
The Role of Information Relations in Network Organizations

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Abstract:

Purpose: The paper aims to identify and analyze key factors determining network organizations' success, assuming that there is common cooperation on the information platform created by network organizations. The aim is also to identify and analyze basic barriers of establishing such cooperation.

Design/Methodology/Approach: The research includes the statistical analysis of information flows efficiency in network organizations. The presented analysis has been conducted using the selected statistical testing methods.

Findings: The obtained research findings confirm Polish companies' understanding of the importance of information in their functioning. The obtained results indicate that enterprises treat the network data flow as an element that only improves their offer.

Practical Implications: Activities aimed at information cooperation with the environment, including network structures, are not optimal. Only a full transition to functioning in the information space allows us to achieve a maximum of positive effects.

Originality/value: The presented approach not only applies to companies that have direct contact with the customer; it can be applied in every sector of economic activity by any organization operating under conditions of uncertainty and dynamic change.

Keywords: Enterprise, network organization, information, relation, cooperation, collaboration.

JEL classification: D83, L14, L26.

Paper Type: Research study.

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1. Introduction

Cooperation and collaboration allow participants of the dynamic market to better use their own capabilities; therefore, in recent years, inter-organizational cooperation and the adoption of network forms by organizations have gained importance in many industries (Raab and Kenis, 2009). It is even assumed that at present, an international corporation is no longer the largest business unit but cooperating networks of globally related companies and organizations (Farok, 2008). They allow each of them to better and faster prepare for changes - take advantage of opportunities and avoid (minimize the effects) threats. Cooperation, from the managerial point of view, is a strategic option for further business development. Enterprises, understanding that external relations strongly influence their internal capabilities, are willing to cooperate with other entities operating in the same industry (Wilke *et al.*, 2019).

The comprehensive research conducted in many industries in which modern enterprises operate showed that cooperation in inter-organizational networks allows generating benefits by sharing resources, knowledge, and competences, which lead to achieving jointly adopted goals, increasing the effectiveness of operations, and increasing the level of innovation (Zaheer *et al.*, 2010). The company's position in such an inter-organizational network also determines its behavior and achieving its goals (Ahuja, 2000). In the context of their impact on contemporary enterprises and any other market's participants, the dynamics of functioning and globalization are the result of technical and technological development, especially IT (Chien *et al.*, 2017). In the authors' opinion, this is achieved primarily due to the greater sensitivity of the networks created in this way to the information appearing on the market and the greater potential for their response. The creation of organizational networks is "the company's response to dynamic technological and technological progress, the growing importance of non-material resources, globalization of the economy, as well as the need to undertake increasingly difficult challenges in the sphere of business and public services enables better access to resources (both tangible and intangible), faster implementation of complex tasks and exceeding traditionally understood limitations" (e.g., production capacity) (Lichtarski and Bandura, 2015). The networks also find economic justification in a dynamic and competitive market because market coordination can be more effective than hierarchical.

Currently, it is assumed that network organizations emerge from the process of constantly repeating cooperation taking place between them, which is largely based on trust and mutual exchange of information and other resources, as well as fact's acceptance that, currently, it is impossible to create a technologically complex global civilization without cooperation between organizations (Starostka-Patyk, 2017). There are different perspectives for the networking process through inter-organizational cooperation:

- networks will be purposely created groups of several organizations that have

- the same goal or strive to achieve the same effect, e.g., strategic business networks or political networks (Raab and Kenis, 2009),
- as the result of an evolutionary process of cooperation between many organizations in their relationships (Wäsche, 2015),
 - stable relationships are also created between organizations that are characterized by a high level of trust and a high level of information exchange in order to reduce costs and minimize risk (Gulati and Gargiulo, 1999).

Among the reasons for the creation of the network, given by the authors, the following should be considered as the most important: dynamics - concerning technical and technological progress and conditions of enterprises' functioning and globalization (Strielkowski *et al.*, 2017). On the other hand, the emergence of cross-functional and inter-organizational conflicts may make it difficult to obtain specific benefits resulting from such cooperation (Allred *et al.*, 2011). In order to achieve the optimal level, the full junction of the participants is necessary. The junction consists primarily of possibly full information integration - minimizing the time of information flow in the network from the moment it appears in it (Gu *et al.*, 2017). The time of the network's reaction to information, that is, performing physical activities to satisfy market needs and provide relevant information to the environment, is equally important (Chien *et al.*, 2016). Thus, this process includes the acquisition and dissemination of information and the creation of network relations.

