/cities				agglomerations/cities				agglomerations/cities				agglomerations/cities				agglomerations/cities			
clusters in TSL sector				clusters in TSL sector				clusters in TSL sector				clusters in TSL sector				clusters in TSL sector			
industry clusters				industry clusters				industry clusters				industry clusters				industry clusters			
supply chains/networks				supply chains/networks				supply chains/networks				supply chains/networks				supply chains/net-works			
T,S,L enterprises				T,S,L enterprises				T,S,L enterprises				T,S,L enterprises				T,S,L enterprises			
SMEs				SMEs				SMEs				SMEs				SMEs			

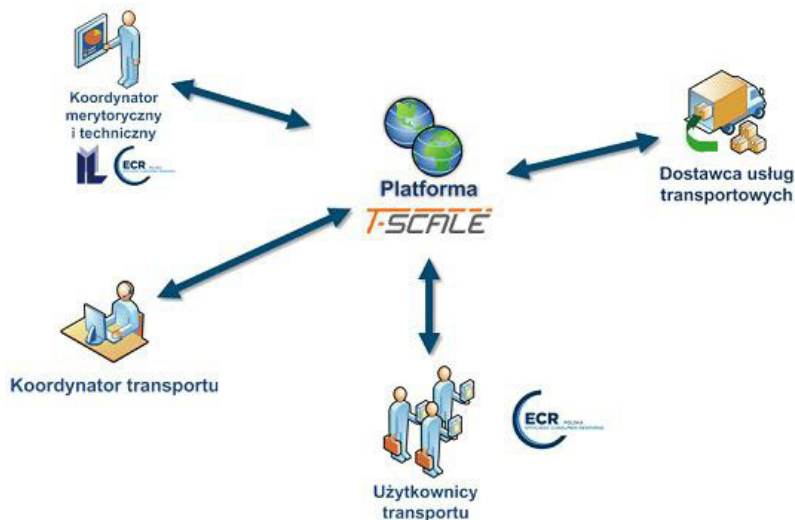
Source: own elaboration.

The above indicates that the innovations proposed by 4PL for the auto-motive supply chains are of great importance. The implementation of in-novations is founded on either the win-win or Vested concept¹. The exam-ples of technological innovations that were created by a 4PL and that are based on the win-win concept include MonZa (an IT system) and T-Scale (a communication platform). The purpose of T-Scale is collaborative pur-chase of transport services by the system users. T-Scale allows for real-time

¹ Vested concept draws on John Nash's game theory for which he received the 1994 Nobel Prize. Nash discovered that in order for a team to win, each of its members ought to do what is best for both him/her as well as the team. Thus, the whole team is going to be victorious. Based on this concept, Kate Vatasek formulated five basic rules for Vested Outsourcing which are focused on: the results, clear principles for results measurement, financial incentives and supervision over the logistics network. Such approach evokes an initiative in a partner, who, by means of the financial incentives, is motivated to implement the innovations.

exchange of information between the entities that are involved in transport operations (the transport user, the transport service provider and the coordinator). The cooperation brings benefits e.g. the reduction of personnel costs connected with transport organisation. This is achieved by the transfer of particular responsibilities to the transport coordinator. The ideas for solutions are presented in Figure 1.

Figure 1. The collaboration of companies in the organization of transport processes



Source: elaboration based on the materials of the Institute of Logistics and arehousing.

The concept of collaboration is based on the assumption that the shippers operating within the industry or region share information on the planned venues from which deliveries will be made as well as the points of destination for the finished products. The coordinator's key tasks include: grouping routes so as to maximize the volume of cargo dispatched in a particular direction or imported from a given region, as well as obtaining benefits for all platform users by attainment of better tariffs from the carriers. In addition, an electronic platform allowing for the exchange of information on collaborative planning of resources is being developed. Its purpose is the support of the transfer of information between the collaborating entities. The CPFR (Collaborative Planning, Forecasting and Replenishment) concept is based on the agreement whereby business partners (from transport, forwarding, logistics and shipping sectors) regularly exchange information. IT system MonZa generates purchase offers on the basis of sales forecasts. The Institute of Logistics and Warehousing implements this innovative solution based on co-financing within regional operational programs (Doliński

