

KEY FACTORS INFLUENCING COOPERATION IN A NETWORKED ORGANIZATION

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Purpose: This article aims to use the experience gained from implementing projects implemented in network structures to indicate key areas that influence the effectiveness of the undertaken cooperation, understood as the completion of the project by the project assumptions.

Design/methodology/approach: An interview study was conducted with the participation of 46 surveyed participants of projects implemented in the last 3 years. Each project was of a network nature, i.e. at least 2 independent organizations cooperated in its implementation.

Findings: The aim of this work is to verify the research hypothesis, which states that both cooperation and competition between teams have a significant impact on the quality of projects implemented within network structures.

Research limitations/implications: The sample is limited in size - the survey was completed by only 47 people participating in 14 projects with a national scope.

Originality/value: The article is unique because it presents practitioners' views of different environments (academic, business, public administration). The study is contributory, but it is planned to expand the survey and use it on a larger scale, enabling the construction of a universal model. The conclusions from the study can also be used to plan the course of further cooperation in network structures.

Keywords: cooperation in network structures, cooperation and competition model, cooperation, cross-functional cooperation.

Category of the paper: Research Paper.

1. Introduction

The article aims to verify the research hypothesis, which states that cooperation between teams significantly impacts the assessment of the implemented project. The fact that the project was implemented according to the initial plan and assumptions without excessively exceeding the budget, time, and resources is a measurable criterion for project assessment. In the conditions of the network economy, we are dealing with the need to constantly undertake cooperation activities, very often going beyond the traditional boundaries of a single enterprise

or institution. This results from limitations in all kinds of material and non-material resources. An organization's market position often depends on the success of implementing projects, and sometimes, it is a factor decisive for its survival in the market. At the same time, the "portfolio" of successes is a networking factor. This means that the organization develops a reasonable opinion and reputation as a reliable and valuable partner for cooperation. This can be another essential element in building the organization's market position. This article aims to use the experience from the cooperation carried out in the last 3 years in 14 projects of national scope in Poland, where each project was carried out in the conditions of network cooperation. Each project was carried out in cooperation with at least two independent organizations. The study aims to determine the impact of competition for material and non-material resources and cooperative behaviors among cooperation members representing different institutions on assessing the implementation of the undertaken cooperation activities and satisfaction with this cooperation.

2. Cooperation in network structures

Any organizational activity aimed at achieving predetermined goals requires the involvement of resources. As the scope of actions undertaken and the complexity of tasks increased, these resources must become increasingly diverse, and sometimes access to them is highly limited. Undertaking new actions requires the organization to make decisions regarding its relations with the environment. The ability to create competitive advantages is a factor that largely determines the organization's future actions and affects its attractiveness to other market participants. These competitive advantages are built based on resources owned by the company or used by it. Traditionally, company resources are divided into two categories: tangible and intangible. Tangible resources include fixed assets, real estate, machines, raw materials, and financial resources. Intangible resources consist of various procedures, operating models, know-how, patents held, and the human factor - employees and their experience, knowledge, and skills. The classic definition of a resource says it must be valuable, rare, and difficult to copy and replace. M. Dollinger (2002, pp. 43-54) lists six types of strategic resources of a company (PROFIT formula): physical, reputational, organizational, financial, intellectual, human, and technological. Discussions on global competitive advantages resulting from effectively combining national circumstances with the company's strategy are becoming more frequent (Porter, 1985). Even a company's operational excellence, which results in a leadership position, cannot guarantee success in a new market. Available resources are one of the pillars of strategy; the other is the organization's environment. In the case of business organizations, we usually talk about a competitive (market) environment in which the customer has the opportunity to choose a supplier. In such a situation, the position can be extended to new

markets and segments, and the actual market power can be strengthened by finding a business partner. Another form may be a situation where a current competitor transforms into a partner with whom we undertake joint actions for a certain period. In such situations, we often talk about competition (Cygler, 2009, pp. 22-27). It is an indirect relationship involving simultaneous cooperation and competition (Czakoń, 2009).

Collaborative activities are increasingly undertaken in the form of networks. This is a result of the development of the ICT network and a natural consequence of the increasingly widespread use of ICT tools in the daily operations of organizations. Undertaking collaborative activities through networks allows organizations to use their partners' knowledge, skills, and competencies. It is an opportunity for organizations to build or strengthen their market position. An essential role in network systems is played by IT systems that support the processes of creating new models of work, communication, and cooperation. As a result, the emergence of various organizational networks in the form of "extended organizations" can be observed more and more often (Mircea et al., 2016; Marchetti, 2023). These structures are intensely focused on sharing, exchanging, and creating knowledge, skills, and competencies, so they are often a place where innovative solutions are created. A network is a model or metaphor describing a system of connections between specific entities. While in social relations, this number can be huge (which can be observed in the form of social networking sites), in economic relations, this number is usually clearly defined. These connections include (Yin, Shanley, 2008; Aulkemeier, 2019):

- trust and interoperability,
- connections and interactions between entities that are part of the network, where the concept of connections means long-term relationships, while interactions are short-term relationships,
- structure and position are understood as the interdependence of the elements that make up the network and - as a result - how their mutual relations are shaped,
- process is a change in company ties due to jointly implemented tasks.

