

# Influence of level of social capital on the functioning of clusters

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**Abstract**— The paper is concerned with the influence of social capital on the functioning of network organizations and methods for measuring and evaluating the performance of clusters. Within the case study, criteria are applied for the evaluation of network organizations on the selected cluster. The results of the carried out analysis and questionnaire survey among members of the cluster are presented in this paper. At the end, weaknesses of the existing functioning of the cluster are shown and recommendations for improvements of the current state are formulated.

**Keywords**— cluster, network organizations, social capital, trust.

## I. INTRODUCTION

THE aim of this paper is to apply the method of evaluation of network organizations, taking into account the issue of social capital [1] on the selected cluster. Existing standard methods for assessing clusters are quite complex to obtain information (e.g. internal economic information on the operation of businesses involved in the cluster, time-consuming of their processing). Therefore, the searched method for evaluation of the functioning of clusters, should minimally burden the members of the examined cluster and at the same time should have the best explanatory value. The basic premise is that social capital is one of the key factors influencing the functioning of network organizations. Social capital represents a wealth of contacts and is based on both social status and the amount of trust in relationships between people, existing social norms, formal and the informal social

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networks that are used to access resources, in problem solving and creating social cohesion. These are the resources obtained from social networks and social relations. [2]

On the basis of the conducted analysis, some methods for measuring the performance of clusters were found and cluster initiatives do not reflect the effect of social capital. A case study is processed in the text on the mining-manufacturing cluster Czech Stone Cluster, which is situated in the Hradec Kralove region in the Czech Republic. The Czech Stone Cluster brings together companies, from the field of stone processing organizations capable of supporting infrastructure, research and educational institutions [3].

## II. DEFINITION OF THE ISSUE AND METHODS OF SOLUTION

### A. Network organizations

Clusters are geographically close groups of interconnected companies and other institutions in a particular field. [4] Likewise, as network organizations represent a group of several companies on the basis of informal relations, which seeks to gain a competitive advantage by working together. This co-operation is advantageous, if the company itself is unable to secure enough resources or knowledge and in co-operation with other companies (even with competitors), achieves higher performance. [5]

From a strategic perspective, network organizations are considered as "long term meaningful arrangement of different but related profit organizations, that allows them to gain or keep the competitive advantage" [1] The common need of all members is to achieve their objectives with minimal effort. In the case of economic network, it is a volunteer created network of independent business partners, linked through contractual relationships. According to Dědina [5], the network acts as a co-ordination mechanism based on trust. In the terms of organizational structure, they are the organizations that use a decentralized system of powers, limited number of rules and flexible co-ordination [5]. Characteristic is group decision making, reciprocal and preferential relations, activities for mutual support, trust and informal, non-contractual agreements. The initiators of the network set out rules of operation for the entire network and supervise their observance. [1]

Keller [6] suggests that the network structure of economic organizations has significant weaknesses. In their context, it is

difficult to accept for example, the abovementioned Dědina's positive characteristic. "Networks (...), allegedly acting as a democratizing element, because they replace the vertical, pyramidal arrangement by horizontal connection of freely co-operating members. There has rarely been a larger sociological fiction. (...) Secession of lower sections of manufacturing organizations and their transfer to the network structure, allows companies to better fulfil the reason why they arose - at its core to accumulate maximum profit, move most market risks to periphery. Networks did not bring less hierarchy and more democracy into it. They only brought more uncertainty and amplified incommensurability of the position of individual contractors. [6] Dědina [5] distinguishes two types of networks: the network with a dominant partner, who communicates with other network partners, while the remaining members do not have to interact at all together. If the dominant member terminates, the network collapses. Termination of other members does not have a significant influence on the functioning of the network. Another type of network is a network with peers, when neither single partner is able to change the rules or the operation of the whole network, while the distribution of power within the network is constantly changing. [5] This type of network in contrast to the first is much more democratic, and in this sense it is closest to the cluster analyzed below.

Network organizations can be characterized based on their structure, processes, or the meaning of their functioning. These organizations need to build a common identity through a strategy and monitoring of common objectives, which reflect the nature and common sense of their activities. These features are characteristic for them: flexibility, common controls, common aims and mutually beneficial specialized benefits [1]. According to Santoro [1] for evaluation of the functioning of network organizations, observing the following basic characteristics that were observed in our case study is recommended:

*Existence of common objective* – clearly defined, attracting new members and serving as a guide for existing members.

