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CONFIGURATION OF A SUPPLY CHAIN OF METALLURGICAL PRODUCTS IN THE CONTEXT OF THE COOPERATION CLIMATE

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Abstract

Background. Supply chains are becoming more and more complex systems. This results mainly from the development of network relations at individual stages of value adding. The development of relations in supply chains by network relations created at individual stages of the supply chain is an essential dimension of the configuration of the supply chain. Network relations can be both on the level of distribution and production or supply.

Research aims. The aim of the paper is to propose a methodology for appointing the climate of cooperation and connecting the climate of cooperation with the configuration of a supply chain. The detailed aim resulting from the purposeful selection of the supply chain is to indicate key determinants of the configuration of the supply chain of metallurgical products.

Methodology. Authors identified determinants of the configuration of the supply chain. Authors defined the climate of cooperation and showed the methodology of appointing him. In supply chains of metallurgical products, a questionnaire with the questionnaire survey method was used to explore the determinants of formation of network relations.

Key findings. Determinants rated as stimulators and destimulators appoint the climate of cooperation in a network. Authors indicates variants of configuration of a network supply chain of metallurgical products underlining the key determinants.

Keywords: cooperation climate, supply chain, network relations, distribution

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INTRODUCTION AND BACKGROUND

Organizations cooperating in order to produce and deliver a product to the customer are defined as a supply chain. Definitions of supply chains stress perspectives as follows:

- The subjective perspective, underlining cooperation among enterprises supplying raw materials, materials and components, industrial companies, commercial as and of service (Witkowski, 2003; Coyle, Bardi & Langley, 2002).
- The process perspective, indicating key business processes initiated by a customer, realized by enterprises in distribution channels, producers and suppliers (Rutkowski, 2004; Szymonik, 2011; Nowosielski, 2011; Witkowski, 2009, pp. 136–143).
- The value added perspective, indicating the configuration of activities adding value and operations supporting value added creation (Porter, 2006; Kruczek, 2012; Czakon, 2004).
- The system perspective, treating the supply chain as a system composed of cooperating links and relations between them, oriented to realization of the common cause, which is delivering the product to the customer to an indicated location (Abt, 1997), in the required time, in the required quantity and quality, at appropriate costs, open, so entering into relations with the environment.

Supply chains are a part of supply networks. Supply networks are a system built from nodes cooperating with one another in order to increase the geographical range of influence, market penetration, activity diversification and an increase in the innovativeness of the offered products and services (Kramarz, 2012). An essential attribute of supply networks are vertical relations created by organizations at individual stages of value added creation. Network relations are characterized, e.g., by the degree of formalization, the frequency of material flows between links, a variety of material flows, degrees of standardization.

According to the graph theory, in supply networks one can distinguish so-called bridges (organizations in the network participating in different supply chains; after removing them the network will lose its integrity), which are organizations connecting different supply chains. At the same time, when focusing attention on the structure of a single supply chain, an increasing meaning of network

relations ought to be taken into account. Such a structure is defined as a supply network chain (Nagurney, Loo, Dong & Zhang, 2002). When analysing the presented categories of material flows, it can be noticed that the choice of a notion: a chain, a supply network or a network supply chain, depends on the accepted demarcation of the system limits. It is so because every organization is a participant of a supply chain and consequently a supply network, most supply chains have a network structure because this structure is an answer to the uncertainty of the environment and the differentiation of recipients' needs. Accepting the perspective of a supply chain, research is focused on key processes without specifying subcontracting. In a network supply chain, primary attention one concentrated on relations built with subcontractors. The perspective of a network supply chain was accepted in the paper.

The structure of the network supply chain is differentiated in respect of such attributes as (Kramarz, 2013):

- the number of links in supply chains;
- the number of shaped network relations;
- the distribution of key points of the network;
- the stage of the supply chain on which network relations are created;
- the form of shaped relations;
- the type of created networks of cooperation.