The importance of informal connections in a network organization is emphasized by authors for whom a network organization is, to a much greater extent, the effect of combining informal networks and goals (tasks that members of the network organization want to accomplish) than formal structures (Czakoń, 2019; Kisielnicki, Sobolewska, 2021; Bayiere et al., 2019). W. Sroka (2010) emphasizes this fact by noting that an organization can only be considered a network when it does not fit within the boundaries set by the formal structure. Organizations cooperating within a network organization choose various connections: strategic alliances, clusters, or cooperative relations. The primary goal of each of these organizational forms is to achieve goals that would be unattainable for an organization operating alone.

Regardless of the form of cooperation undertaken, we can indicate certain factors that influence the willingness to cooperate between organizations. These are:

- leadership and culture of cooperation: effective leadership and a culture promoting cooperation are vital to increasing the performance of the organization (Sepuru et al., 2021),
- characteristics and compatibility of cooperating partners have a significant impact on the success of joint efforts (Feller et al., 2009),
- trust and interoperability: trust between partners and interoperability of IT systems are essential to managing the success of cooperation,
- strategic and external factors: external influences and strategic alignment also promote successful cooperation (Gruat La Forme et al., 2007; Saiz et al., 2010).

J. Cygler (2009) makes a similar distinction. It indicates that entering into cooperation relations is a derivative of two groups of factors:

- internal, resulting from the specificity of the organization itself, the management method, goals, and strategies, as well as the organizational culture in force in,
- sectoral – such as technological advancement, the sector's structure, its profitability, or entry barriers.

However, regardless of the sector and the specificity of the organization itself, the directions of development (and the pace of changes taking place in the market) require the organization to be ready to undertake various activities, including cooperation activities.

All these cooperation activities aim to increase the organization's efficiency using the synergy effect. In the organization, cooperation facilitates the transfer of resources, including knowledge resources, which should ultimately increase the organization's innovative capabilities (Wohlin et al., 2012).

3. Own study

The research used the model proposed and verified by S. Ghobadi and J. D'Ambra (2012). The original model describes cooperation within functional task teams; the author aimed to study project knowledge and the factors influencing it. A similar study, focusing on strictly scientific projects, was conducted in 2017. In the current study, I used proven constructs and the model (Pronskikh, Sobolewska, 2018). Similar to the model described in this article, the author of the 2012 study focused on the implementation of projects of cross-functional organizations that were geographically dispersed.

The research assumes that the final effect of cooperation is a derivative of cross-functional cooperation of independent units.

The first research task is to identify factors influencing the relations of cross-functional cooperation in scientific projects. The aim of the study is not only to identify factors influencing cooperation relations but also to determine the nature of their impact. The second research task identifies factors influencing competitive relations between entities in projects implemented in network cooperation conditions. In particular, I would like to obtain an answer to the question of which factors (material or non-material) and how they influence the competitive relations between cooperating entities.

The study, the results of which will be presented in this article, was conducted through a dedicated website containing questions (CAWI) was conducted in August 2024 and was addressed to a non-random group. Fifty-three respondents who had participated in implementing a project in a network structure (i.e., in cooperation between different organizations) in the last 3 years were invited to the study. The study involved people representing 14 projects with a national scope (Poland). As a result of the study, obtaining 47 fully completed surveys was possible. The survey contained 14 primary questions and four additional ones, in which information about the respondents was requested: their place of employment, position in the project, gender, and age (Table 1).

Table 1.
Survey metrics

Sex	N	%
Female	28	60,9%
Male	18	39,1%
Age	N	%
Less than 30	8	17,4%
30-40	10	21,7%
40-55	16	34,8%
55+	8	17,4%
Refusal to answer	4	8,7%
Role in the project	N	%
Team member	25	54,3%
Task/project leader	21	45,7%
Affiliation	N	%
university	7	15,2%
business	24	52,2%
Public administration	11	23,9%
NGO	4	8,7%

Source: own work.