2011). A similar TSL solution for the automotive sector was produced by Müller – Die lila Logistik company. It uses Kanban technology and VMI (Vendor Managed Inventory) system in order to improve the material flows. Moreover, consignees it plans transport routes (that are based on such methods as: milkrun, full truckload direct routes and cross-docking), as well as makes use of the economic analyses, which take into account the distance, time limits, times of loading/unloading, logistic parameters (i.e. outer dimensions) and insurances. In 2011, the company was awarded The German Sustainability Award for its effective integration of freight movements into ‘green routes’ (which combine the supply flows of different enterprises). Furthermore, General Motors named Müller – Die lila Logistik ‘Supplier of the Year’ twice (in 2011 and 2012). The award is granted for outstanding achievements in the area of technological innovations, excellent quality, support in placing products on the market and low-cost solutions. Müller – Die lila Logistik’s solutions are also dedicated to SMEs. As a logistics service provider for Polish home appliances sector, it once again organizes Forum for Home Appliances Producers and builds a positive image of Polish companies on the international arena.

3. Clusters in the automotive sector vs. clusters in TSL sector

Those observing the automotive and TSL sectors may receive the impression that they do not need integration as both in the automotive market and among the companies that provide the logistics and transport services for the automotive industry the hierarchy has long been established. This is true in case of the cars and automotive spare parts distribution systems and the components supply systems from the first-rank suppliers. However, the suppliers of the second and lower ranks (the subcontractors of goods and services for car producers) ought to cluster with the aim of improving innovativeness and competitive advantage over the consignees. In Poland, these are thousands of enterprises which presently have no say power against the international producers of automotive components/modules or TSL – 4PL.

At present, the SMEs in both the automotive and the TSL sectors are regarded as an easy source of margin or even a trade credit. Therefore, SMEs of the automotive and TSL sectors should be clustered. According to Scott Norton, the cluster approach is characterized by: common goals, common competences, collaborative work, collaborative decision-making, harmonized priorities and plans, collective responsibility, power and trust, common remuneration and motivation system. The cluster/network structure allows for rapid implementation of innovations thanks to effective man-

agement. Brilman (2002: 426). enumerates the following rules for network management: specification of both the functions and character of the entities, infrastructure, infostructure, infoculture, contacts and laws, organizational and strategic coexistence, operators, management and users. It can be presumed that the number of cluster initiatives in Polish economy will grow. What is more, they will integrate TSL sector and SMEs from the automotive sector, as well as generate the following types of innovations: technical and technological, organizational and management, process, marketing, financial and PPP-related.

The spatial concentration of enterprises that are interlinked by means of a network of various cooperative and competitive relations and that are frequently concentrated around universities is an increasingly widespread phenomenon (Przybyłowski et al. 2011: 13). The clustering of TSL and automotive sectors ought to be a deliberate act on the part of stakeholders i.e. SMEs and both the regional and national authorities. Several automotive clusters e.g. Silesian Automotive Cluster (Śląski Klaster Automotive), the Wielkopolska Automotive Cluster, Automotive Parts Manufacturers' Association and logistics clusters e.g. Silesian Cluster of Logistics, Cluster of the Innovative Railway Technologies, Southern Railway Cluster, Maritime Cluster of Western Pomerania, NOSTRA Association – Modern Transport Systems (Stowarzyszenie NOSTRA – Nowoczesne Systemy Transportowe), Interdisciplinary Partnership for Innovative Transport and Infrastructure Development Cluster were established in Poland. They took different forms of functioning: non-formalized cooperation beside the cluster animator, a civil law agreement, an association, civil law partnership or corporation. At the beginning of their activity, clusters are open to new members. While conducting statutory activity, the cluster animators collect membership fees, use public funds and maintain close contact with foreign clusters of a similar profile. The integration of systems and logistics processes, that determines efficiency and effectiveness, is of key importance in clusters. The domination of the small and medium enterprises that compete strongly with one another on the market within the clusters, does not indicate that there are no areas of economic activity where cooperation could be established. In order to accelerate the process of integration, cluster animators ought to develop a vision of the integrated system, point out the benefits that it may bring and list the strengths and weaknesses of the ongoing merging of enterprises (Stawiarska 2012: 22-32). The cluster initiative is subject to various external influences and should not be a static scheme. On the contrary, it ought to be dynamic and mobile as only then may it create sectoral innovations and support the innovative solutions within the supply chains/networks (Sureephong et al. 2008).

