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USING THE NETWORK THINKING METHODOLOGY IN THE PROCESS OF CREATING PROCUREMENT STRATEGIES OF ENTERPRISES

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Purpose: an attempt to implement the methodology of network thinking in the process of creating procurement strategies for companies.
Design/methodology/approach: The basic research methods used in this paper include an in-depth interview with procurement specialists from the selected large companies from the Wielkopolska region. The interview was conducted to identify basic factors influencing the procurement process. Then, elements of network thinking methodology were used to design a procurement strategy. This is a methodology of systemic origin and it allows to analyse the examined phenomena holistically.
Findings: The applied research tool allowed us to discern the most important factors the entrepreneurs should take into account when designing their procurement strategies.
Research limitations/implications: Due to the fact, that there is a network structure linking manufacturing, trade and service companies, this methodology should be increasingly used while designing corporate strategies.
Practical implications: In currently deteriorating market conditions, procurement may increase in importance. Entrepreneurs must strive to maintain continuity of the production process, and this is – undoubtedly – related to meeting the company's needs for materials.
Social implications: The results of this research underline the importance of extensive cooperation with many suppliers, especially in times of economic crisis. Thanks to it, many companies in the industry will be able to survive and develop.
Originality/value: An important value of this piece of research lies in the attempt to implement and popularize network methods in the process of creating strategies.

Keywords: procurement strategies, network thinking methodology, supply logistics

1. Introduction

In contemporary industrial enterprises, procurement is increasingly seen as a way to increase competitiveness. Strategic approach to procurement affects the implementation of the most important company objectives and increases its value. The operation of modern companies

is based on a network of relations and the strategy creation process should largely take this aspect into account. This paper constitutes an attempt to implement the methodology of network thinking in the process of creating procurement strategies for companies. This is a holistic methodology, allowing to view the analysed problem from different perspectives.

2. The strategic importance of procurement

Today's business reality shows companies moving towards globalization and specialization, needing to manage and analyse more relationships with partners, suppliers, competitors and other organizations (Bowles, Lyman, Caswell, and Biern, 2009, p. 120). Market success of modern companies depends, to a large extent, on the efficiency of logistics processes, whose identification is, thus, of utmost importance for understanding value creation.

Streamlining these processes and their continuous improvement increase the effectiveness of a given organization, which translates into increased customer satisfaction. In dynamically changing business conditions, skilful application of the process approach in logistics may contribute to achieving strategic goals.

Effective procurement and supply of goods are some of the elements of creating a competitive advantage for companies. Procurement and supply ensure appropriate quality of manufactured goods and constitute a significant part of total costs of an enterprise. Thus, all managers should be interested in efficient procurement. For procurement to be efficient in a company, an effort to create a procurement strategy is necessary (Grzybowska, 2011, p. 5).

The main goal of procurement logistics is the acquisition of material goods on favourable terms to ensure the continuity of company's operations (Murphy, and Wood, 2011, p. 145). Deliveries should take place at the right place and time, in the right quantity and assortment, at an acceptable price and have to be characterized by appropriate quality and specific technical parameters (Pisz, Sęk, and Zielecki, 2013, pp. 67-68). Other tasks of the logistics subsystem may include searching for and keeping reliable suppliers, negotiating terms of cooperation with them, their assessment, maintaining assumed stock levels, minimizing stock costs, ensuring smooth flow of goods, cooperation and integration with other parts of the enterprise (Koliński, Małyszek, and Trojanowska, 2016, p. 38). The basic objective of supply logistics is to satisfy the material needs of an enterprise efficiently and economically (Bendowski, and Radziejowska, 2011, p. 45).

Subject literature distinguishes two ways of perceiving procurement and supply purchases. The first way is connected to the implementation of the procurement process at the operational level. It, thus, relates to a number of tasks and activities carried out by employees. The way of perceiving procurement at the operational level is understood in a functional sense. The second way of perceiving procurement includes the strategic level and is preferred by the managers who formulate, implement, evaluate and control the procurement strategy in order to achieve the intended objectives of the company (Grzybowska, 2011, pp. 19-20).