*Focus on action* - when group members do not perform together, and thus do not affect their surroundings, they cannot be considered as a network.

*Adhesion, participation and independence* - the main success of network, is if it links the people who decide to devote their time and efforts for joint projects. At the same time, they are so independent that they can finish anytime and create a new network.

*Equality and multi-leadership* - equality is a pre-requisite for the separation of powers. Each member can gain the role of leader, propose action and get more members for its implementation. Individual leaders, however, must co-ordinate their actions to eliminate conflicts and duplications.

*Distribution of information and freedom of speech* - the sharing of information leads to the elimination of activities that are performed by two or more members simultaneously, while it could be carried out by only one member and with the same

result. It is important, therefore, to create a mechanism for generating and sharing information.

*Self-organization and co-operation* - a key success factor of network is the co-operation of individual members, which is not easy, especially if the members do not know each other properly, or do not have the opportunity to meet face to face. Therefore, it is necessary to create mechanisms to support the co-operation.

*Capability to attract new members* - the network's aim is to disseminate their ideas and activities, in the long run to compensate loss of members by their increase, and thus eliminate the formation of a new network with the same goals. To increase the performance of network organizations is necessary to increase the number of their members or to improve the performance of existing ones. [1]

The effectiveness of the network depends on the ability of each member to share information at the right time, enrich the existing information, support the growth of knowledge and the ability to analyze. Mutual trust among members, who often compete with each other, is a pre-requisite for the sharing of knowledge.

#### B. Analysis of methods for measuring the performance of clusters

Existing methods of monitoring of the performance of clusters do not always include the evaluation of the impact of social capital. Therefore, a basic analysis of these methods was carried out, based on monitoring the following criterion:

- 1) Part of the method is the assessment of the direct effect of social capital in the cluster to its functioning.
- 2) Assessing the level of social capital/networks is secondary (the number of members, number of shared knowledge, etc).
- 3) Level of social capital is not assessed (e.g. only financial indicators are monitored).

Evaluation of selected approaches is as follows. To the methods, that take account of social capital as a primary factor, a number is assigned - 1, social capital is assessed indirectly - number 2, the effect of social capital is not included in the method - 3. The following table highlights the fact that the influence in the level of social capital for the functioning and

TABLE I  
THE IMPORTANCE OF SOCIAL CAPITAL IN THE METHODS FOR MEASURING THE PERFORMANCE OF CLUSTERS AND CLUSTER INITIATIVES

Name of the method of measuring performance	Evaluation
Cluster initiative performance model	1
Performance evaluation of clusters according to the Canadian National Research Council (NRC)	1
British approach to the evaluation of clusters	1
Scottish Enterprise approach to the evaluation of clusters	1
Evaluation of regional intellectual capital in clusters	1
Benchmarking of cluster initiatives	2
Cluster benchmarking model	2
Projects of mapping and exploration of the development of clusters, carried out by the M. Porter group	3
Multi-dimensional assessment of clusters and cluster initiatives	3

Source: author's research, [7].

development of the cluster is generally regarded as significant. In five of the nine methods, social capital is assessed as one of the direct factors.

### C. Research assumptions and methodology

The authors based assumptions on the following research, which they used to process the case study of the mining-manufacturing cluster Czech Stone Cluster:

- 1) The level of social capital is a pre-requisite for further development of the cluster.
- 2) For the evaluation of the cluster, the method for the evaluation of network organizations can be used.
- 3) The influence of the initiator of the cluster to its further development is significant.

The case study of the examined cluster, with the help of the survey, focused on finding answers to the following research questions:

- 1) What is the level of social capital amongst members of the cluster?
- 2) How does the cluster work as a network organization?
- 3) How do the cluster members obtain and share information??