The configuration of a network supply chain is understood as the definition of a variant of the structure of the supply chain of defined by the attributes given above. Variants of configuration of the supply chain are determined with demand fluctuations (Kramarz, 2012), the degree of differentiation of recipients' segments, attributes of the product (Kramarz, 2013) as well as other factors which can favour formation of network relations or hinder it. In connection with the complexity of measurements of the configuration of a network supply chain, the research of determinants was divided into stages (Figure 1).

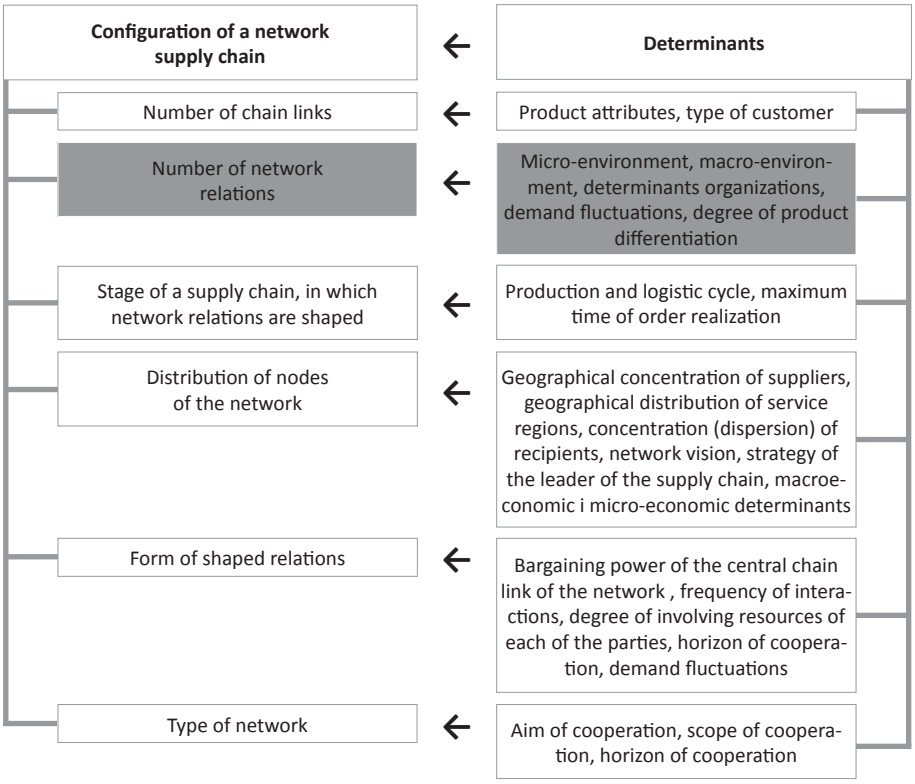

Figure 1. Stages of the research into determinants of the configuration of a network supply chain

Source: The authors' study.

The accepted procedure demands interpretation of product attribute, the type of created network of cooperation, forms of shaped relations.

Product attributes affecting the configuration of the supply chain are the degree of product processing, the degree of product complexity and the degree of product differentiation to the recipients' needs. Product attributes, including especially the degree of product differentiation to the recipients' needs, are the most important location factors of the material decoupling point of a distribution in supply chain (Kramarz & Kramarz, 2012). The material decoupling point of the supply chain is an organization connecting the supply part of the chain with its demand part (Harrison & Van Hoek, 2010). In other words, in the material decoupling point, two types of processes are combined: processes realized in the pull system with processes realized

in the push system. The material decoupling point is appointed by determining the production and logistic time and the maximum lead time. The maximum lead time, being sometimes the maximum time in which the customer agrees to wait for the product, results from the customer's needs concerning the degree of product differentiation. Product differentiation can take place in an industrial company (early differentiation) or in distribution channels (late differentiation) (Gupta & Benjaafar, 1999; Anand & Girota, 2004, pp. 697–712). Product differentiation can concern modular products assembled according to complex orders as well as the postponed production strategy – so, production of base products and removal of the last stage of the production process in time until the moment of placing the order (Qin & Xiong, 2013, pp. 644–649). The mentioned variants of the location of material decoupling points in supply chains have an essential influence on formation of network relations as one of dimensions of the configuration of a network supply chain.