Similarly to the company's strategy, the procurement strategy, if developed and implemented well, boosts the company's development and contributes to its competitive advantage (Grzybowska, 2011, p. 38).

Monczka, R.M., Hnadfield, R.B., Giunipero, L.C., Patterson, J.L., and Waters, D., proposed a development model for procurement strategies. Its design starts with an analysis of the company's overall strategic objectives. The subsequent stage constitutes an in-depth analysis of the function of procurement in the company, including the analysis of expenses and their classification. This is followed by an analysis of the business environment. As a result, the selected and implemented procurement strategy is subject to continuous monitoring and control (Osicka, 2012, p. 86).

3. Network thinking methodology as a tool for designing a procurement strategy

There are many methods to be used when designing a procurement strategy. These include environment analysis methods, for example Spekman's method or PEST analysis. Other frequently used methods include the SWOT analysis and Porter's five forces analysis. Such methods as the Buy-Grid model, the Kraljic matrix, the strategic positioning matrix and Gelderman's dynamic approach also deserve some attention. However, subject literature says very little on the value-network methods in the process of creating strategies. Modelling value networks is not only a strategic technique, but also a tool for people on every level of organization. Value networks play an important role in exchange of knowledge and other intangible assets and, thus, help to identify the forces of business and the possibilities for creating value (Alee, 2003, p. 194). One of them is the network thinking methodology.

Network thinking methodology has its own system origin and allows to analyse the studied phenomena in a holistic way. According to Deming, E.C., "the system should have a specific purpose – it should generate value, in other words, the result" (Deming, 2000). The system, in this sense, should be understood as a relationship between various elements present in the network. Speaking of improving the operation of a company as a system, one needs to thoroughly investigate its processes. According to Kozminski, system analysis allows to control

variability, diversity and complexity by realizing dependencies and relationships between various elements (Piekarczyk, and Zimniewicz, 2010, p. 27). Effective and efficient systems enable organizations to satisfy their clients' requirements. It is, therefore, necessary to manage system processes in order to achieve agreed goals in accordance with the adopted policy, as well as to introduce, exploit and evaluate effective and efficient quality systems. System approach to management refers to managing networks of interrelated processes and their connecting interfaces, as well as improving the system by constant measures and evaluations. Applying the system approach to management requires identification of related elements, their borders, relations with the environment, processes running in the system and feedback to maintain the system in a state of dynamic equilibrium with the environment (Prusak, 2006, pp. 48-49).

Network thinking allows to view the problem from different perspectives, analysing the factors occurring in the network and determining the type and strength of interactions of all components. It also enables the development of scenarios and possibilities for change management. Thus, it allows a better understanding of the whole system and its individual parts. Network thinking methodology was developed in the late eighties of the last century in Switzerland by Gomez, P., Probst, G. and Urlich, H. It is based on the following seven basic principles (Grzelczak and Werner, 2011, pp. 22-23):

- the whole and the parts (the system is part of an existing whole, which can also be the system),
- networkingness (in which system components are connected to each other),
- openness (which requires recognition that there is a completely autonomous system, which does not require any adaptation to the environment),
- complexity (describing the operation of an educational facility in a dynamic environment),
- order (resulting from simultaneous connections of parts in a network with structures built on the basis of the pattern of conduct),
- control or driving (based on the system's ability to self-control by controlling and regulating),
- development (social systems are able to pose questions regarding their own structures and procedures and, therefore, they are able to assess themselves. Social systems can also learn and improve their own ability to learn).

The methodology consists of the following six phases: setting targets and modelling problem situations, analysing interactions, recognizing and interpreting the possibilities of situational changes, explaining the possibilities of management, planning strategies and operations and introducing practical solutions to problems (Figure 1).

