

FLAGSHIP FIRMS OF A DISTRIBUTION NETWORK IN SUPPLY CHAINS OF METALLURGIC PRODUCTS

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Abstract Enterprises cooperating in supply chains must efficiently react to variable conditions of the external environment and skilfully adapt themselves to changes inside the structures of the chain. A turbulent and stormy environment is the main factor affecting the reconfiguration and changes of the structures of supply chains, including the enlargement of the width of individual chain links of the chain. The presentation of networks of cooperating enterprises and network supply chains, proposed in the article, indicates a new exploratory area which is the role of flagship firms and their strategy in distribution networks with postponed production.

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1. INTRODUCTION

The cooperation of enterprises in different network configurations is a consequence of dynamic changes in the environment and customers' behaviour, which is difficult to forecast. Participation in a network is for an enterprise an opportunity to enlarge its potential at relatively low costs. On the other hand, a differentiated supply base provides a possibility of creating innovative solutions both in the area of product innovations and innovative logistic services. Networks of cooperating enterprises take different organizational structures depending on the type of the relationship between the subjects and the kind of subjects which are the actors of the network. Supply networks, which are a type of networks of cooperating enterprises, are the widest look at the cooperation of production, commercial and service companies (including logistic ones). After narrowing the research to the analysis of the flow of selected products, the configurations of enterprises cooperating as part of supply chains can be investigated . Increasing the interorganizational relations on certain levels of the supply chain (through selected links) by network relations, built horizontally with competitive enterprises, allows taking a perspective of the analysis of the network supply chain. The network supply presented in the paper is shaped by developing network relations on the product distribution stage.

The presentation of networks of cooperating enterprises and network supply chains, proposed in the article, indicates a new exploratory area which is the role of flagship firms and their strategy in distribution networks with postponed production. Over the recent years numerous publications have appeared presenting findings of research in the area of supply chains, network supply chains and networks of cooperating enterprises. Interpretations of these terms were mentioned in Chapter 2 of this article. The aim of the analyses in Chapter 2 is to indicate the characterization of network supply chains and distribution networks, essential from the perspective of the further part of the article. Chapter 3 indicates, however, the crucial role of flagship firms in distribution networks. At this stage discussion was undertaken on the meaning of this type of organization in different supply networks. Consequently, the attributes of flagship firms were indicated. Chapter 4 characterized a network supply chain of metallurgic products distinguishing flagship distributors in it. Chapter 5 focuses on the analysis of the changing role of flagship distributors in network supply chains of metallurgic products in years 2003-2010. The authors also indicated other network structures in the metallurgic products distribution sector, including the Metal Cluster and the meaning of the logistic cluster for the organization of distribution processes. The proposed research problems are a consequence of the results of analyses obtained in the authors' research project "An IT system to assist the management of material flows in a network as exemplified by metallurgic products." and the authors' commitment in the cluster initiative established in 2011 linking logistic organizations of the Silesian province and universities, the Municipal Council of Gliwice and the Regional Development Agency.

2. THE NETWORK STRUCTURE OF A SUPPLY CHAIN

The fluctuations of demand, customers' variable preferences, the degree of product differentiation and changes in the micro- and the macro-environment of enterprises are the most essential factors determining the manner of formation of interorganizational relations. The complexity of the relationships between organizations induces explorers to develop both theoretical interpretations of the notion of: the supply chain and exploratory areas connected with the supply chain. The literature mentions a number of notions which attempt to describe complex relationships, including: supply networks, business networks, multidimensional networks of collaborating enterprises or network supply chains. Most explorers of this problem define supply networks as cooperating enterprises, independent legally and organizationally, which compete and cooperate simultaneously. Similar definitions can be found in the literature quoting the notions of business networks and multidimensional networks of collaborating enterprises. The logistic literature increasingly frequently emphasizes that first definitions of the supply chain are not sufficient any longer and require being supplemented with the essence of network relations among between the nodes. Chopra S, Meindl P (2007) indicate that the notion of the supply chain can suggest that at every stage of value adding there appears only one organization (the player). In fact producers can include many other producers (subcontractors) in material flows and many distributors in products flows. Therefore it would be more appropriate to use the notion of: the supply network or the network supply chain, to underline the complex structure of the supply chain.

