The being and types of network relations in distribution of metallurgical products

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Abstract:
The article analyses the motives for establishing cooperation within a supply network by companies being division points in a metallurgical products supplies chain. It defines division points and identifies them at the level of service centres in the investigated chain. In the analysis were taken into account the various types of inter-organisational bonds which are placed in the network relations classification matrix. The research is concerned with a complex distribution system. The analysed distribution network combines flows characteristic for both flexible and narrow supply chains.

Keywords: supply chain, logistic customer service, network relations, inter-organisational bonds

1. Introduction

In complex distribution systems, which, among other things, characterise the metallurgical industry, distribution companies take over part of the production process in order to diversify the product closer to the final consumer market. Hence infrastructure in such organisations is more diversified than in traditional wholesale stores. In the article is presented a thesis that, in order to ensure high standards of realisation of orders from its customers by a distribution company which adapts products to the customers' orders, is crucial to acquire logistic resources from partners in the chain. Therefore, distribution companies establish diversified relations with companies which are their thitherto competitors in the market. It is of paramount importance in particular for orders which are difficult to forecast, due to the turbulence of the environment or the product's variety. The goal of these considerations is to point out the various motives for making decisions on the cooperation with former competitors in the area of distribution of metallurgical products, and to suggest a direction for future research aimed at determining the significance of relations between The formation of inter-organisational bonds is motivated in different ways, from the drive towards organisational learning, to the drive to reduce uncertainty [Czakon 2007]. The intensity of the formed inter-organisational bonds is one of strategic decisions both in the configuration process and in the supply chain.

A special case of making decisions on the creation of a network relation is the need to gain access to substitutive, relative to own, resources of the partner. The formation of network relations within substitutive resources on the one hand increases the maximum output of a network, and on the other hand weakens the competitive position resulting from being distinctive (according to the added value chain concept of Porter). Thus, it can be assumed that there exist flexibility thresholds for which the increase in flexibility (through

successively established network relations) does not improve a company's economic success and logistic customer service.

2. Relations and motives of cooperation (inter-organisational bonds) within supply networks and chains

High standards of service are related to the need for adaptable reaction to non-standard orders. For the customer requires an order realised timely, comprehensively, securely, adapted for their specific needs, thus they require flexibility from the supply chain in general. Within the supply chain, on the basis of flow characteristics, there can be distinguished links responsible for flexibility in reaction to non-standard orders. In the metallurgical industry, such links are service centres. Companies responsible for flexibility, combining different flow characteristics, try to establish cooperation with other companies, because individually, any of them does not possess sufficient resources to fully realise very complex objectives. It is the key motive for establishing cooperation in metallurgical products distribution. Generally, collaboration relations can be the result of needs in the area of:

— the acquisition of complementary or substitutive production resources,
— the acquisition of new technological solutions, including shared R&D,
— production and services,
— marketing and market research,
— logistics.

The significance of relations in administrative processes increases due to the increasing popularity of the relation marketing paradigm. Despite dynamic development of research on relations between economic entities, there have not been agreed any stances on the issue of defining relations and distinguishing them from interactions or bonds, which categories are sometimes confused [Eriz V, Wilson D 2006]. Relations are the most broadly defined as interaction, any kind of interrelation occurring between entities of any kind, e.g. due to the presence of a causative relation, mutual influence [Pszczółkowski Z. 1978]. This notion is based on the sciences, as opposed to interaction and bond, which derive from social sciences. Interactions understood as stimuli between two elements. Bonds in social sciences are understood as exchange based on reciprocity, long-term relations, trust. The emphasis is on primary bonds, including economic and technical, commonly referred to as emotionless, and secondary bonds, based on the exchange of knowledge, technology, the sharing of vision and strategic goals, trust between partners, which are emotional bonds. In administration sciences

relations mean different intensities of mutual interactions, up to the bond as the strongest relation between organisations. In that sense, not every relation is a bond, but every bond is a relation. In the article, long-term relations based on trust and collaboration, developed together with other links of the supply chain and network will therefore be termed bonds and will be identical to network relations.

In the context of network relations development of significance are variables influencing the quality of relations. Among those predominate variables concerning the aspects of mutuality and sharing [Wilson D., 2005]. The quality of relations is assessed, however, according to three criteria: trust, involvement and satisfaction [Ulaga W., Eggert A., 2006].