Manufacturing the product to store determines the formation of network relations on the product distribution level. Product assembly to order designing the product to order, depending on the accepted strategy: early differentiation, requires formation of network relations on the level of production companies or, in the case of the postponed production strategy, realized in the conception of late differentiation on the distribution level. The material decoupling point, designing products to order, shifts formation of network relations to the level of the production company and supply.

Demand fluctuations and the differentiation of recipients' segments require increasing the flexibility of resources in the material decoupling point or increasing the supply base via formation of network relations. Consequently, these factors increase the need for formation of network relations in material decoupling point.

The mentioned factors are investigated in the literature and analysed in supply chains of metallurgical products by the authors of this paper in their earlier publications.

This paper indicated other determinants affecting the configuration of the network supply chain. In the dimensions of the configuration the authors focused on the influence of factors on the number of network relations shaped by enterprises in supply chains of metallurgical products.

METHOD

The climate of cooperation was defined as the whole of the phenomena which affect making decisions about creation of network relations. In the first phase of the research over the climate of cooperation the author proposed a collection of climate-forming factors (Kramarz, 2012). The first stage of defining the climate of cooperation of a given supply chain is appointing climate-forming essential factors for a particular industry (stages of appointing the climate of cooperation were pictured in Figure 2).

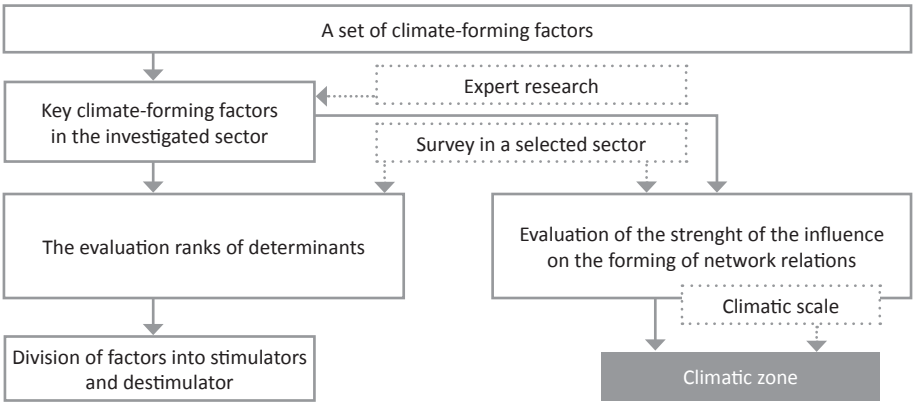

Figure 2. The methodology of determining the climate of cooperation
Source: The authors' study.

At this stage it is appropriate to carry out expert research. The proper research rates factors selected by experts. Climate-forming factors are rated as regards the direction of the influence on establishing network relations (inhibitory or favourable) and as regards the power of the influence on the undertaken decisions. In the research carried out in the metallurgical industry the authors accepted the (–5;5) scale. At the same time respondents give ranks to climate-forming factors. Due to the number of major climate-forming factors in the metallurgical industry, appointed by experts, the total number of determined ranks was 100.

The direction of the influence on taken decisions allows dividing the climate-forming factors into stimulators and destimulators of formation of network relations.

In the next phase of determining the climate of cooperation it is postulated to determine the weighted rating of stimulators (S_{WO}) and weighted rating of destimulators (D_{WO}).

$$S_{wo} = \sum_{i-1}^{n} w_i \times o_i$$

$$D_{wo} = \sum_{j-1}^{m} w_j \times o_j$$

Where:
w_i – the rank of i-stimulator,
o_i – the rate of i-stimulator,
n – the number of stimulators,
w_j – the rank of j-destimulator,
o_j – the rate of j-destimulator,
m – the number of destimulators.

The sum of weighted rating of stimulators and destimulators determines the climate of cooperation (CC).

$$CC = S_{wo} + D_{wo}$$

In connection with the accepted assumptions of the rating of climate-forming (–5;5) factors and giving them ranks (ranks amount to 100 altogether), the authors accepted a scale of division of the climate into climatic zones (Table 1).