In numerous supply chains the product differentiation stage to the customer's needs is shifted from the production companies level to the selected links of distribution channels. Then, distributional enterprises are accountable for the "networking" of a supply chain and they shape horizontal relations in order to increase the variety of the offered additional services, the complexities of realized orders or the scope of market influence. This is one of possible options of the postponed production strategy. In the literature one can even encounter equating the notion of "postponed production" with the notion of "delayed differentiation". Such an approach is presented, amongst others, by Aviv, Federgruen (2000). They define delayed differentiation as a strategy allowing reduction of the risk connected with differentiated products through searching for a common base for products and designing products and distribution processes so as to begin the process of their differentiation possibly at the latest. In practice it is stressed that the strategy of delayed differentiation of products requires leading the manufacturing and distributional pro-

cesses on several stages, every of which is characterized with a specific cycle. The findings of the research within postponed production presented in the literature (Schwarz, 1989), (Garg & Tang, 1997) indicate that the advantages of delayed differentiation come down to the following factors:

- · economics of scale
- drawing from the risk pool (listed in the research with the strategic bonus)
- learning effect.

Strong product differentiation limits the role of retailers and classical wholesalers. In such supply chains there is a growing position of enterprises fulfilling postponed production tasks. In order to enable complex fulfilment of distribution tasks resulting from the specificity of supply chains of differentiated products, distributors make investments in resources which allow fulfilling tasks of the last stage of the production process. However, the strong differentiation of recipients' segments indicates the necessity of investment in differentiated and specialist resources. These factors make distributors search for partners with similar or complementary resources, which together with the resources of the base enterprise will allow complex fulfilment of customers' orders. The enterprise which has the skill of building this type of network relations gains a competitive advantage in the product distribution sector of a given industry. Simultaneously it creates a distribution network as well.

One of the essential classifications of networks was proposed by Hagel and Brown (2007) indicating the manner of organization of the network as an essential classification criterion. According to this criterion, the researchers distinguish business networks (networks of processes), which are created through an initiative of specified economic subjects having a strong market rating. Such subjects often take over the co-ordination of processes, simultaneously developing the criteria for selecting subjects for the network and also undertake decisions about establishing collaboration with particular enterprises. This type of networks (dominated) are oriented towards business objectives and the superior objective is to satisfy customers' needs. Such a structure is adopted, among other things, by distribution networks created by distributors with the greatest bargaining power, defined in the article as flagship units of the network. According to this classification the second type of network is business ecosystems (clusters).

Clusters, also called circles, industrial districts, innovation networks can be understood as a spatial concentration of enterprises, institutions and organizations interrelated with a developed network of formal and informal relations, based on a common trajectory of development (e.g. technological, common destination markets), simultaneously competing and cooperating in certain aspects of activity (Knop, 2009). The superior aim of such a network is to transfer knowledge and technology. The organizations which form a cluster concentrate on operational objectives connected with fulfilment of orders using the resource base of the organizations engaged in collaboration; they also set high-level goals, including especially the economic development of a given region and attracting new investors. Ow-

ing to objectives set in this manner, local government units are interested in initiating cluster activity in the region and they support actively participate in this type of initiatives. In the cluster, large and small enterprises gain far more than if they were to work by themselves. The concentration aids creation of new enterprises, products and new workplaces for highly-qualified, well-paid employees (Porter, 2010). The Ministry of Economy accepts the definition of the cluster as: "a flexible form of horizontal collaboration between 3 groups of subjects: enterprises, science and research units and public authorities, which create an environment facilitating intensive processes of interaction and cooperation between individual actors of national and regional innovation systems". The so-defined structure is named a triple helix. Therefore, the key attributes of a cluster are:

- The local structure
- Competition and cooperation
- Triple helix
- Innovations.

Consequently, the main differences between clusters and business networks can be indicated (Tab. 1).

Table 1 Comparison of a network with a cluster; The authors' study with the utilization of: K. Kładź (2009)

Determinants	Networks	Clusters
The basis of the agreement	Contract, alliance (cooperation contract, joint venture, partial takeover)	Contract for establishing a cluster initiative
Value added	Focus on key competences, complex order fulfilment	External advantages (also social ecological, etc.)
Main advantages	Growth of profits and sales, increasing the market range	Access to suppliers, services and labour market, regional development, attracting new investors
The basis of external advantages	Distribution of functions and resources	Location/proximity
Geographical proximity	of little importance	essential

Dominated networks, created by distributors of a strong market position can be complemented with different types of logistic networks. Logistic networks are defined as a system composed of cooperating enterprises rendering logistic services. Logistic networks are to offer complex support of manufacturing and sales processes through combining different logistic processes offered by specialized transport enterprises, distribution centres or logistic centres. Logistic networks can be created on the principles close to the discussed distribution networks, or they can also appear in the form of virtual networks focused on information exchange between cooperating organizations or regional industrial networks - clusters.