The broadest classification of relations is proposed by Gummesson [1994], who indicates 30 types among which there are also included strategic alliances formed within the market and the sector. Alliances as a type of formalised network relations are discussed at length in part t3 of the article.

In the literature are discussed two primary models pf collaboration of entities in distribution: traditional transaction (win – lose relations) and partnership relations (win – win), which are broken down to more detailed models. With respect to technological premises of relation formation, there cane be distinguished vertical and horizontal integration. Horizontal integration (industry-specific) is based on the diversification of a company's business. The horizontal configuration is usually characterised by the similarity of technological processes, the uniformity of processed products. Vertical integration results, on the other hand, from the realisation of basic, fundamental processes of a company. Partnership is created between companies possessing complementary resources. In this interpretation can be indicated differences in formed bonds at the level of the supply chain and network, which will be a subject of analysis in the latter part of the article. However, before relation characteristics in supply networks and chains can be pointed out, it is worth noting that logistic attributes of a product (including in particular the level of product diversification) determine the character of the supply chain.

Harrison and van Hoek [2010] observe that logistic strategies are formulated differently for mass products which induce the formation of slim supply chains, and for products offered in different versions, for which flexible chains are preferred. In the case of standard products, forecast accuracy is higher than in the case of multi-variant products, strongly diversified according to the customer's needs. Hence, it makes it possible to design

with grater accuracy the supply chain and the output of individual links. Non-standard products require from the supply chain flexibility, the ability to react to diverse needs. Resource demands are thus more complex and cannot be based on the potential of a narrow group of entities integrated in a supply chain. At the same time, by analysing tendencies in different industries, it can be noticed that proportions between mass, standard products and those offered in multiple variants, highly differentiated, change. In relation to the metallurgical industry, the majority of separate metallurgical products consumers requires the adaptation of the product to special requirements of the customer. Those factors show an expansion of the role of intermediaries in distribution channels with additional functions related to the adaptation of the product to special requirements of the customer. An example can by the service centre analysed in the metallurgical products distribution sector. It is a division point in the supply chain, because it combines two type of the chain's characteristics. On the one hand, it secures the flows of mass standard products (II segment) required by slim supply chains, realising the functions of the classical wholesale store. On the other hand, it secures contemporary product diversification trends in distribution channels (I and III segment) by additional resources which make it possible to develop form usability. The separate segments: I – the automotive industry, II – trade companies, III - the house appliances sector and medical equipment are included in the assessment of the level of logistic customer service in the 4th part of the article.

A supply chain, as a sequence of organisations collaborating to provide the largest possible amount of a product or service for the customer, can create very complex interrelation networks at every stage. Harrison and van Hoek [2010] note that, although in the literature the notions of supply network and chain are often used interchangeably, in actuality they are characterised by different relations and flows. The network denotes a more complex structure than the chain, organisations can be connected in a crossing manner and exchange between them bidirectional, just as in the case of the presented in the research metallurgical products network.

The cooperation in a distribution network involves three aspects: compatible goals, the type of relations between cooperating entities and the diversification of the significance collaborative relation for the cooperating entities. In addition, there can be distinguished two cooperation principles: the principles of profitability and reciprocity [Spyra Z., 2007]. In distribution networks of metallurgical products it is vital to have a broad perspective on own and the partner's organisational potential, encompassing the company together with its

branches with different geographical coverage, as well as inter-organisational bonds with transport companies and shippers.

3. Network relations characteristic - a suggestion of a relations classifier

In market entities research, from the methodological point of view, of extreme importance was considered the model of Eiriz V. and Wilson D., which orders the approach to relations from the research perspective based on three priorities:

— rationale for relationship: fundamental theoretical bases for the creation, development, maintenance and eventual cessation of relations,

— relationship processes: the processes during which relations are created, developed, maintained and broken; the most significant is considered here the explanation in which relation variables, such as trust, involvement, adaptation, uncertainty, interrelation and reciprocity are crucial,

— relationship structure: appropriate structures for the management of relations; it is fundamental here to understand hoe companies organise and administer relations and (originally in the research of Eiriz and Wilson) which forms of network structures and management models are more useful for relation marketing. This priority in the research direction presented in the article refers to the estimation which forms of network structures (relation types) are more useful for the increase of flexibility for non-standard orders. Flexibility is, in turn, treated as a priority motive for the formation of network relations, which has its main sources in the need to diversify the product at the distribution stage.