Table1. Climatic zones

Climatic zone	Scale	Characterization
Favouring climate	(250;500)	Climate favouring formation of network relations, indicates positive conditionings of gaining resources via cooperation. Enterprises can shape differentiated relations, both permanent bonds and relations of an average time horizon and involvement of resources, such differentiation warrants large flexibility and adaptivity of the shaped network.
Positive moderate climate	(25;250)	Factors show positive influence on formation of network relations however, the power of influence is moderate. Enterprises in such conditions will not form long-term relations especially in case of extreme rating of stimulators and destimulators.

Neutral climate	(–25;25)	Climate-forming factors have an imperceptible influence on creation of network relations. Factors of both the nearer environment and the further environment and organizational factors do not hinder establishing of network relations but also do not favour such activities. Consequently, enterprises must estimate whether the expected advantages of cooperation will be bigger than the costs connected with it.
Negative moderate climate	(–250;–25)	Climate climate-forming factors hinder formation of network relations, however, the power of the influence is moderate. Enterprises in such conditions will not be inclined to long-term relations. Relations of the average time horizon will be established in special cases, e.g. when as result of combining resources of the organization it is possible to obtain product innovations significantly influencing the competitiveness. Consequently, the enterprise they must estimate not only if the expected profits will exceed the incurred costs but also whether chances of success of the shaped relation will overcome threats connected with creating such relation.
Unfavourable (inhibitory) climate	(–500;–250)	Climate-forming factors hinder creation of network relations. Organizations in such conditions organize processes based on their own resources in case of such necessity increasing their supply base. Consequently, the supply chain accepts the slim structure

Source: The authors' study.

This proposed procedure of defining the climate of cooperation was used in the supply chains of metallurgical products.

The supply chain of metallurgical products is a meta-logistic system with predominant distribution because metallurgical products are characterized with a small complexity of processes of base products production, with a slight constructional complexity of metallurgical products in relation to the complexity of recipients' markets. Consequently, in such a system the stress is on the distribution and adaptation of the product offer to specific needs of individual segments of recipients. The differentiation between the segments requires both adapting distribution channels, the logistic service and designing the location of the material decoupling point. The differentiation of recipients' segments and the width of the assortment are joint decisive factors about the fact that although different products can flow by the same distribution channels, the material decoupling point can be different organization for each of the products. However, this feature causes strong tendencies to shape network relations on the distribution level. Network relations are shaped both between business organizations, including especially those realizing the task of postponed production (service centres and steel yards) and logistic enterprises.

The research into determinants was carried in 2014. Taking into account the findings of the earlier literature and empirical research, the authors prepared a questionnaire and conducted interviews based on it. The research questionnaire was filled in by a pollster during conversations with higher rank workers of distribution enterprises of metallurgical products. 27 organizations agreed to participate in the survey. The study rated both the importance of a given factor in formation of network relations and the direction and the power of influence. The importance was rated dividing 100 points among the mentioned factors, however the rating was distributed in the scale: (–5) the factor completely hinders creation of network relations, (5) the factor most positively affects creation of network relations. The choice of the set of factors is a consequence of the research which has been carried out in this sector since 2009 (expert research). The initial set of determinants was supplemented by additional factors which were indicated by representatives of this industry; factors which were characterized with strongly divergent opinions of experts were eliminated. The final set of determinants of formation of relations and weighted average are presented in Table 2.

Table 2. A list of sums of ranks of the most important factors

	The most important determinants of the development of network relations	**Average ranks**
1	Common organization of transport processes	1
2	Delivery and payment time	1
2	Joint organization of the stock management	1
4	Business information exchange, frankness of communication	1
5	Development of innovative forms of order realization	1.5
6	Flexibility of cooperation	1.5
7	Market position of subjects entering into the network structure	1.5
8	Using the cooperator's resources	2
9	Number of errors in the process of order realization	2
10	Number of common final customers	2
11	Previous experience of cooperators	3
12	Scope and possibility of cost distribution	3.5
13	Scope and possibility of distribution of profits	3.5
14	Stability of cooperation	4
15	Financial potential of the cooperator	4

16	Quality (products, services and remaining aspects)	4
17	Scope and possibility of risk sharing	4.5
18	Trust	5
19	Reputation of potential cooperators	7
20	Joint work over adaptation to market changes	13
21	Degrees of compatibility of activities, resources and aims	15
22	Competences of the cooperator (prominent key competences and resources)	19

Source: The authors' study.