Taking into account these two classifications the authors indicated certain networks created in the Silesian voivodship over the recent years. Table 2 takes into account only model initiatives which can help to characterize each class of networks.

Table 2 Classes of networks on the level of the network supply chain; The authors' study

Organization criterion	created: tl	According to the level of the supply chain, on which network relations are created: the supply network, the production network, the distribution network, the logistic network						
	Supply ne	Supply networks Motor industry			Distribution networks	Logistic networks As part of supporting all supply chains		
Business networks	Motor ind				Iron and steel industry			
Clusters	the collabo	According to the variety of the organizations included into Logistic the collaboration (production, commercial, service organizations): Supply network						
	The Silesian Water Cluster	The Si Aviati Cluste	lesian on	The passive and energy- saving building Cluster		The Silesian Logistic Cluster		
The conductor in selected cluster initiatives	of the Upper Silesia Waterworks PLC (S.A.) in Katowice	The Federa Aviati Enterp Bielsk	rises	The Upper Silesia Industrial Park Ltd (Sp. z o.o.) in Katowice	The Association for the Information Society "E- South"	The Regional Development Agency Gliwice		

A cluster can include organizations with a similar business profile, e.g. logistic services providers (the Silesian Logistics Cluster) or various organizations concentrated on business activity in a particular industry (e.g. the Metal Cluster, the Aviation Cluster). In the first case, with reference to supporting a distribution network, the logistics cluster supplements processes realized within the cluster with complex logistic tasks, especially transport ones. In the second case logistic enterprises with trade-dedicated services are included in the structure of the regional industrial network – the cluster.

In 2010 the Municipal Council of Gliwice initiated building The Network of Transport and Logistic Collaboration (The Silesian Logistics Cluster), involving the Technical University of Silesia, the Regional Development Agency, the University of Economics in Katowice and logistic enterprises. The justification of such an undertaking underlined that the Silesian conurbation is a location of great logistic potential. Its developed multi-modal system (airports, railways, a road network, an inland port), including the potential provided by the A1 /A4 highway interchange, the developing Pyrzowice Airport as well as attractive investment lands of the Katowice Special Economic Zone and favourable urban planning con-

ditions are the reason of intensive development of the logistic industry in this geographic area. The development of the logistic industry in this area is also favoured by its geographical location which predestines the Silesian conurbation and Gliwice to the role of the central logistic centre connecting areas of Poland, the Czech Republic, Slovakia and Hungary. This decision will undoubtedly influence numerous distribution network in this region.

3. ATTRIBUTES OF FLAGSHIP FIRMS

Enterprises cooperating in distribution networks depending on the accepted strategy and their bargaining position, take different roles. A special meaning is attributed to the focal position of the leading enterprise in a given network. According to Zorska A (2000), the basis of enterprise networking is the decomposition of the chain of the flagship firm's value as a result of transferring selected activities to be realized by other enterprises which are becoming partners in the network. The flagship unit concentrates on the key competences and the management of the relations in the network. The concept of the flagship firm was introduced by D'Cruz J.R. and Rugan A.M. (1997, 2000). They defined central enterprises in the network as leaders of vertically integrated business networks. Other authors define the flagship firm as the heart of the network (Ernst & Kim, 2002) or as a subject taking a strategically central position (Lazerson & Lorenzoni, 1999). A number of literature studies concentrate on indicating the role of the flagship firm in regional industrial networks - clusters. In this aspect authors additionally underline such tasks as representing the network in the business environment, establishing alliances with science and research institutions, colleges, schools, local government representatives. Therefore, such organizations should coordinate information flows between all actors of the regional industrial network. Actors of business networks, characterized by D'Cruz J.R. and Rugan A.M., are the flagship firm as well as suppliers, recipients, collaborating competitors and other subjects. Moreover, Andersen P. and Christensen P. (2005) notice that flagship firms, due to their own position in the network, are very important in creating and spreading innovation. Referring to the opinions by D'Cruz J.R. and Morgan A.M., it can be accepted that the flagship firm is predisposed to co-ordinating the network and the strategic leadership which allows formulating a strategy for the network and caring for it to be implemented by other members of the network. Yet taking into consideration the result of the study by Girod S.J. and Rugman A.M. (2005) this range should be supplemented with requirements placed upon flagship firms: aspiration to offering synergetic advantages, a long-term vision of the network, providing business stabilization as reference to the strategic role of the central link of the network.