Taking into account the priorities of the model of Eiriz V. and Wilson D., in the research was suggested a classification of relations based on the intensity of created relations and their degree of formalisation. It was also assumed that reliability (security, completeness and timeliness) of tasks carried out within a network is higher for formalised bonds.

The Polish word “alians” itself was borrowed from the French “alliance” and means a union or coalition [Kopaliński W., 1988]. The question of alliances is raised in few theoretical concepts. To the most significant belong the transaction cost theory and the game theory. In the late 1995 was published a new consideration of the problem, in the electrical international production model by J.H. Dunning, which immediately became a turning point in the development of thoughts and theories dedicated to strategic alliances. One of the most general definitions of strategic alliances was presented by K.R Harrigan [1988] saying that it is joint ventures and cooperation agreements which provide the partners with the ability to

collaborate in order to achieve specific strategic goals, which approach is consistent with that propounded by Contractor F,J., Lorange P [1988]. The source of strategic alliances lies therefore in the possibilities of acquiring complementary resources of the partners for the development of key processes facilitating the gaining of competitive advantage in the market. According to the diverse degree of vertical integration or independence, alliances can take on different forms, the range of which is described in Fig. 1.

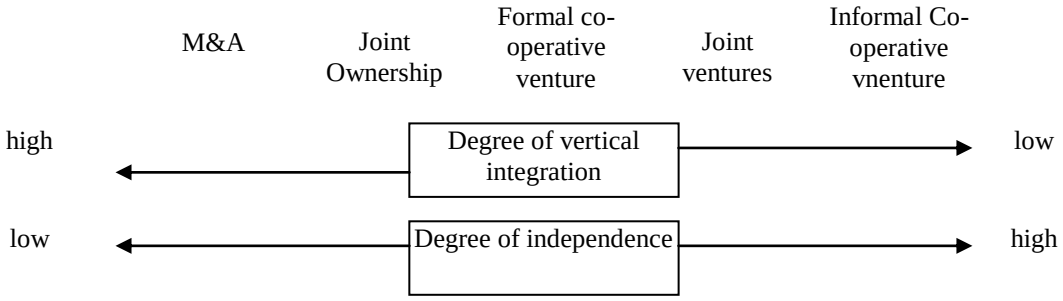

Figure 1. Strategic spectrum of alliances

Source: Huang J., Tzeng G., Ong C., Choosing best alliance partners and allocating optimal alliance resources using the fuzzy multi-objective dummy programming model. Journal of the Operational Research Society 2007

In analysing the definition of Harrigan, special attention needs to be given to its four basic elements: the problem of separation of cooperation agreements from joint ventures, partnership relations between allies, the union of work and profits, and the purposefulness of agreements. The author draws a clear line between cooperation agreements, that is those in which proprietary relations do not change and joint ventures, where a new organisational entity is created, the shareholders of which are the partners signing the contract. Contractor and Loranie [1988] define cooperation agreements as nonequity alliances and treat them as agreements between partners aimed at the gaining of common benefits. Contractor and Loranie also consider the possibility of establishing an alliance as an agreement based on partial buyout of the partner's shares (minority equity alliances) which does not have the character of joint ventures. The three types of the alliances mentioned: joint ventures, nonequity alliances, minority equity alliances, are considered in the majority of literature publications generally valid and this classification will also be adopted in the article.

4. Motives for the establishment of network relations illustrated with an example of a chosen distribution network of metallurgical products

Taking into account the literature publications mentioned in part 3 of the article, a matrix of relations in supply networks was drawn (Fig. 2). The matrix combines two of the presented classification criteria: the degree of independence of the partners with reference to

the degree of formalisation of cooperation and the scope of cooperation relating to tasks carried out together and the expenditure of resources for their realisation.