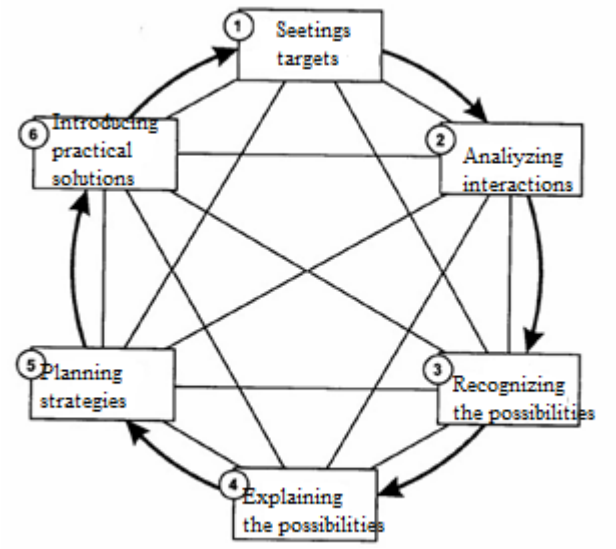

Figure 1. Network thinking methodology phases. Adapted from: Piekarczyk and Ziemniewicz, 2010, p. 48.

Solving problem situations by using network thinking methodology requires an analysis within individual phases. The essence of modelling a problematic situation lies in establishing system elements that are necessary to be changed. The analysis of interactions between network elements should determine the type of impact, its intensity and time. In terms of the interpretation of possible developments, it is necessary to specify expectations for the future, on the basis of which it will be possible to create optimistic, pessimistic and probable scenarios. The explanation of the capabilities of change management is associated with indicating important factors in the implementation of the process, managing their division into controllable and uncontrollable, as well as identifying early warning signals before the occurrence of any problematic, feedback and anticipatory situations. The phase for planning strategies and actions refers to the search for alternative strategies, their evaluation and selection. The practical implementation of solutions should ensure smooth functioning of the system by taking adequate actions to solve both current and anticipated difficulties (Grzelczak, and Werner, 2011, pp. 24-33). This methodology allows for the identification of errors in the management process. The aforementioned errors include the following (Piekarczyk, and Zimniewicz, 2010, p. 81):

- uncritical acceptance of values and goals,
- lack of criticism in the perception of the situation and static thinking,
- ignoring interactions and feedbacks,
- lack of creativity in the search for something new,
- return to the cause-effect thought pattern,
- ignoring time factor in the analysis,
- "doing something" instead of "developing something",
- creating an inadequate system of early warning,
- passive behaviour in times of crisis.

Network thinking methodology requires a convergence of views – a developed network of links between factors must be planned to its very end and its operation must remain within a certain timeframe (Piekarczyk, and Zimniewicz, 2010, p. 82).

4. Implementing the network thinking methodology in the process of creating procurement strategies

This research constitutes an attempt to implement the methodology of network thinking in the process of creating procurement strategies for companies. We selected factors for evaluation based on an in-depth telephone interview with experts (heads of procurement departments in selected manufacturing companies). The study was conducted in April 2020, when the global economy got struck by the Covid-19 virus pandemic. Uncertainty and the spectre of the economic crisis could, thus, affect the results of our research. Factors identified as influencing the implementation of the procurement process included:

- timely deliveries (marked with an A symbol in the network),
- flexibility of supplies (B),
- contracts with suppliers (C),
- supplier assessment (D),
- procedures and instructions for shipping orders and accepting deliveries (E),
- internal company communication (F),
- competence of procurement staff (G),
- complaint procedures (H),
- list of alternative suppliers (I),
- price of purchased goods (J),
- quality of purchased goods (K),
- supplier innovation (L),
- job instructions (Ł),
- list of qualified suppliers (M),
- procurement procedures (N),
- development of cooperation (O).

Identified factors and their interrelations have been presented as a relationship network (Fig. 2).