The information has always been a driver of action, and now, its role in supporting enterprises' operation has to become increasingly important. They generate them, affect the course and effects. So, this is a direct reason for the acceleration (dynamism) of functioning and the blurring of borders in physical terms - in which information and knowledge play a significant role. It is no longer possible to make appropriate and rational decisions without accurate and up-to-date information in the management processes. Their shortage causes the need to collect data, which in effect may strengthen the position of the company (Kubicka, 2016). The shaping of contemporary processes in enterprises resulted in the emergence of a new information infrastructure in which relations regarding the production, processing, storage, and use of data and information play a dominant role (Andriushchenko *et al.*, 2019). The process of creating new information infrastructure is a process initiated and taking place under the influence of external factors, among which the most important is positive customer experience because it enables the enterprise not only to stay on the market but also to strengthen its position in the highly competitive environment (Samuels, 2018). At the same time, rapid technological development is the result of a free information flow unlimited by time and place.

2. Network Organization Concept

The organization itself can be defined as a specific solution created by more or less

autonomous actors to achieve common goals (Vlist, 1998). Networks can be groups of organizations, but also groups in organizations. Network organizations emphasize the interdependence between organizational entities and attach great importance to the development and maintenance of (communicative) relationships. At the same time, individual organizations have their own specific interests. They can be linked to various network organizations. Therefore, network relationships can always be characterized by a tension between autonomy and interdependence, between team loyalty and individuality, between competition and cooperation (Powell, 1990).

Network organizations are defined depending on their nature and mode of operation. Initially, they were defined as independent units that create a common structure for specific and defined operations (Brilman, 2002). The concept is currently wider because network organizations also include networks of dispersed entities, forming one capital group (Czop and Leszczyńska, 2002). Jones *et al.* (2007) defined a network organization as an intentionally selected, durable, and orderly set of autonomous business entities involved in the production of goods and services based on implicit and undefined contracts and coordination of the exchange transaction process. In turn, according to Czakon (2016), links between organizations, in addition to the nature of economic cooperation, may also have the character of friendship, advice or sympathy.

On the other hand, the nature of cooperation results from establishing specific relationships, organization, and control of cooperation itself. It is also emphasized the voluntary nature resulting in the transition from hierarchy rules to creating a cooperation network between various economic entities to implement specific strategic goals (Maszyk-Musiał *et al.*, 2012). A modern network organization should be created based on an innovative platform, understood as a team of entities cooperating within an organizational, functional, and process network, working together on new ideas, new solutions, new methods and tools, new products and services, and creating common structure and strategy, taking into account the standards of effective management of creativity and innovation (Rostek and Młodzianowski, 2018). At this point, it is also worth mentioning networks in the social dimension, defined as social networks being currently one of the main sources of obtaining information and creating networks of information connections. Most social networks are used by organizations to promote working groups to cooperate, disseminate innovation and ideas, and promote the exchange of information and knowledge to meet business needs (Flores, 2016).

3. Research Methodology

By acquiring and processing information, the organization "learns" while changing the scope of its potential behaviors (Borgatti and Cross, 2003). The way the organization shares information can become an important factor in the development of the company, as more and more attention is devoted to the research on the provision of information by network organizations. Research carried out by Borgatti

and Cross (2003), made it possible to identify the behaviors that organizations adopt in order to search and obtain information: knowing what another organization knows, valuing what that other organization knows in relations to its work and being able to gain access to that is an organization thinking process.

However, the problem arises when the various market participants start cooperating. Networks have a richer set of resources, greater ability to identify information, adapt to customer requirements better, and have a greater possibility of information impact. However, all these advantages will not be used optimally if the information cooperation does not proceed optimally. In this respect, the network has to be one "system"; it represents unity on the market. This problem is reinforced by the fact that the organizational network should be created when important market information is identified - opportunities and threats. It has to be a structure optimally suited to implementing the specific task and no network, and no company is so universal. This is due to the characteristics of the 21st-century enterprise indicated by Drucker (2012). Therefore, it should be stated that the network organization is the structure based on the network of information connections. It is efficient and effective, as much as efficient and effective is its network of information connections.