According to the respondents participating in the research the most essential factors are: cooperators' competences (prominent key competence and resources), degrees of compatibility of activities, resources and aims and the common work over the adaptation to market changes. These three factors together obtained an average weight of 47 points, which is nearly 50% of the total value of weights. Pressure on compatibility, as a dimension of process adjustment of the organization, results from the characterizations of the sector of metallurgical products distribution because this sector over the last years is more and more strongly subject to specialization and concentration on market niches. The strong differentiation of metallurgical products to the needs reported by different recipients requires improvement of processes the supply specialization to particular segments of recipients. Tendencies for product specialization and differentiation have their reflection in the arrangement of the remaining determinants of formation of network relations. It is so because the common organization of transport processes and warehouse processes was rated low. These logistic elements, being a premise of logistic networking, are not key in the sector of metallurgical products distribution. The factor with the highest rate was cooperators' competences, whose rating is clearly distinguished against the background of the remaining determinants. Such pressure on competences, understood as possession of large theoretical knowledge and practical skills as well as effective realization of tasks in the area of distribution (but also in the entire logistic system), prove that the main condition of establishing network relations is the certainty that a potential partner will contribute, thanks to his high competences, a large added value. The above mentioned factors have a strategic character because they affect the functioning of the entire supply network.

Another major factor is mutual information exchange and the openness of communication. Business information exchange, and

primarily, non-concealing of essential data, allows building long-lasting relations based on trust as well as strengthening mutual bonds. After all, the confidence and the stability of cooperation were also indicated as essential determinants. Mutual trust is fundamental to stable relations and gives the chance to attain mutual benefits and overcome conflicts, creates the possibility to anticipate attitudes of market partners, thereby reducing uncertainty.

Attaining of competitive superiority thanks to the cooperation within a distribution network is significantly influenced by the flexibility of cooperation and a factor associated with it, i.e. the readiness to collaborate in adaptation to market changes. It is so because more preferably declared is the readiness of establishing relations based on partnership with subjects inclined to concessions and changes of the earlier negotiated conditions in order to conform more quickly and effectively to the stormy market environment.

Another major factor is also the quality of products or services offered, which allows building a strong market position and increasing the confidence and the loyalty of common customers.

Attention must also be paid to the range and the possibility of sharing costs, profits and risks, which must be an object of a deep analysis by managers. While establishing relations in the network, partners must be aware that by sharing tasks and resources, they agree to a proportional division of not only benefits coming from it but also negative results.

RESULTS

Another stage of the research was to elaborate the variants of the configuration of the network supply chain of metallurgical products. The averaging results were presented in Table 3.

Table 3. Rating of the determinants of formation of network relations in supply chains of metallurgical products

	The most important determinants of the development of network relations	**Rate**
1	Joint organization of transport processes	3
2	Delivery and payment time	–2
3	Joint organization of stock management	2
4	Exchange of business information, openness of communication	–3

5	Development of innovative forms of order realization	–2
6	Flexibility of cooperation	2
7	Market position of subjects entering into the network structure	1
8	Free capacity of the potential cooperator's resources	5
9	Number of errors in order realization	–1
10	Number of common final customers	3
11	Previous experience of co-operators	2
12	Scope and possibility of cost distribution	–2
13	Scope and possibility of the distribution of profits	–4
14	Stability of cooperation	2
15	Financial potential of the cooperator	–1
16	Quality (products, services and other aspects)	4
17	Scope and possibility of risk sharing	2
18	Trust	1
19	Reputation of potential co-operators	3
20	Common work on adaptation to market changes	2
21	Degrees of compatibility of activities, resources and aims	4
22	Competences of the cooperator (prominent key competences and resources)	3

Source: The authors' study.

According to the accepted procedure, determinants were divided into stimulators and destimulators of creation of network relations in the distribution sector of metallurgical products. Table 4 lists stimulators and destimulators appointed for each of the groups the total weighted rate.