The survey itself was preceded by an analysis of available materials on the website of the cluster (from 1<sup>st</sup> of February 2010 to 13<sup>th</sup> of July 2011), the above mentioned analysis of methods for measuring the performance of clusters, and an in-depth interview with the chairman of the cluster. The scenario of questions for the in-depth interview was prepared on the basis of collected information and findings from the study of specialized literature. The results of the interview were used to prepare a questionnaire, which was submitted to the chairman of the cluster for comment. After obtaining the contacts on current cluster members, the questionnaires were distributed electronically, making use of the free user licence of easyresearch.biz. The survey took place at the turn of 2010 and 2011. The business members were asked 38 questions relating to the functioning of individual firms, the cluster, the level of social capital and the possibility of co-operation in tourism. Academic members of the cluster were not asked questions regarding the functioning of an enterprise.

## III. THE CASE STUDY OF THE CZECH STONE CLUSTER

### A. Basic characteristics of the Czech Stone Cluster

Kamenolom Javorka Company Ltd., was the initiator of the Czech Stone Cluster project, in the field of stone processing, starting from the end of 2004. An application for a grant for cluster start-up, was sent to the CzechInvest agency on the 31<sup>st</sup> of January 2006. The evaluation committee of the CzechInvest agency approved the request on the 16<sup>th</sup> of March 2006. [8] The cluster is a form of co-operatives and is chaired by Eng. Frantisek Zocek, who is also the representative of the Kamenolom Javorka Company Ltd.

The cluster currently has a total of 19 members, of whom 8 are academics and 11 are businesses. The business cluster members are primarily small businesses employing up to 10

people. Among the "academic members" are other non-business members (e.g. schools and towns).

In the questionnaire survey conducted among members of the cluster, a total of 14 members responded, from which 7 are academic and 7 businesses. The total return of questionnaires was therefore 74%. All responding business members are small businesses employing up to 10 people.

### B. Assessment of level of social capital

The basic component of social capital is considered membership of people in voluntary associations. The contacts and social networks in them, create a significant resource for the problem solving of collective action and advocacy of certain aims within a company. Membership in voluntary associations are linked to the high volume of social capital that contribute to greater cohesion within the community, and thus reduces social tension. The external role of these associations make co-operation between different parts of company easier, allowing contact between these groups, or between associations and public institutions at the local and central levels. [9]

A part of social capital is also a generalized trust - a sense of control over their own lives, which includes social trust. People, by involvement in an association, acquire confidence in its other members, which they then pass beyond the borders of this association. In other words, it is important how people trust other people (institutions, organizations) around them. It is the expectation of a respondent and their experience with behaviour based on trust. [10]

The level of social capital has been investigated mainly through the following questions:

*Do you see the future of your business positively? (n = 14)*

Definitely yes - 8, Likely yes - 5, unsure - 1, Rather negatively - 0 Negatively - 0. The vast majority of respondents see the future positively. Optimism is closely connected with another question below, because it shows self-confidence and in world development of life (or work). One interesting fact is that respondents amongst the business members (7) are optimistic despite economic problems in the world and stagnant or slightly declining economic indicators in their enterprises.

*Do you think that you have the power to make a decision that could change your life? (n = 14)*

Definitely yes - 8, likely yes - 3, not really - 3, definitely not - 0. This question focuses on the degree of control of the respondent's everyday decisions. The degree of control is influenced by perceptions of corruption, honesty of representatives of state administration, the behaviour of economic partners, etc. The majority of respondents believe that they are the master of their own lives and therefore have confidence in themselves.

*Would you say that you can trust people? (n = 14)*

Definitely yes - 0, likely yes - 8, not really - 6, definitely not - 0. Here the answers diverge, the balanced result may be due to personal experiences of the respondents from their private and working life, and therefore, it is particularly interesting is to compare the resulting answers with the question of confidence in the actual cluster..

*Do you trust other cluster members? (n=14)*

Definitely yes - 4, likely yes - 9, not really - 1, definitely not – 0. Trust among members of the cluster appears to be high, while the prevailing response in the category "not really", besides any personal animosity, for example, may have occurred by the fact, that from the classical economic view they are mutually competing enterprises. In relation to the above question, whether to trust people, it shows that respondents who believe that they can trust people, also trust in other members of the cluster. Trust among members of the cluster is higher than trust in people generally.

The respondents were also asked, *whether they are members of any other organizations*.