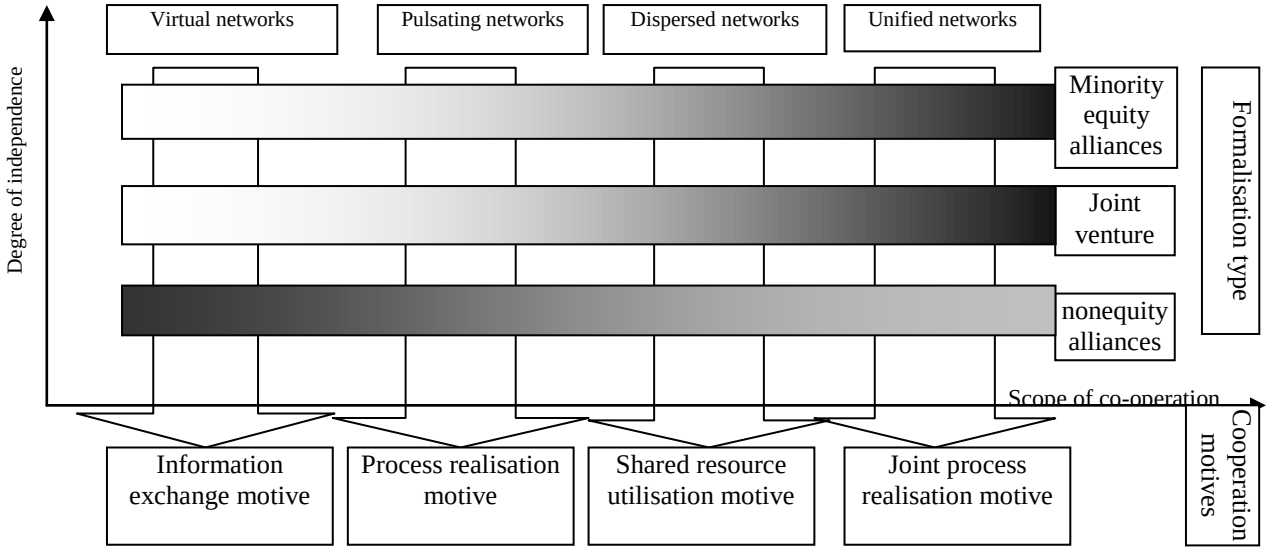

Figure 2 Relation matrix in a supply network

Source: Own research

Flows in the discussed metallurgical products network (Fig. 3) are multidirectional. The service centre cooperates with four suppliers. In the case of cooperation with the supplier S1, we can talk about a strategic alliance in the form of a minority equity alliance. The highest level of partnership between those companies results from their being related by capital and their cooperation being defined formally. The scope of cooperation is broad and includes joint realisation of marketing processes, partly logistic and technological.

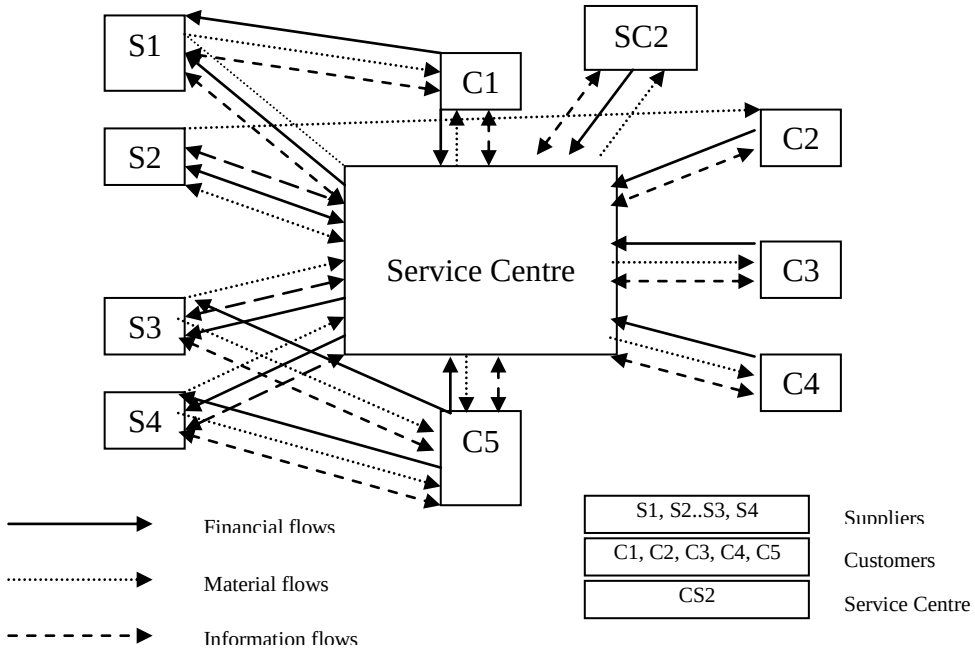

Figure 3 Relation map : suppliers – service centre - customers

Source: On the basis of the company's materials

According to the presented map of relations, here is a group of customers for whom the source of supplies is both the analysed service centre and supplier S1. The division of supplied products between supplier S1 and the service centre is related to various resources of the service centre and supplier S1. The fundamental difference is that supplier S1 is used to supplying large material shipments (a specified production minimum) and the service centre offers more flexible shipments and the possibility of changing shipment schedules. Such a division of supplies is very beneficial both to the customers and suppliers. The customer is provided with a service of a specific level by trusted suppliers, where all purchased products come from one source of supplies, that is from supplier S1, which additionally removes the risk of the material being inconsistent with requirements.