Table 4. The weighted rate of stimulators and destimulators of network relations

	Stimulators	**Rate**	**Sum of ranks**	**Weighted rate**
1	Joint organization of transport processes	3	1	3
11	Previous experience of cooperators	2	3	6
2	Common organization of the stock management	2	1	2
10	Number of common final customers	3	2	6
6	Flexibility of cooperation	2	1.5	3
7	Market position of subjects entering into the network structure	1	1.5	1.5
14	Stability of cooperation	2	4	8
8	Free capacity of the potential cooperator's resources	5	2	10

16	Quality (products, services and remaining aspects)	4	4	16
17	Scope and possibility of risk sharing	2	4.5	9
18	Trust	1	5	5
19	Reputation of potential cooperators	3	7	14
20	Joint work on adaptation to market changes	2	13	26
21	Degree of compatibility of activities, resources and aims	4	15	60
22	Competences of the cooperator (prominent key competences and resources)	3	19	57
Sum				283.5
	Destimulators	**Rate**	**Sum of ranks**	**Weighted rate**
5	Development of innovative forms of order realization	–2	1.5	–3
9	Number of errors in order realization	–1	2	–2
2	Delivery and payment time	–2	1	–2
4	Exchange of business information, openness of communication	–3	1	–3
12	Scope and possibility of cost distribution	–2	3.5	–7
13	Scope and possibility of distribution of profits	–4	3.5	–14
15	Financial potential of the cooperator	–1	4	–4
Sum				–35

Source: The authors' study.

The investigated distribution sector of metallurgical products is dominated by factors favouring formation of network relations.

$$CC = 283.5 - 35 = 248.5$$

The value of the climate of cooperation indicates a zone favouring formation of network relations. The superiority of factors stimulating is determined by both their number and their rank. Such an arrangement of factors indicates not only an inclination of enterprises of this sector to create domineered business networks but also other forms of cooperation, including metallurgical clusters (Saniuk, Saniuk, Lenort, Samolejova, 2014, pp. 725–727; Saniuk, Saniuk, 2012, pp. 1796–1802) or a virtual network, which is The Polish Union of Steel Distributors. Moreover, relations according to the need appointed by the location of the material decoupling point can be created in different variants.

Taking into account the determinants of cooperation dimensions, including especially the determinants of formation of network relations,

the research indicated variants of configuration of the network supply chain of metallurgical products:

- Variant 1 formation of network relations on the level of production of metallurgical products (early differentiation).
- Variant 2 formation of network relations on the level of realization of postponed production tasks (late differentiation).
- Variant 3 formation of network relations on the level of realization of commercial and marketing tasks (e.g. The Polish Union of Steel Distributors, The Metallurgical Cluster).
- Variant 4 formation of network relations on the level of realization of logistic tasks (including logistic networks).

The obtained results indicate an especially profitable climate for setting up a network supply chain of metallurgical products for variant 2. Simultaneously, experts stressed also the meaning of logistic processes, including elements of reliability such as order realization without damage, innovative forms of order realization as well as organization of transport and warehouse processes. Indeed, these elements did not obtain high ratings in the proper research or simply were rated negatively but it ought to be stressed that the proper research assessed relations with cooperators understood as other distribution organizations (warehouses or service centres and steel yards). The aspects which were not assessed were relations built with logistic enterprises. Consequently, in the further part of the research it is worth analysing variant 4, which is formation of network relations on the level of realization of logistic tasks. In this variant, one should take into account logistic networks which enlarge the degree of flexibility of the distribution system. Logistic networks can take the form of business networks with the dominant link and also logistic clusters.

Innovative order realization in domineered logistic networks requires formation of relations between logistic organizations of different competences and key resources. Logistics is in this instance understood as the main skill in the enterprise and the value of assets is usually very high, e.g. as regards allocation of resources or possessed know-how. However, clusters are an essential element of the developed economy and the being developed economy. They can be acknowledged as a simultaneous indication of globalization and regionalization. Logistic clusters are developed intensely giving a new dimension of organizing logistic processes.