Among the 14 respondents, 8 are members of other organizations. One of the respondents is a member of five other associations, and three respondents are members of three other organizations. Mostly, they are professional organizations with industry-specific focus.

It turns out that the level of social capital is high in the studied cluster. Respondents do not generally have too much trust in people, and mostly they are also members of other organizations, within the cluster they can generally trust each other, are optimistic and have confidence in themselves. Subsequently, was also shown that they trust in the help of other members in case of any problems, unless financial help would be needed.

### C. Evaluation of the functioning of the cluster as a network organization

For the functioning of the cluster, it is important to define joint objectives to which joint efforts should be directed. The primary function of the cluster is to promote economic growth, increase competitiveness, promote innovations [3]. The task force has defined general objectives on its website, which are as follows:

- 1) *"Elevating the entire stone industry in innovations, science and research, joint advertising and marketing, human resource development and education.*
- 2) *Creating a strong group of co-operating companies in various fields of production, suppliers and research, educational organizations and optimization of supply chains.*
- 3) *Linking of mutually co-operative design, engineering, manufacturing and assembly companies.*
- 4) *Creating a strong domestic competitive group of stone-processing firms, capable of succeeding in the global economy.*
- 5) *Promotion of the cluster and its members at national and international level, the establishment of international co-operation.*
- 6) *Joint action in the field of human resources in the field of stone processing.*
- 7) *Joint science, research, innovation within subsidies and grants in the CR and the EU.* " [3]

With regard to the ability to attract new members, the cluster at the time of its creation (2006) had 26 members, from that 6 were academic and 20 members were conducting business activity. On the 30th of November 2010 it had 19 members including 8 academic members and 11 businesses. Of

the 19 members, 11 are from the Hradec Kralove region, where the cluster is established, others are from the Moravia-Silesian (3), Prague (2), Vysocina (1), Pardubice (1) and South Bohemia (1) regions. The decline is mainly due to dissolution of member companies, or their existential problems. The investigation results show that competition in the industry is perceived as very strong. In this context, the information from the chairman of the cluster in an interview is interesting, that cluster members do not want the involvement of large dominant companies in the cluster, which may undermine their independence and separation of powers.

As we noted above, an important characteristic of network organization is focus on action, because if members do not act together and affect their surroundings, they cannot be considered as a network. The most successful result of a joint activity of cluster members was the approval of the "Czech Stone Cluster project - linking of science, education and practice in order to increase competitiveness and number of innovations in making rational use of the Earth's mineral resources," by the Ministry of Industry and Trade for the period 2010 - 2012, with total costs of € 928,000, from that, the amount of state aid amounted to € 557,000. Obtaining funds to cover the financial participation from custom resources of the member firms and bank loan can also be evaluated positively. [11] Also found on the website were, joint activities in the presentation of the cluster at specialized trade fairs, such as Stone + tec, Nuremberg 2011, through Grano Skutec, Ltd. which contributes significantly to the development and management of the cluster. In addition, the presentation of the cluster at the specialized trade fair of FOR ARCH 2006 and 2007. From the other joint actions, organizing of an international conference entitled "Use of Sources of Raw Materials" since 2008 can be mentioned. An interview with the chairman of the cluster shows that the cluster is able to obtain 8 to 12 larger orders per year, which could not be realized by the members as individuals.

Part of the cluster functioning and evaluation of network organizations is also self-organization and co-operation. In the network organization, in the cluster, it is not a classic hierarchized organization of activities, but the co-operation of equal members. Although there must be some authority to co-ordinate the activities of the organization. In the case of the studied cluster, it is the chairman and the board, while the supreme body is the membership meeting.

The problem of self-organization and co-operation in the studied cluster is the question: Please, write three things that could improve the functioning of the cluster (n = 14), 12 respondents answered, to improve the functioning of the cluster, a better mutual understanding of individual members would help, and deepen their co-operation, including assigning tasks. This points to the fact that, disappointingly run self-organizing mechanisms seem to be within the cluster.