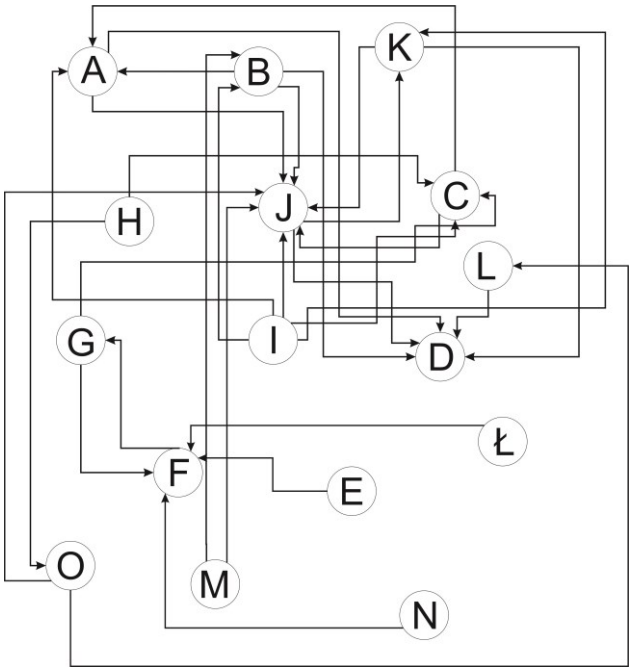

Figure 2. Relationship network. Own analysis.

The following scale was used to determine the strength of interrelations between the factors (0 – no impact, 1 – low impact, 2 – high impact, 3 – very high impact). The impact matrix compares the strength of interrelations between the factors. It allows to identify which factors belong to the active group (a very strong impact on other elements, subject to weak impact themselves), passive (weak impact on other elements while being subject to strong impact themselves), critical (a strong impact on other elements and subject to strong impact themselves) and lazy (weak impact on other elements and subject to weak impact as well). The impact matrix is shown in Table 1.

Table 1.
Impact matrix

		A	B	C	D	E	F	G	H	I	J	K	L	Ł	M	N	O	A
A	Timely supplies	x	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	4
B	Flexibility of supplies	3	x	0	3	0	0	0	0	0	2	0	0	0	0	0	0	8
C	Contracts with suppliers	3	0	x	0	0	0	0	0	0	3	3	0	0	0	0	0	9
D	Supplier assessment	0	0	3	x	0	0	0	0	0	0	0	0	0	0	0	3	6
E	Procedures and instructions for shipping orders and accepting deliveries	0	0	0	0	x	2	0	0	0	0	0	0	0	0	0	0	2
F	Internal company communication	0	0	0	0	0	x	1	0	0	0	0	0	0	0	0	0	1
G	Competence of procurement staff	0	0	2	0	0	1	x	0	0	0	0	0	0	0	0	0	3
H	Complaint procedures	0	0	1	0	0	0	0	x	0	0	0	0	0	0	0	3	4
I	List of alternative suppliers	3	3	2	0	0	0	0	0	x	2	2	0	0	0	0	0	12

Cont. table 1.

J	Price of the purchased goods	0	0	0	3	0	0	0	0	0	x	3	0	0	0	0	0	6
K	Quality of purchased goods	0	0	0	3	0	0	0	0	0	3	x	0	0	0	0	0	6
L	Supplier innovation	0	0	0	3	0	0	0	0	0	0	0	x	0	0	0	0	3
Ł	Job instructions	0	0	0	0	0	3	0	0	0	0	0	0	x	0	0	0	3
M	List of qualified suppliers	0	3	0	0	0	0	0	0	0	1	0	0	0	x	0	0	4
N	Procurement procedures	0	0	0	0	0	2	0	0	0	0	0	0	0	0	x	0	2
O	Development of cooperation	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	x	4
P	Total P	9	6	8	15	0	8	1	0	0	15	8	1	0	0	0	6	X

Note: own materials.

The obtained values of indicators have been plotted on the intensity map. The intensity map was divided based on maximum A and P values and divided by two. With this assumption, we obtained the position of lines dividing the area of A = 6.5; P = 8.0.