The model uses three constructs: quality of cooperation is assessed in the category of project success. To assess success, the classic project approach was used, which is presented as a project triangle (scope, time, and project quality consistent with the assumptions established before the start of cooperation activities). Quality of cooperation is understood here as the degree of fulfillment of project requirements. Cooperation between project participants takes place on three levels: cooperation in implementing tasks (task orientation), interpersonal relations, and communication. Competition is the degree to which project participants tend to compete. Competition is expected in every implemented project, regardless of the specificity of the undertaking. Competition is a natural consequence of coping with objective limitations

in access to project resources. All these constructs are reflected in the research questions (Table 2). As part of the survey, participants were to answer questions about their activities and experiences resulting from cooperation using a 5-point Likert scale. Basic statistical measures for the sample of 46 responses are presented in Table 3.

Table 2.
Survey structure

Construct	Questions
Project Qualification Assessment (CQ)	The jointly implemented project was completed by the fundamental assumptions (time/scope/quality)
Assessment of Collaboration Between Teams (CFUN)	Collaboration's assessment
Task Orientation (TASK)	<ol style="list-style-type: none"> 1. Other teams completed their work according to established schedules and without unnecessary delays or obstacles (TASK1) 2. The participation of all other collaborators in the experiments is essential to the overall success of the project (TASK2) 3. There were no problems resulting from task planning, defining the scope of responsibilities of individual teams, and task schedules (TASK3)
Communication (COMM)	<ol style="list-style-type: none"> 1. Information and knowledge resources provided as part of the project implementation served to achieve the goals (COMM1) 2. Both the goals of individual tasks and current results as part of the project implementation were systematically published and discussed by cooperating teams (COMM2) 3. Problems arising as part of the project were discussed and solved on an ongoing basis (COMM3) 4. As part of the project implementation, collaborators declared their willingness to cooperate and mutual readiness to assist other participants (COMM4)
Interpersonal relationships (IREL)	<ol style="list-style-type: none"> 1. Collaborators communicated regularly with other partners, not limited to scheduled statutory meetings (IREL1) 2. Collaborators established social relationships outside of the workplace (IREL2)
Competition within the project (RIV)	The intensity of competition during the project implementation
Competition for Material Resources (TGBR)	<ol style="list-style-type: none"> 1. Competition for resources necessary to implement the project (tools, software, etc.) (TGBR1) 2. Competition for financial resources (TGBR2)
Competition for Intangible Resources (ITGBR)	<ol style="list-style-type: none"> 1. Competition for the attention and support of the project management (ITGBR1) 2. Resulting from the need to promote the employer (the entity employing the employee) and highlight its contribution to the project implementation (ITGBR2)

Source: own work.

Table 3.
Basic descriptive statistics for the sample N = 46

Construct	Average	Standard Deviation	Variance
Project Qualification Assessment (CQ)	4,24	0,85	0,67
Assessment of Collaboration Between Teams (CFUN)	4,11	0,77	0,59
Task Orientation (TASK)	3,72	0,71	0,50
Communication (COMM)	4,00	0,54	0,29
Interpersonal relationships (IREL)	3,85	0,71	0,51
Competition within the project (RIV)	3,78	0,92	0,84
Competition for Material Resources (TGBR)	3,89	0,79	0,62
Competition for Intangible Resources (ITGBR)	3,96	0,74	0,55

Source: own work.

Table 4 illustrates the correlation between the analyzed factors. A strong correlation is one for which the quotient is more significant than 0.5. Such a correlation indicates a functional relationship between the analyzed factors. The table highlights factors with moderate (greater than 0.3) or significant correlation coefficients.

Table 4.

Correlation analysis (N = 46) with strong and moderate correlation coefficients marked title

	CQ	CFUN	TASK	COMM	IREL	RIV	TGBR	ITGBR
CQ	1							
CFUN	0,77	1						
TASK	0,37	0,29	1					
COMM	0,62	0,37	0,14	1				
IREL	0,01	0,11	0,16	0,084	1			
RIV	0,10	0,19	0,54	-0,04	0,24	1		
TGBR	0,21	0,11	0,34	-0,01	0,28	0,51	1	
ITGBR	0,42	0,48	0,22	0,24	0,04	0,20	0,37	1

Source: own work.

The analysis presented in Table 4 indicates that the assessment of the project and the quality of its implementation are most strongly influenced by factors responsible for cooperation in the implementation of tasks and aspects related to communication within the project. It should be noted that the existence of a correlation between factors does not mean causality. It can be seen that there is a strong connection between the assessment of the project quality and the assessment of commitment to the implementation of tasks and, similarly, this connection is much smaller in the case of the assessment of the project and the assessment of interpersonal and social relations that took place at the time when the cooperation relationship was established.

In order to verify the hypothesis stated in the introduction to the article, I used a linear regression model (Table 5). For the adopted model, the value of the R-squared ratio was 0.79, which means that the model explains as much as 79% of the variability of the dependent variable (i.e., in the case of the model for assessing the quality of cooperation).