The conducted research allowed us to conclude that there are statistically significant correlations between gaining information from the market about competing companies and the needs and expectations of customers, thus improving the company's offer. There were also statistically significant correlations between shaping success in the field of cooperation between the company and the environment through the dissemination, control, supervision of information outside the company and active delivery of information to the company's environment through mass media and direct communication and in general about undertaking activities aimed at dissemination market information about the company and its offer. There were statistically significant correlations between the implementation of cooperation with the environment to improve the offer and exchange of information and knowledge. The results of the analyzes allowed positive and partly positive verification of the research hypotheses.

4. Sample Research Description

For the assessment of Polish enterprises' network character, the study of the method and efficiency of information flow, based on the survey among employees and owners of small Polish enterprises, was conducted. The Silesian voivodeship is characterized by high population density. It is an area where a significant number of enterprises operate on a national scale. Indicators presented in the PARP report in 2018 show that the number of enterprises per 1000 inhabitants is at the national average. In this region, the highest survival rates of start-up companies in the country are also recorded. The Silesian voivodeship in Poland, which belongs to one of the most economically and technologically developed regions. This region is the

place for 11% of micro-enterprises in Poland (second place in regions). At the same time, it is one of Poland's most industrialized regions, where both the number of active micros and small enterprises and the number of people working in them is higher than the national average (GUS data).

According to the Research Institute of Market Economics, in this region, there is a special economic zone recognized as the best, according to the FDI Business Financial Times ranking (Strefa i region) and the most attractive investment region of Poland. The environment of the zone is conducive to applying innovative solutions in enterprises and the exchange of information and establishing business contacts. To obtain, in the opinion of the authors, the most accurate and reflective reality of the situation in the subject area of the article, the companies included in the study were chosen at random. The survey questionnaire was available on the Internet in the period between 1.02.2018 – 30.04.2018. The link to the survey was included in an e-mail sent to 245 micro and small enterprises operating in the Silesian Voivodeship in network organizations. The survey questionnaire was divided into four parts:

- the first part provided the general information about the respondents in terms of type, age, and employment, identification of the employment area, assessment of awareness of the impact of activities on customer relations, company's approach to these relations, the cooperation of the company with the external environment to improve the offer and management, monitoring actions were undertaken by competitors, as well as information activities directed to the external environment,
- the second part contained questions about the area of obtaining information from the closest environment, from customers, the impact of information on the development of cooperation between the enterprise and the customer, the impact on the development of the commercial offer, the willingness of customers to share information with the enterprise,
- the third part included questions about the area of information dissemination by the enterprise, identification of ways of disseminating information, the impact of dissemination of information on the image and perception of the enterprise, the impact on achieving success and establishing cooperation to create a network organization,
- the fourth part included questions about building mutual relations in network organizations, the purpose, and the causes of creating a network organization.

The nature of the answers to individual questions took the form of a one-time choice answer. Before conducting the main study, a pilot study was carried out on a group of 10 enterprises to eliminate potential inaccuracies so that the respondents had no doubts about the essence of the questions asked. After that, the main study was conducted.

5. Findings

The survey questionnaire was filled by 144 respondents (133 employees and 11 company owners). According to Krejcie-Morgan's theory of minimum sample size, this condition has been met. The structure of respondents for the area of employment is presented in Table 1.

Table 1. The quantitative structure of the sample in view of the respondents' area of employment

Area of employment	Frequency	Percent	Valid percent	Cumulative percent
Production	38	26,4	26,6	26,6
Supply	1	0,7	0,7	27,3
Distribution/Sales	15	10,4	10,5	37,8
Warehouse	9	6,3	6,3	44,1
Transportation	4	2,8	2,8	46,9
Customer service	51	35,4	35,7	82,5
Other	26	18	17,5	100,0
Total	144	100	100,0	

Source: Own study.

The condition for effective cooperation is the ability to properly exchange information between the organizational network entities, which is associated with the acquisition and dissemination of information from and to the environment. This approach set out the main research framework covering three key aspects of information flow and networking of collaboration:

1. Acquiring information from the environment:
 - a. Information on activities undertaken by competitors and events taking place in the environment, which are taken into account in the management of the company;
 - b. Gathering information about customers' needs, expectations, and requirements and the company's ability to take actions aimed at customer satisfaction with the cooperation with the company;
 - c. Acquiring information from the market and improvement of the company's offer.
2. Dissemination of information in the environment:
 - a. Undertaking activities aimed at disseminating information about the company and its offer on the market;
 - b. How the process of disseminating information about the company and its offer takes place;
 - c. Shaping the company's success by spreading, controlling, supervising information outside the company;
 - d. Active provision of information to the company's environment through the Internet, newspapers, television, radio, and direct communication, influences the decision to start cooperation with the company.
3. Building mutual relations:

- a. Establishing cooperation with clients, other companies, scientific institutes, non-profit organizations, which aims to: develop and introduce new products/services to the offer, improve the features of products already offered for sale, improve the quality of the customer service process;
- b. Establishing cooperation with clients, other companies, scientific institutes, non-profit organizations, which aims to: improve the organization's management (only employees);
- c. The possibility of establishing cooperation between the company and the environment is not related to the sale, but only the exchange of information and knowledge.

These three aspects of cooperation are the basis for creating an organization's network. The level of involvement of individual entities is treated here as a factor determining information flows' efficiency. Therefore, it was assumed that the effectiveness of the organization's network results from the ability to collect information from the environment (an aspect I), dissemination of information in the environment (aspect II), and establishing contacts with the environment (aspect III) (Figures 1, 2 and 3). In order to assess the degree of network utilization of the surveyed enterprises in the development of their own business, the following research questions were asked:

Research Question 1: Does participation in the inter-agency exchange of information improve cooperation with the client?

Research Question 2: Does the dissemination of information about the company increase its network potential?

Research Question 3: Is the goal of cooperation undertaken to improve the organization's management?

The formulated RQ allowed the adoption of the following research hypotheses:

Hypothesis 1: *Participation in the network exchange of information improves cooperation with the client.*

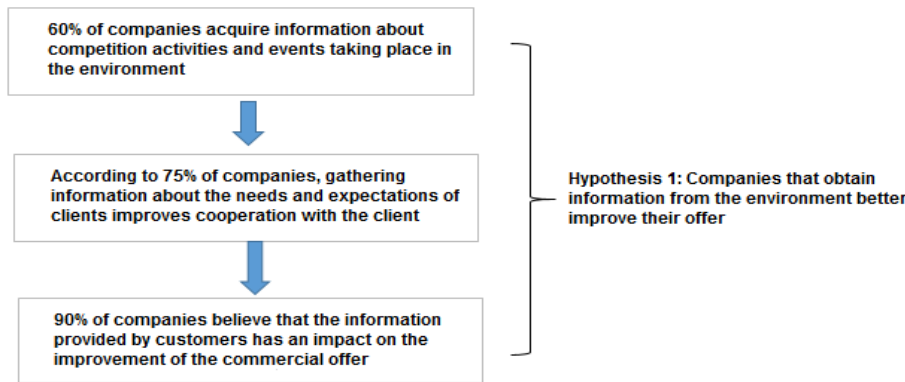
Hypothesis 2: *Dissemination of information about the company increases its potential for contacts in the organization's network.*

Hypothesis 3: *As a result of the cooperation undertaken in the network, the enterprise is improving its management process*

In order to verify the research hypotheses, the primary data obtained from the questionnaire form were analyzed.

The obtained results of frequency analysis made it possible to make some observations concerning individual areas of information exchange in network organizations. The most frequent answers are in Figures 1, 2, and 3. These observations served to define three research hypotheses. To verify the hypotheses, the statistical analysis of the relationship was carried out using the chi-square test.

Figure 1. The structure of the hypothesis 1 for the area of obtaining information from the environment



Source: Own study.

Table 2. Pearson's Chi-Square for hypothesis 1

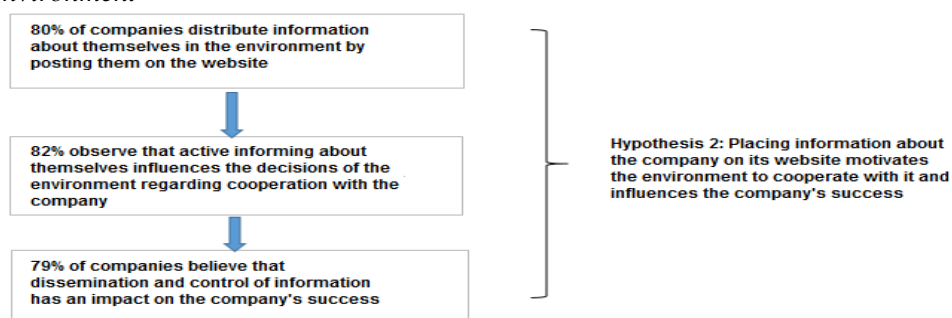
Variables	Pearson's Chi-square	df	Asymptotic significance p (double-sided)
1. a and b	19,93	6	0,003*
1. b and c	17,66	4	0,007*
1. a and c	18,39	4	0,001*

Note: *for $p < 0,01$, ** the numbers and letters in columns one correspond to the subpoints described above 1 (a,b,c); 2 (a,b,c,d); 3 (a,b,c)

Source: Own study.