Taking into account the quoted interpretations of the notion: the flagship firm, it can be accepted that the flagship firm of a distribution network is a node which

is responsible for synchronization of material flows and co-ordination of tasks commissioned to partners in the network. The efficiency of the flagship unit in a distribution network involves especially the skill to satisfy the recipients' needs. Organizations of this type are assessed by key partners in a supply chain. Consequently, with reference to the characterizations of the network supply chain quoted in Chapter 2, it can be noticed that the degree of differentiation of a product determines the tasks realized by the flagship distributor and quantities of network relations formed by this subject.

Flagship enterprises of a distribution network realizing tasks connected with postponed production, were defined on the basis of necessary and sufficient attributes. Necessary attributes decide about the central position of such an enterprise in a distribution network, however, sufficient attributes allow flagship distributors to compete among one another. Necessary attributes are especially:

- Steelwork turnovers positioning the enterprise in the first 10 places on the ranking list of distributors
- Quantitative steelwork flows positioning the enterprise in the first 10 places the ranking list of distributors
- Realization of postponed production tasks
- Domestic scope at least
- Centralization according to the mediation
- Centralization according to the degrees of the top

Sufficient attributes include:

- The quantity of different processes realized in the value added stream
- The width and the differentiation of the shaped network relations
- The width of the assortment
- The level of integration of processes in the value added stream
- The width of the possessed distribution network

The role and the tasks realized by the flagship firm are different in particular classes of the network. The central enterprise of a dominated network (business network, processes network), as mentioned above, fulfils the role of the coordinator of material flows, synchronizes flows and builds network relations in order to reduce the negative results of demand fluctuations. The cluster coordinator does not have to participate in material flows. Its main task is to supervise information flows and negotiations, moderating the cluster participants' meetings. The key tasks of the cluster coordinator most often include:

- representing the Cluster in external relations;
- appointing the operating teams, responsible for daily relations with the Cluster Participants, for preparation and realization of specific activities;
- preparation of the annual statement from the Cluster activity;
- collaboration with the Cluster Participants within the development projects;
- co-ordination of work on the cluster development strategy;

- notifying the candidates for participation in the Cluster;
- deciding about the current financial activity of the Cluster as part of the confirmed budget and providing the bookkeeping services;
- efforts in the area of raising external financial sources as part of public support measures for financing the Cluster activities;
- providing animators;
- providing infrastructure essential for the realization of basic activities as part of the Cluster;
- informing the participants about activities planned within the Cluster the website maintenance service;
- preparing reports and delivering them to the Participants;
- leading activities in marketing and promotion;
- initiating cooperation with networks, clusters and institutions from other regions within joint ventures, domestic and international projects and permanent economic cooperation.

4. NETWORK SUPPLY CHAINS AND CLUSTERS – A PERSPECTIVE OF METALLURGIC PRODUCTS DISTRIBUTION

In supply chains of metallurgic products one can observe a tendency for designing structures in compliance with the variant of late differentiation. Tasks connected with the realization of postponed production are shifted in this variant to distribution enterprises. Distribution enterprises, in order to fulfil commissioned orders, establish collaboration with distributors concentrated on other market niches. Such relations, based simultaneously on competition and cooperation, decide about the network structure of the supply chain of metallurgic products on the distribution level.

Changes in the Polish metallurgy observed within the last 15 years indicate the adequacy of selecting this industry in order to study the issues of flagship firms in supply networks. The Polish metallurgy gradually changes its own production offer towards deeply converted products. Such tendencies concern both the production part of the supply chain and its distribution part. Offering additional services by distribution enterprises in order to differentiate metallurgic products in accordance with the specificity of the placed orders, is an answer to changes both in the environment of the supply chain and in its structure itself. Consequently, the strongest distributors on the market combine tasks resulting from the realization of the push strategy and tasks resulting from the realization of the pull strategy. The realization of production and logistic objectives entails the necessity of building numerous cooperative relations in order to gain substitutional and com-

plementary resources. Production and logistic systems, designed in this way, allow complex and punctual realization of complex orders.