Supplier S2 is a company similar to the discussed service centre, seated in Germany. Relations between them are based on partnership and long-term relations formalised with a cooperation agreement. All flows on the map of relations are bidirectional, due to the fact that supplier S2 is for the service centre both a source of supplies and a customer. Supplier S2 supplies the service centre primarily in finished products compliant with a specific order of the customer. After shipment, such products are sent to the end consumer at the latest within 48 h.

As can be seen in Fig. 3, there also exist material flows between supplier S2 and customers of the service centre K2. In such a case, between supplier S2 and the service centre occur also information and financial flows and the products are transported directly to he customer. The customer accounts for transactions only with the service centre. It is a very convenient manner of cooperation, because it makes it possible to reduce the duration of order realisation and decreases the number of products brought into the warehouse, as well as the costs of transport. However, this type of cooperation is possible only between trusted and loyal partners, which can be seen in the degree of formalisation of cooperation between those partners. Between the service centre and supplier S2 there is no competition for customers, each company services a defined region of the European market. In the case of suppliers S3 and S4, cooperation with the service centre is based on the same principles. There are no formal relations with the suppliers, the cooperation is based on pure transactional relations and each transaction is preceded by negotiations. Due to the fact that between the service centre and suppliers S3 and S4 exists competition for end consumers, there is no possibility of material flow directly to the customer. One of the ways to reduce the supplies in the

warehouse is ordering of finished products for specific orders of the customer, delivering them to the service centre and then to the end consumer.

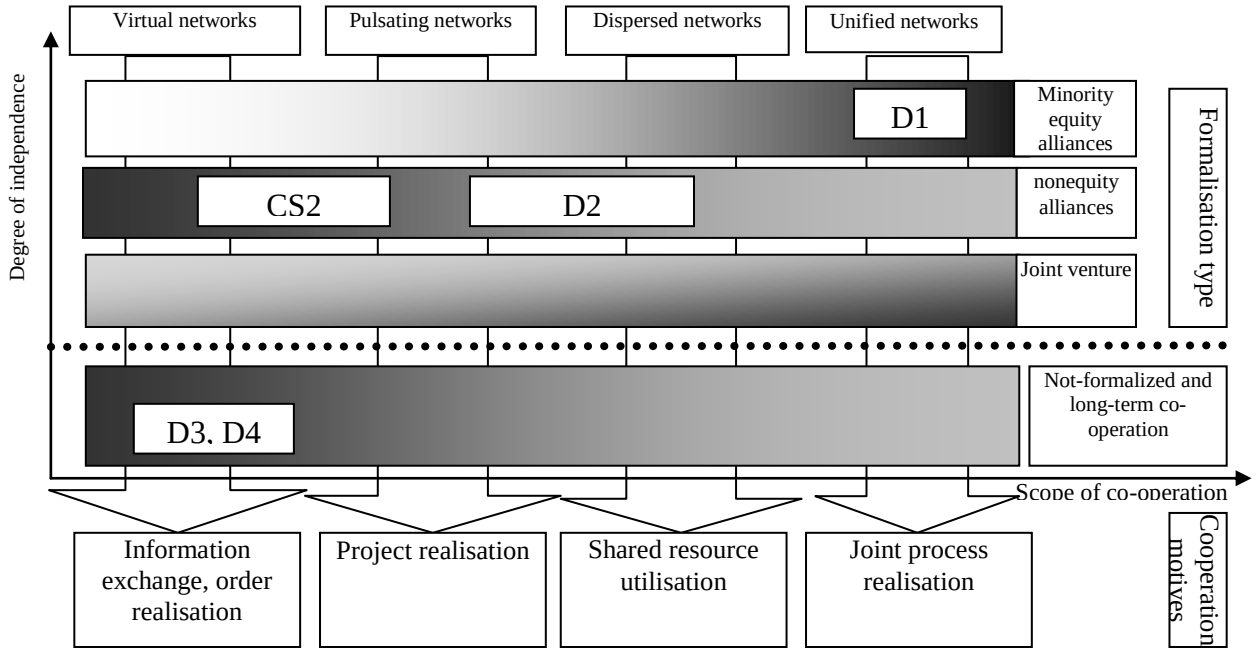

Figure 4. Inter-organisational bonds in the chosen supply network of metallurgical products