There were statistically significant correlations between gaining information from the market about competing companies and the needs and expectations of customers ($\chi^2 = 19,93$, $p = 0,003$) and improving the company's offer ($\chi^2 = 17,66$, $p = 0,007$). The more information the company acquires from the environment about both competitors and potential business partners, the better it can prepare its commercial offer. Thus, the H1 hypothesis can be positively verified; it assumed that companies, which obtain information from the environment, acquire them, among others, from customers, which undoubtedly positively affects the improvement of the offer.

Statistically significant correlations between shaping success in the field of cooperation between the company and the environment were observed by spreading, controlling, supervising information outside the company and actively providing information to the company's environment via the Internet, newspapers, television, radio, and direct transmission ($\chi^2 = 66,95$, $p = 0,000$) and in general about undertaking activities aimed at disseminating information about the company and its offer on the market ($\chi^2 = 20,93$, $p = 0,007$). The more data and information the company disseminates on its own, it can count on greater success in acquiring new business partners and creating networks.

Figure 2. Structure of the hypothesis 2 for the dissemination of information in the environment

Source: Own study.

Table 3. Pearson's Chi-Square for hypothesis 2

Variables**	Pearson's Chi-square	df	Asymptotic significance p (double-sided)
2. b and c	0,99	4	0,911
2. c and d	66,95	8	0,000*
2. a and c	20,93	8	0,007*
2.a and d	3,06	4	0,546

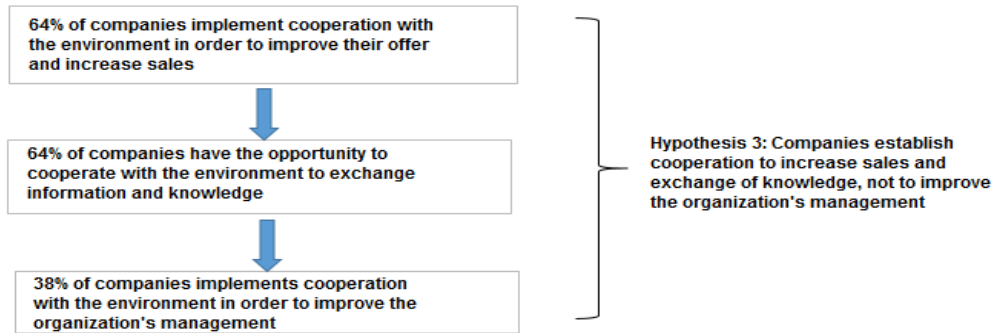
Note: *for $p < 0,01$, ** the numbers and letters in columns one correspond to the subpoints described above 1 (a,b,c); 2 (a,b,c,d); 3 (a,b,c)

Source: Own study.

The obtained results partially verify the H2 hypothesis, which assumed that placing information about the company on its website motivates the environment to cooperate with it and influences the company's success. Therefore, it can be assumed that placing information on the website contributes to establishing cooperation, but to a minimal extent compared to other information channels. The surveyed companies show an organic approach to active management in the information space, most often using websites. Generally speaking, companies should consciously distribute information among current and potential cooperators and are aware of it, which results from the second and third components of the verified hypothesis. The company's success is influenced by the proper information about the environment using the largest possible number of different communication channels.

There were statistically significant correlations between the implementation of cooperation with the environment in order to improve the offer and to exchange information and knowledge ($\chi^2 = 50,99$, $p = 0,000$). At the same time, both these factors affect the course of cooperation in order to improve the organization's management ($\chi^2 = 11,60$, $p = 0,021$; $\chi^2 = 23,93$, $p = 0,001$). Cooperation between companies favors the exchange of information and knowledge, improvement of the organization management, and improvement of the offer, which has the final effect of noticing a higher sales level.

Figure 3. Structure of the hypothesis 3 for the area of building mutual relations



Source: Own study.