Taking into account the attributes of flagship firms of the distribution networks of metallurgic products, flagship distributors have been distinguished. Necessary attributes were used for dividing distributional enterprises in the supply networks of metallurgic products into two groups: flagship firms and other enterprises. At this stage of the research the discriminatory function was used. Attributes characterizing a flagship firm chosen on the basis of the literature research, taken into account in the discriminative analysis, include: product flow streams according to tonnage (in the case of flagship firms, in the metallurgic products distribution sector they are defined by entering an enterprise on the ranking list of 30 enterprises with the highest turnovers with metallurgic products according to tonnage, published by the Polish Steel Distributors' Union, (Miejsce_TLR)), the number of processes realized in the value added stream (Proc_sum), the scope of influence of the enterprise (Zasieg dz P), the width of its own distribution network (Własna sieć), products turnovers according to the ranking list of the Polish Steel Distributors' Union (in the case of enterprises in the metallurgic products distribution sector they are defined by entering an enterprise on the ranking list of 30 enterprises with the highest turnovers with metallurgic products according to value, published by the Polish Steel Distributors' Union (Miejsce OLR)). According to the research presented in Chapter 3, the flagship firm in a distribution network should be characterized with differentiated processes realized in the value added stream (processes connected with inventory control, the organization of transport processes, the differentiation of processes in the area of postponed production, the logistic and marketing information management, etc.), should deal with differentiated groups of recipients and provide differentiated assortment, providing a large capacity of their own distribution network built through a suitable location of warehouses and creation of regional distribution centres increasing penetration of the market which consequently translates into a stream of flowing products in the tonnage perspective and also provides high turnovers of the enterprise. The authors took into account two perspectives of the market share of distributional enterprises: according to the tonnage and according to the value. The first approach stresses the logistic meaning of a flagship firm in a distribution network, and the second takes into account the processes of postponed production which enable an increase in value added on the distribution stage.

Based on the market analysis of steel distributors, including the market share of individual enterprises and the intensity of shaped relations, it can be noticed that 20 enterprises from the base of the Polish Steel Distributors' Union stand out from the group of all the participants of the metallurgic products distribution sector. Simultaneously, these enterprises took over the key role in consolidation of the entire metallurgic products distribution sector. Consequently, a hypothesis was put forward that these subjects were potential flagship units of the network.

In order to properly select for further research representatives of the distribution sector, classified initially as flagship firms of the network, a discriminative analysis was performed on the entire group of distributional enterprises associated in the Polish Steel Distributors' Union (67 enterprises).

The joint fulfilment of all the necessary attributes allowed qualifying the subject to the group of integrators of the distribution network of metallurgic products, On the basis of the observation of distribution enterprises and based on the trade data analysis and interviews with experts of this line of business, taking into account the network relations built by them and the co-ordination of logistic processes, an initial categorization of subjects was made into flagship firms and other enterprises.

The variables which are to fulfil the criterion of division are the indicated necessary attributes of the model of a flagship firm.

From among 67 enterprises under research in a distribution network of metallurgic products, the foundations determined for the model of a flagship firm were fulfilled by 17 enterprises. Necessary attributes, selected on the basis of the literature research, which are a theoretical construct of the model of a flagship firm, significantly differentiate subjects in a distribution network of metallurgic products. Thanks to this, they allow dividing all subjects into flagship firms and other participants of the network.

Flagship distributors, gaining complementary and substitutional resources from partners in the network, strive for more efficient adaptation to changes in the environment. At the same time, they increase the resistance of the entire supply chain to disturbances. However, flagship firms in every sector should analyse factors which stimulate and hinder establishing collaboration. In the sector of the distribution of metallurgic products, expert studies were carried out in this scope in 2006 and then they were repeated in 2011. Questionnaires contained 117 factors selected on the basis of the literature research and trade expertises. These factors were rated in the (-5; 5) scale, where -5 meant the factor which most strongly hinders establishing network relations and 5 meant the factor which strongly stimulates establishing network relations. Those factors were grouped in 6 classes indicating factors in the macroeconomic sphere, factors determining the network collaboration resulting from the relationship between the flagship distributor and the supplier, factors determining the network collaboration, resulting from the relationship between the flagship distributor and the cooperator (the competitor), factors determining the network collaboration resulting from the relationship between the flagship distributor and the customer, factors determining the network collaboration resulting from technology and technical solutions, factors determining the network collaboration resulting from organizational solutions (factors grouped in classes 5,6 comprise mainly factors grouped in classes: 2,3,4). Figure 1 reveals the results of the carried out research. The figure shows the range of the experts' responses.