CONCLUSIONS

Metallurgical products are differentiated both in respect of the degree of their complexity, processing and differentiation to the recipients' needs. Simultaneously, the supply chain of metallurgical products is a system with predominant distribution. This results from a considerable differentiation of the recipients' market including especially differentiation of the needs of the recipients grouped in segments distinguished according to a business line. A significant number of segments of recipients, demand fluctuations and the features of a metallurgical product itself are key factors which determine establishing, by the chain links of the supply chain, network relations enlarging the supply base and competence differentiation on individual stages of value addition. Such a characterization of the supply chain of metallurgical products indicates that this is the proper subject of research into the climate of cooperation.

This research indicates the superiority of positive conditionings of formation of network relations in the distribution sector of metallurgical products. As the key determinants of the network structure of the supply chain, the research indicates attributes of metallurgical products, variables and individualised recipients' needs and also the climate of establishing the cooperation in the distribution sector of metallurgical products. The climate of cooperation is consists of a set of factors determining formation of network relations grouped as stimulators and destimulators. The weighted rating indicates a positive climate of establishing of network relations especially on the level of realization of postponed production tasks. This variant of the configuration of the network supply chain of metallurgical products is optimal for the degree of metallurgical product differentiation, heterogeneous needs of recipients' segments, which results in a necessity to build a differentiated supply base. So wide a supply base is possible in case of a network of cooperating organizations. The base supply network allows innovations as regards product differentiation and offering to customers.

The findings obtained indicate the need for detailed investigation of the variant of formation of network relations in the area of realization of logistic tasks. Flexible logistic networks will be understood in further research as a logistic support of distributional enterprises which requires

organizing logistic processes through formation of a logistic network. However, the logistic network will be interpreted as a dynamic system composed of cooperating enterprises offering logistic services, including distribution centres, shipping companies, and logistics centres and organizations supporting logistic services.

REFERENCES

Abt, S. (1997). *Systemy logistyczne w gospodarowaniu, Teoria i praktyka logistyki*. Poznań: AE.

Anand, K., & Girota, K. (2004). The strategic perils of delayed differentiation. *Management Science*, *53(5)*, 697–712.

Coyle, J., Bardi, E., & Langley, C. (2002). *Zarządzanie logistyczne*. Warszawa: PWE.

Czakon W. (2004). *Łańcuch wartości w teorii zarządzania przedsiębiorstwem*. Katowice: Wydawnictwo AE.

Gupta, D., & Benjaafar S. (1999). *"Make-to-order" "Make-to-stock" or Delay Product Differentiation? – A Common Framework for Modeling and Analysis. Working Paper*. Ontario: Michael G. DeGroote School of Business, McMaster University.

Harrison, A., & Van Hoek, R. (2010). *Logistics Management.* Warszawa: PWE.

Jayaram, J., & Tan, K.Ch. (2010). Supply chain integration with third-party logistics providers. *International Journal of Production Economics*, *125*, 263–228.

Kramarz, M. (2012). *Strategie adaptacyjne przedsiębiorstw flagowych sieci dystrybucji z odroczoną produkcją. Dystrybucja wyrobów hutniczych*. Gliwice: Wydawnictwo Politechniki Śląskiej.

Kramarz, W. (2013). *Modelowanie przepływów materiałowych w sieciowym łańcuchu dostaw. Odporność sieciowego łańcucha dostaw wyrobów hutniczych*. Warszawa: DIFIN.

Kramarz, M., & Kramarz, W. (2012). *Decoupling Point in Supply Network of Steel Products – Dynamics of Changes.* Metal 2012 Conference Proceedings, TANGER 2011, Ostrava, Czech Republic, EU.

Kruczek, M. (2012). *Metody i techniki zarządzania łańcuchem dostaw przemysłu odzieżowego*. Gliwice: Wydawnictwo Politechniki Śląskiej.

Nagurney, A., Loo, J., Dong, J., & Zhang, D. (2002). Supply chain networks and electronic commerce: a theoretical perspective. *Economic Research and Electronic Networking*, *4(2)*, 479–503.