Table 4. Pearson's Chi-Square for hypothesis 3

Variables	Pearson's Chi-square	df	Asymptotic significance p (double-sided)
3. a and b	50,99	4	0,000*
3. b and c	11,60	4	0,021*
3. a and c	23,93	4	0,001*

Note: *for $p < 0,01$, ** the numbers and letters in columns one correspond to the subpoints described above 1 (a,b,c); 2 (a,b,c,d); 3 (a,b,c)

Source: Own study.

Thus, the H3 hypothesis can be positively verified, which assumed that the companies establish cooperation to achieve greater sales and exchange of knowledge and not improve the organization's management. The surveyed companies establish cooperation primarily to achieve greater sales and knowledge exchange, but less frequently to improve their management. At the same time, it is recognized that knowledge in the conditions of the changeability of the environment and thus changing conditions of functioning on the market should be used to improve the organization's management.

4. Conclusion

In the modern market economy, information and knowledge is an increasingly important asset, which with the use of information and communication technologies, has become the driving force of small and medium enterprises. This forces them to obtain and process information resources necessary for use in decision-making processes. Data exchange and technological connection between these entities create a network of organizations. The networking of SME enterprises is aimed at developing their potential and creating a new dimension of cooperation.

The issue of cooperation on the market is known in the literature. In this respect, the authors of this publication pay particular attention to the efficiency of cooperation at the information level. This, in their opinion, is the research area, which is relatively

rarely considered. The efficiency of cooperation in terms of compliance and matching of IT systems within the network is analyzed.

The conducted research has shown that small and medium-sized enterprises eagerly use information and communication technologies to increase the customer service level. These companies obtain information from the environment, which most often comes from the consumer market, positively affecting the commercial offer's improvement.

Moreover, they declare that their information and knowledge flows are aimed at acquiring new customers. To this end, they eagerly place information about their assortment on their website, hoping to increase recipients' level. Simultaneously, these companies have a dubious approach to active management in the information space based on various information channels.

Because the contemporary functioning of the individual and the organization is related to information, which results directly from the dynamic reality (the dynamics of life/functioning is a derivative of dynamism in the information space), the authors believe that research on conducting business in the information space should be continued. Dynamics of change and uncertainty are directly affected by the development of IT, especially the Internet. Subsequent changes in this area increase the importance of information. This is especially about the time: their identification, acquisition, understanding, analysis, dissemination, and use. The use is related to the business's physical aspect (changes in the assortment offer, management methods, customer service) and sharing information (transfer to the information space) that affect enterprises' activity in the operational and strategic area. Including creating network structures for the implementation of tasks to take advantage of upcoming opportunities and avoid threats. Just as identifying and obtaining information counts, so is the time of creating and starting activities through the network structure. In this respect, market intelligence's effectiveness in terms of potential entities (their material and non-material resources and cooperation capabilities at the information level are important - minimization of time losses in the scope of information flows and knowledge - understanding - effectiveness of information connections).

However, the conducted research has some limitations. First, only selected aspects of information exchange were examined. Secondly, the issue covered the potential of information and communication technology. Among the limitations faced by authors of this publication, one should mention a small number of responses from the companies to which a request for completing the survey was sent. Another problem seems to be a relatively small understanding of the importance of management issues in the information space by enterprises (as a whole), but also of individual employees.

The obtained results confirm the understanding of the importance of information in the functioning of enterprises. At the same time, based on the conducted research, it

can be noticed that the acquisition of information is associated primarily with the modification of the assortment offer. In this respect, it should be stated that activities aimed at information cooperation with the environment, including the creation of network structures, are not optimal. According to the authors, only a full transition to functioning in the information space, that is, the information in the information world to maximally adjust to reality (in each area of functioning), allows us to achieve maximum positive effects. This particularly applies to the creation of structures based on cooperation and mutual use of individual unit potentials.

The results constitute a starting point for further research in the scope of the activity's generated effects due to the information flows carried out in the network and specific experiences and competencies, which entities exchange among themselves. The proposed model (approach to information management in the information world) can be applied in every economic activity sector. This does not apply only to companies that have direct contact with the end customer. This applies to any organization operating under conditions of dynamic change and uncertainty. In such a reality, the most important thing is the time to react to the information appearing or even appearing on the market (information about upcoming market events). Equally important is the organizations' ability to obtain the right information in the shortest time from their appearance. According to the authors, this is the basic determinant of the company's competitiveness.

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