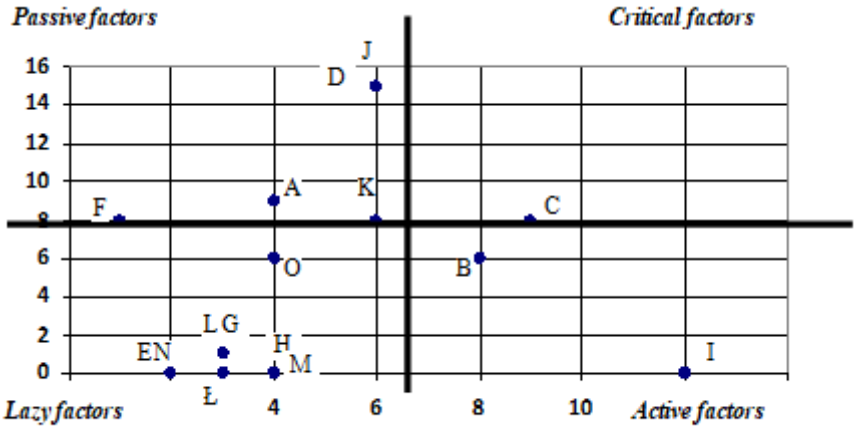

Figure 3. Intensity map. Own analysis.

Based on the intensity map presented in Fig. 3, key factors can be identified (active – influencing these factors will result in high effectiveness of an action, as these are the elements that significantly affect other elements, but are themselves subject to very little impact). These factors include:

- list of alternative suppliers (I),
- flexibility of supplies (B),
- contracts with suppliers (C).

The "contract with suppliers" factor is on the border between critical and active. However, it is undoubtedly an important factor.

These active factors determine the possibility of introducing changes and enable to increase the stability of the created strategy. The significance of the "list of alternative suppliers" draws attention to the need of implementing a multiple-source strategy. It allows the use of the services of many suppliers and subcontractors, ensuring high security of purchases. This strategy is

characterized by many suppliers, many relationships and many strategies. In case of the multiple-supplier strategy, it is necessary to use and cooperate with a relatively large number of suppliers, with whom the company creates various relationships, levels of cooperation and different transactions. It also guarantees continuity and reliability of supply, as well as allows to avoid dependency on selected suppliers. The disadvantage of this strategy includes complex logistics and administration of deliveries (Grzybowska, 2011, p. 58). However, in the current economic conditions (pandemic and the spectre of economic crisis), it gives the company a chance to maintain and implement an undisturbed logistics process. Undoubtedly, factors such as "flexibility of deliveries" and "contracts with suppliers" also enable continuity of the process. The strategic logistic planning process should push managers to question the level of flexibility that could be considered right with a certain degree of uncertainty inherent in the company's logistical processes and the supply chain in which it operates. The strategic planning process should also take into account existing and potential strategic alliances, new institutional configurations and opportunities for diversification as ways to reduce the company's vulnerability to threats and reduce the time it takes to adapt to unforeseen market changes. Contracts with suppliers also guarantee the performance of deliveries. A precisely concluded and enforced contract may not only bring significant savings to the company, but also guarantee the effectiveness of cooperation with suppliers.

5. Conclusion

When selecting methods and tools for strategy design, they must be best suited to the market situation and the organisation itself.

Contemporary logistics is consumer-oriented and aims to create a network structure linking manufacturing, trade and service companies, as well as provide positive feedback in terms of an increase in transport traffic and the rotation of goods, as well as its impact on the environment (Szczepankiewicz, 2011, p. 11). The strategy development process should, therefore, take into account the conditions discussed above. This paper attempts to implement the network thinking methodology to design a procurement strategy. The key factors influencing future procurement strategies include the list of alternative suppliers, the flexibility of supplies and contracts with suppliers. Therefore, these factors take into account the current situation characterised by the risk of bankruptcy of many companies and the spectre of economic crisis. To ensure the continuity of material supplies, companies should pursue a multi-supplier strategy, thereby ensuring the flexibility of supplies. Appropriate supplier contracts will enable this process.

Please note that the crisis conditions determine not only the chances for procurement to gain on importance, but also certain threats to the development of partnership-based cooperation with suppliers. This is because they favour short-term use of such practices as aggressive

negotiations on price reductions, extending payment deadlines to suppliers, shortening them in exchange for massive price discounts or concluding long-term contracts with prices particularly favourable for the buyers (Osicka, 2012, p. 81).

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