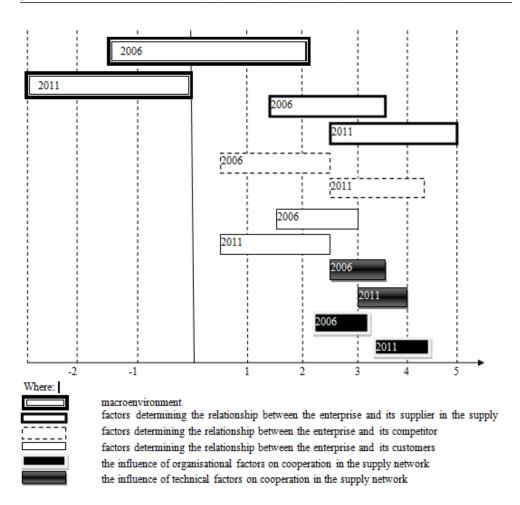


Fig. 1 Determinants of network relationships; The authors' study

The carried out research allowed investigating the changes in the metallurgic industry representatives' subjective rating as regards building network relations in a supply chain of metallurgic products. The strongest group of factors hindering the formation of network relations are elements of the macro-environment. In 2006 those factors were evaluated neutrally (experts' ratings fluctuated in the 0 range), in 2011 they were unanimously rated as the strongest inhibitors among all the investigated factors. Simultaneously, a similar, though not so vivid, tendency was observed in the group of factors resulting from the relationship between the flagship firm and the customer. The worsening macroeconomic indices determine the fact that enterprises concentrate on their own potential and use their own key competences. Similar types of behaviour can be noticed in the recipients of metallurgic products, a business depression strongly touches most of the sec-

tors to which metallurgic products have been delivered. This affects the relations between distributors and their customers of different industries. In the examined years, however, relations between suppliers and distributors were established and there were also relations built between flagship firms of the distribution network and their cooperators.

At the same time, taking into account new forms of the network, including especially the logistic cluster, flagship distributors should use the opportunities provided by collaboration with such a network structure. These opportunities appear thanks to innovative logistic solutions proposed by differentiated logistic enterprises aided by scientific research units.

5. CONCLUSIONS

Flagship enterprises of distribution networks of metallurgic products concentrate on their basic activity, which is the commerce of metallurgic products. Additional activities, including transport processes, commission more and more frequently outside. Therefore, the tendency for logistic outsourcing is a signal for logistic enterprises, including the logistic centre and transport enterprises, to extend their offer towards complex logistic services for the distribution of metallurgic products. So, it seems that the arising Silesian Logistic Cluster is perfectly becoming part of the specificity of this sector. One can suppose that the cluster comprising both logistic enterprises, science and research units and municipal units, will be a source of innovative organizational and technological solutions which will significantly aid solutions in networks of cooperating distribution enterprises. A factor undoubtedly strengthening the power of a flagship firm using solutions developed by cluster organizations comprehensively realizing logistic processes, will be surely an increase in punctuality of realized orders and a decrease in negative results of disturbances arising at the stage of transport processes, which affected the resistance of the entire network supply chain. A potential factor capable of weakening the position of flagship firms in distribution networks in the future is allowing by the enterprises associated in the cluster to provide the complexity of logistic services connected also with the inventory control.

Enterprises cooperating in supply chains must efficiently react to variable conditions of the external environment and skilfully adapt themselves to changes inside the structures of the chain. A turbulent and stormy environment is the main factor affecting the reconfiguration and changes of the structures of supply chains, including the enlargement of the width of individual chain links of the chain. The enlargement of the number of formed relations at the stage of supply, production or distribution is especially characteristic in periods of the growth of demand for products flowing through the supply chain.

The analysis of flagship firms in systems characterized in such a manner is a new area of research into logistic tasks. The examined factors determining decisions about establishing network collaboration indicate a change in the metallurgic industry representatives' attitudes towards network collaboration. More and more factors are evaluated as strong factors stimulating formation of network relations and only the macro-environment is the area evaluated as inhibitor of such initiatives. Because of the dynamic character of contemporary business networks, emphasized in publications characterizing supply networks as complex adaptive systems, the tasks realized by decoupling points are especially complex. Simultaneously, an interesting area emerging on the basis of the analyses of contemporary distribution systems and the analysis of the role of flagship firms in distribution networks, presented in the article, is the assessment of the influence of logistic networks (including logistic clusters) on the position of flagship firms in distribution networks and on the structure of the entire distribution network and the supply chain, especially as the macro-environment, which according to distributors of metallurgic products is a de-stimulator of network relations in this sector, strongly favours cluster initiatives.

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