Another part of the functioning of the cluster, respective evaluation of the functioning of the network organization in relation to social capital is adhesion, participation and independence. The issue of adherence and participation were examined in the questionnaire in particular through the following questions:

*Do other cluster members ask you for help? (n=14)*

Definitely yes - 2, rather yes - 2, not really - 10, definitely not - 0. Interesting results in this question point to the fact that members of the cluster do not often ask for help from each other. This may be due either because they do not need help, or they cannot imagine the help. One explanation might also be fear of revealing the complex situation of the member, loss of reputation or low mutual knowledge of members.

*If you have financial problems, do you think, that other member of the cluster would provide you a loan of €4000? (n=14)*

Definitely yes - 0, probably yes -1, I don't know - 7, unlikely - 2, No - 4. Most respondents are either unable to assess, whether other members of the cluster would provide a financial loan, or they do not believe it. This result may indicate either ignorance of the financial situation of other members, or the uncertainty of the willingness or ability of financial help, that may be due to competitive status, lack of trust or a difficult financial situation of small business (under 10 employees) and one medium-sized enterprise (up to 99 employees) or public institution.

*Help with other than financial problems*

Definitely yes - 2, likely yes - 6, I don't know - 3, rather no - 1, no - 1. Most respondents believe that other members would help them if it is not a financial problem. This supports the hypothesis that a key reason for a sceptical view of the possibility of financial help, may be the financial situation of the partners and not mistrust of the members who need help.

With regard to participation and adherence, it appears that the adhesion between members is not high to the extent that members would significantly help each other. In the question of How many cluster members do you collaborate closely (contact min. 2x a week) with? the minority of respondents (6 out of 14) stated a number of other members (average number was 1.2 members with whom they come into contact). Other respondents did not even state one contact, respectively not even one member, which may be due to improperly chosen limit 2x a week). Participation in the functioning of the cluster still seems relatively low, as we can see from the fact that the respondents stated only the 5 most active organizations, out of total number of 19. The most (13x) stated were Kamenolom Javorka Ltd., whose representative is the cluster chairman. Furthermore, there were companies such as Grano Skutec Ltd. (8x), Banska Univerzity - Technical University of Ostrava (6x), Secondary Industry School of stone and sculpture (3x) and the TEKAM company of Jiri Srsen (2). Three respondents stated only one company (Kamenolom Javorka) and one respondent stated two companies (Kamenolom Javorka and Grano Skutec).

With regard to the ideals of independence and equality, it shows that for this purpose, a legal form of co-operatives is appropriately chosen, which not only allows equal and democratic status of the members of the cluster, but also easy to join the cluster, and even easier to get out of it. Entry into the co-operatives is possible by the approval of application by Board and payment of the membership deposit, which is € 0,04 for academic members and €120 for business members.

Termination of membership is possible by written agreement, dissolution of the legal person, member's death, declaration of bankruptcy at member's assets, excluding of the member and the termination of co-operatives. [12] The supreme authority of the co-operative is a membership meeting, held at least twice per year. Membership meeting elects and dismisses members of the Board and Directors and Audit Committee, decides on the fundamental questions of cluster activity, controls the co-operative's property management, etc. The form of a co-operative allows each member to assume the role of leader, propose action and to gain more members for its implementation. Thus, in addition to equality and independence, the above-mentioned idea of multi-leadership may also be fulfilled.

There is a general belief that the organizations maintaining the democratic principles of decision making are more effective than others. A share in the decision-making is one of the indicators of structural social capital. [10] Within the survey carried out, none of the respondents complained about the impossibility of engaging in activities in the cluster.

*D. Obtaining and sharing information*

Within the diffusion model of information dissemination, information goes through the chain of links and the ability to get it depends on the position in the social network. Constituencies of people, connected by strong ties, overlap, and thus, more or less constantly circulated the same information between them. The new findings are mediated by weak ties, which can mediate contact between the large number of people. Features representing the main type of social network relationships are reciprocal, intensity and stability. [13] Retaining and improving levels of social capital, therefore depends on the ability of cluster members to communicate with each other and with other groups. Face to face contact is still the most important form of direct communication [10]. However, the possibility of this type of contact is very limited for geographically dispersed organizations. Web technologies are a good inexpensive solution for those, who want to pursue the common objectives, share information and co-ordinate their actions. [1]

For the functioning of a network organization, respectively for cluster, distribution of information and freedom of speech is very important. The survey showed that for respondents, the opportunity to exchange knowledge is the main benefit of membership within the cluster. Respondents in the questionnaire had to choose three main benefits of membership in the cluster. 12 out of 14 respondents chose "the possibility of exchange of knowledge and information, consultation of problems." Then followed a contribution in the form of "establishing co-operation with educational institutions" (6x).