Source: Own research

If there is no possibility of ordering finished products, the service centre acquires semi-finished products which require additional processing by cutting to desired size. Due to the above, in the analysed supply network of metallurgical products were identified bond types and motives related to them which are presented in Fig. 4. The analysed enterprise doesn't form the alliance joint venture. However the reach of the network is growing significantly thanks to not-formalized and long-term relations. The results of the adopted strategy were assessed through the analysis of the customers' satisfaction level. Three consumer segments were isolated: the automotive industry, the household appliances industry and medical equipment, as well as broadly defined trade companies. The results concerning the transaction function are presented in table 1. In the general assessment of the company, in all segments it was concluded that the strongest point of the service centre are such elements as: product quality and availability, shipment flexibility and timeliness. In the case of pre-transactional service elements, the company is judged very highly with respect to the quality of offered products, the time of response to queries, the ability to adapt the offer to individual needs and the provision of non-standard products.

Table 1. Customer satisfaction assessment with reference to transaction elements of customer service.

No.	C. Service elements during transaction/during order realisation	Average mark		
		S I Motorisation	S II Trade companies	S III Household appliances, medical equipment
1.	**Realisation deadline and order timeliness**	5.00	4.50	5.00
2.	**Full order realisation - shipment completeness**	4.75	4.75	4.75
3.	**Consulting and technical support**	4.50	4.50	4.50
4.	**No limit as to the size of the order**	4.00	4.25	3.75
5.	**Information about the order's realisation status**	4.75	4.50	4.75
6.	**Precision of packing and marking**	4.50	4.75	4.75
7.	**Flexibility of reaction to orders of non-standard products**	4.25	4.50	4.25
8.	**Payment conditions**	4.25	4.50	4.25
9.	**Quality of documentation**	5.00	4.75	4.50
10.	**Certificates**	5.00	4.75	4.25

During transaction (tab. 1), of significance for the customers is the short deadline and timeliness of order realisation, as well as the completeness of shipments and the absence of a production minimum. In the assessment of post-transactional service elements of key importance is the manner of examining complains and qualitative complaints. Special attention should be given to aspects which are very important to the customers and very lowly graded at the same time. In the case of customers from the first and third segment, no such features were recorded, in the second segment it can be seen that customers are dissatisfied with the price level.

5. Conclusions

Each group of relations between the companies is characterised by a definite group of features distinguishing it from all others. Cooperation agreements are characterised by: their fragmentary nature, transfer of assets within the coalition and integrity. The fragmentary nature means that they pertain to a chosen part of the businesses of the participants to the contract which is the subject of the agreement. This is adequate to the second plane of classification suggested in the article with respect to relation intensity. In this plane are isolated virtual networks occupied with information exchange, dispersed networks occupied with resource utilisation, pulsating ones occupied with project realisation and unified ones

occupied with process realisation. The participants can also function individually and conduct business which is not part of the agreement. These types of relations are included in the analysed supply network of metallurgical products. The analysed service centre tries to meet the expectations of its customers by establishing different types of relations within the network and the supply chain, depending on the motive of established cooperation. As follows from the conducted questionnaire study of customer satisfaction, this type of flexibility formation strategy gives, as a result, a high level of customer satisfaction.

The presented features of inter-organisational bonds prove that the discussed forms of cooperation are of a dynamic character. This manifests especially in the possibilities of structural changes of systems depending on the conditions of the environment. The success of cooperation is based primarily on the achievement of balance between the goals of the coalition, individual partners, their capabilities and the willingness to adjust to the requirements of the alliance and constantly changing environment. An interesting area for further research seems therefore the analysis of determinants of he forms of cooperation between companies in a distribution network of metallurgical products. At the same time, further research will be aimed at determining of thresholds of flexibility developed by network relations. Thus, more thresholds for which the increase in flexibility (through successively created network relations) does not improve the economic success of the company and the logistic customer service..

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