Intensification of cluster activities is based on the cluster assumptions and goals. However, this does not indicate that the strategies of the clustered enterprises need to be fully in line with the cluster strategy or that the parts of the models of integrated businesses must fit into the model of the network.

Brzóska (2007: 33) divides the network models into four groups:

- the models that are based on determinants of profitability,
- the models that shape the competitive advantage,
- the models that are based on the key resources,
- the model that are based on innovations.

The examples of clusters whose basic premise is the creation of innovations include the aforementioned Polish automotive clusters or ACOD (Automotive Cluster Ostdeutschland). The purpose of integration (particularly that led by 3PL) in TSL sector is undoubtedly the acquisition of the key resources for serving the most demanding customers. A cluster that is focused on resources (i.e. whose operations are based on the model that relies on the key resources), will attach particular significance to integration of the logistics, transport, information systems and the maximum use of their shippers' supply, production and distribution systems. The coordination of the activities (including communication) ought to take place on the operational, tactical and strategic levels. It is necessary to create precise but flexible rules of procedure of the group as well as develop some conflict resolution mechanisms. It should be noted that it is possible to produce common innovative solutions in each model. Furthermore, in order for cluster innovativeness to grow, communities of practice are built².

The results of the research conducted by German clusters in both TSL and automotive sectors have revealed regularities regarding the factors that influence the development of given areas (the structures, services, competences and reengineering of jointly implemented processes, innovative projects and financing). The conclusions drawn from the research can be listed as follows:

1. The structural development is dependent on knowledge. New members undergo 'performance' tests where their potential is analysed. Moreover, training courses are arranged for them and they are incorporated into the knowledge management system.
2. The development of services depends mainly on the flow of information within IT platforms that facilitate the establishment of business contacts.
3. The competences and reengineering of jointly implemented processes and innovative projects are the effects of proper data and

² *Community of Practice*, (CoP) – the term was first used in 1991 by J. Lave and E. Wenger to denote a group of people who share a wish to solve a particular problem and collaborate over an extended period of time sharing ideas, searching for solutions and creating new knowledge in order to achieve it.

information management. The active cooperative support for the project initiatives is of crucial importance here. There are project management tools (cooperation agreements, project planning, project description forms, criteria for the selection of the project manager, the tools for planning improvements and network analyses, guidelines for project meetings, the minutes of the meetings, forms for early recognition of impending crises in the projects, evaluation made by the project participants).

4. The funding of the studied clusters slowly becomes independent due to the establishment of the membership fee, organization of marketing campaigns, promotion of projects and public relations of TSL clusters.

Conclusions

It is only by means of the cluster initiatives that the automotive parts market and the logistics services for the automotive industry market will evolve towards a more partnership cooperation that is based on 'win – win' principle. In the current uncertain economic situation, with the high Euro exchange rate and high fuel prices on the one side and the clients' pressure for innovative solutions and lower prices on the other, it is the only way for automotive subcontractors to develop. 4LP can be the leader of the network, create a strategic map on the basis of which a stable or a dynamic organization of co-shippers (3PL and the IT companies) arises.

IT develops electronic logistics platforms which support performance of the logistics networks. By electronic platforms, the following operations are implemented:

- management of contractors fleet,
- tracing the shipping route, order management,
- exchange of information and documents among participants of logistic processes,
- gathering information on traffic routes, logistics and distribution centers, storage facilities, transport terminals, customs agencies, border crossings, customs procedures, etc.

Electronic platforms provide efficient flow between the cell networks. Creating and functioning of the cluster initiatives allow entrepreneurs to implement the "win-win" principle. The structure of the cluster depends on the needs of regional shippers. These needs should be measured by the cluster animator ie. the company 4LP. Its task is also pointing to the effects that can be achieved by cooperation, showing the strengths and weaknesses of the dynamic merger processes in the TSL sector.

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