The way individual members receive information and the communication infrastructure of the cluster, was monitored.

The cluster members frequently receive information from their chairman (12 of 14 respondents) and consequently from the workshops (8x). This in the context of other findings, highlights the great importance of the chairman of the cluster (Kamenolom Javorka company), as the most active member and their former leader. Quite surprising is the fact that a minimal role for the acquisition of information is played by a

printed periodical Revue Kamen, which was mentioned by only one respondent, compared with web pages, which were mentioned 6 times. The website of the cluster was last updated on 22<sup>nd</sup> of November 2011. For example, the website even today still lists former members of the cluster. There, we can also find an invitation to the meeting of the membership on the 24<sup>th</sup> of November 2010, where members should become familiar with changes in membership, but the site still has not updated the list of members. The latest upgrade of the public section of the website was in 2008. Conversely, the mentioned Revue Kamen is published 3 times a year and in monitored context it can be considered more relevant than the preferred website. From the view of cluster members, the printed source is a minor importance, but in terms of timing of information on the website, it is needed to paradoxically consider it as better and more important. When sharing information, informal contacts with members (mentioned 2x) or information from the Board of Directors (1x), do not play any significant roles.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

For the functioning of network organizations, some characteristics that distinguish them from classical hierarchically controlled organizations are typical. An important component of network organizations is social capital, which plays an important role in the functioning of clusters. The case study of mining in the manufacturing cluster of the Czech Stone Cluster showed, that the level of social capital is relatively high. Not only that the cluster members trust each other more than to the rest of society, but they are also members of other organizations, they are optimistic in looking to the future of their company, they also trust in their abilities and opportunities to change their surroundings. If they were in trouble, they believe that other members would provide them with non-financial help.

It turns out that the studied cluster operates democratically, than is expected from the typical business networking organization. In fact there is no dependence of one member to another in the cluster. None of the members have complained about the undemocratic functioning. The weaknesses of the functioning of the cluster in relation to the theory outlined above, relatively low direct participation in its functioning can be described (for the most active, from 19 members, were marked only 5 members, but this does not preclude others being more active) and the insufficient flow of information from sources other than the internet. Members themselves consider insufficient knowledge of each individual members, the lack of assigning tasks and the resulting low level of cooperation, as the weakest part. Although due to the form of co-operatives and size of business members of the cluster, it is not the type of network organization with one dominant partner, it is evident that communication, organizational and activating level, one of the companies, respectively their representative, and chairman of the cluster play an important role. However, they naturally perform tasks arising from their function and the other members have the opportunity to change the leadership. Cluster members consider the greatest benefit of membership as the acquisition and sharing of information. This information, however, is received and shared

particularly through the chairman of the cluster and websites that are outdated. A less important source of information is working meetings and a very small role is played by informal contacts. Therefore, the application of basic principles of knowledge management can be recommended here [14]. Although restrictions regarding freedom of speech were not recorded, the activity of majority of members is relatively low. Despite these weaknesses, the co-operative managed for example, to arrange financing and implementation of the costly project, and membership in it is perceived as beneficial.

If we want network organization to rid itself of some of weaknesses, which are highlighted for example by Keller [5], [15] it can be said that for the business organizations and their activities it is probably best to choose the legal form of co-operatives. "In many regions of the world co-operatives are perceived as the primary form of the above-family socio-economic self-organization" [16]. In addition, we can recommend the creation of working groups and more frequent thematically meetings, whose output can be opinions on various expert issues, then spread between the other members of the cluster. The support of informal meetings is needed, connected with cultural-educational activities (conferences associated with cultural programs, lectures), which can reduce the geographic distance between members.

It is essential to ensure timeliness of web sites, to ensure quality distribution ways for printed sources and give more tasks to cluster members, in order to achieve common objectives.

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