Nowakowska-Grunt J. (2014). Strategiczne aspekty polityki regionalnej w Polsce na przykładzie klastra logistycznego w województwie łódzkim. In: R. Krupski

(red.), *Zarządzanie strategiczne, rozwój koncepcji i metod*, Prace Naukowe Wałbrzyskiej Wyższej Szkoły Zarządzania i Przedsiębiorczości, *27(2)*, 423–430.

Nowosielski, S. (2011). *Podejście procesowe w organizacjach*. Wrocław: Wydawnictwo UE.

Porter, M. (2006). *Przewaga konkurencyjna. Osiąganie i utrzymywanie lepszych wyników*. Gliwice: Helion.

Rutkowski, K. (2004). Zarządzanie łańcuchem dostaw – próba sprecyzowania terminu i określenia związków z logistyką. *Gospodarka Materiałowa i Logistyka*, *12*, 16–26.

Qin, Y., & Xiong, D. (2013). Optimization of postponed production decision in mass customization. *International Journal of Computer Science Issues*, *10(2)*, 644–649.

Saniuk, S., & Saniuk, A. (2012). *Prototyping of Production Networks in Regional Metallurgical Cluster*. 21. jubilejní ročnik mezinárodni konference metalurgie – METAL 2012, TANGER, Brno 2012, Czech Republic, 1796–1802.

Saniuk, S., Saniuk, A., Lenort, R., & Samolejova, A. (2014). Formation and planning of virtual production networks in metallurgical clusters. *Metalurgija*, *53(4)*, 725–727.

Skowron-Grabowska, B. (2011). Wpływ funkcjonowania operatorów logistycznych na rozwój rynku usług w Polsce. *Zeszyty Naukowe Uniwersytetu Szczecińskiego. Finanse, Rynki Finansowe, Ubezpieczenia*, *46(685)*, 225–234.

Szymonik, A. (2011). *Logistyka i zarządzanie łańcuchem dostaw*, cz. 2. Warszawa: DIFIN.

Witkowski, J. (2003). *Zarządzanie łańcuchem dostaw. Koncepcja, procedury, doświadczenia*. Warszawa: PWE.

Witkowski, J. (2009). *Orientacja procesowa w różnych koncepcjach i modelach referencyjnych zarządzania łańcuchem dostaw*. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, *52*, 136–143.

KONFIGURACJA ŁAŃCUCHA DOSTAW PRODUKTÓW METALURGICZNYCH W KONTEKŚCIE KLIMATU WSPÓŁPRACY

Abstrakt

Tło badań. Łańcuchy dostaw stają się coraz bardziej skomplikowanymi systemami. Wynika to głównie z rozwoju relacji sieciowych na poszczególnych etapach dodawania wartości. Rozwój tych relacji w łańcuchach dostaw jest najistotniejszym wymiarem konfiguracji łańcucha. Relacje sieciowe występują zarówno na poziomie dystrybucji, produkcji, jak i dostaw.

Cel badań. Celem artykułu jest przedstawienie metodologii stosowanej do określenia klimatu współpracy oraz połączenie klimatu współpracy z konfiguracją łańcucha dostaw. Celem szczegółowym będącym wynikiem celowej selekcji łańcucha dostaw jest wskazanie kluczowych determinantów konfiguracji łańcucha dostaw w odniesieniu do produktów metalurgicznych.

Metodyka. Autorzy określili czynniki mające wpływ na kształt łańcucha dostaw, klimat współpracy, a także przedstawili metodologię stosowaną przy tworzeniu tego łańcucha. Wykorzystano w tym celu kwestionariusz ankiety umożliwiający zbadanie czynników odpowiedzialnych za kształtowanie relacji sieciowych.

Kluczowe wnioski. W rezultacie przeprowadzonych badań stwierdzono, że stymulatory oraz destymulatory wyznaczają klimat współpracy w sieci. Zaprezentowano również warianty kształtowania łańcucha dostaw produktów metalurgicznych, podkreślając ich kluczowe determinanty.

Słowa kluczowe: klimat współpracy, łańcuch dostaw, relacje sieciowe, dystrybucja