Table 5.

Regression analysis for model (N = 46)

Regression statistics	
R-multiple	0,893299384
R-squared	0,79798379
Fitted R-squared	0,760770278
Standard error	0,401809868
Observations	46

Variance analysis				
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>
Regression	7	24,24	3,46	21,44
Residual	38	6,14	0,16	
Total	45	30,37		

Cont. table 5.

	Coefficients	Standard Dev.	t Stat	p-Value
Intersection	-1,10	0,61	-1,81	0,08
CFUN	0,66	0,11	6,86	3,77
TASK	0,23	0,11	2,22	0,03
COMM	0,58	0,12	4,79	2,55
IREL	0,17	0,09	-1,86	0,07
RIV	0,17	0,09	-1,91	0,06
TGBR	0,24	0,10	2,49	0,02
ITGBR	0,06	0,11	-0,62	0,54

Source: own analysis.

The regression analysis method was also used to determine the factors influencing the cooperation and competition relationships. The results are presented in Figure 1.

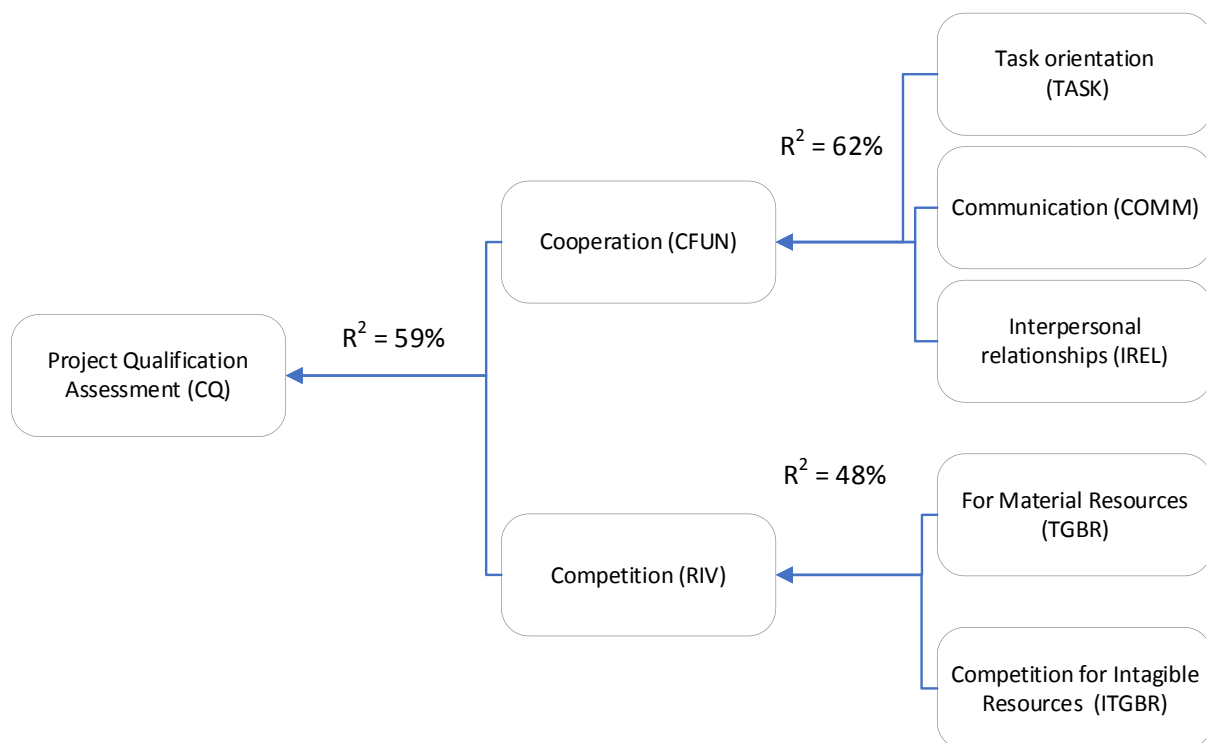


Figure 1. Results of regression analysis for three models.

Analyzing the first component model (Fig. 2), i.e. analyzing determinants of cooperation, after rejecting factors with insignificant statistical significance ($p < 0.05$), it can be seen that the success factors were practical cooperation, by the established plan, schedule and division of tasks within the cooperation project (TASK1), as well as a genuine desire to implement the project manifested in responding to emerging problems and providing assistance (COMM4), and solving them when the problem arose (COMM3). An essential element was also the fact that cooperation participants in network conditions desired to establish social relationships beyond their workplace (IREL2). This refers to lasting contacts or acquaintances in a private life sphere. This factor is related to cooperative interpersonal relations in project management.

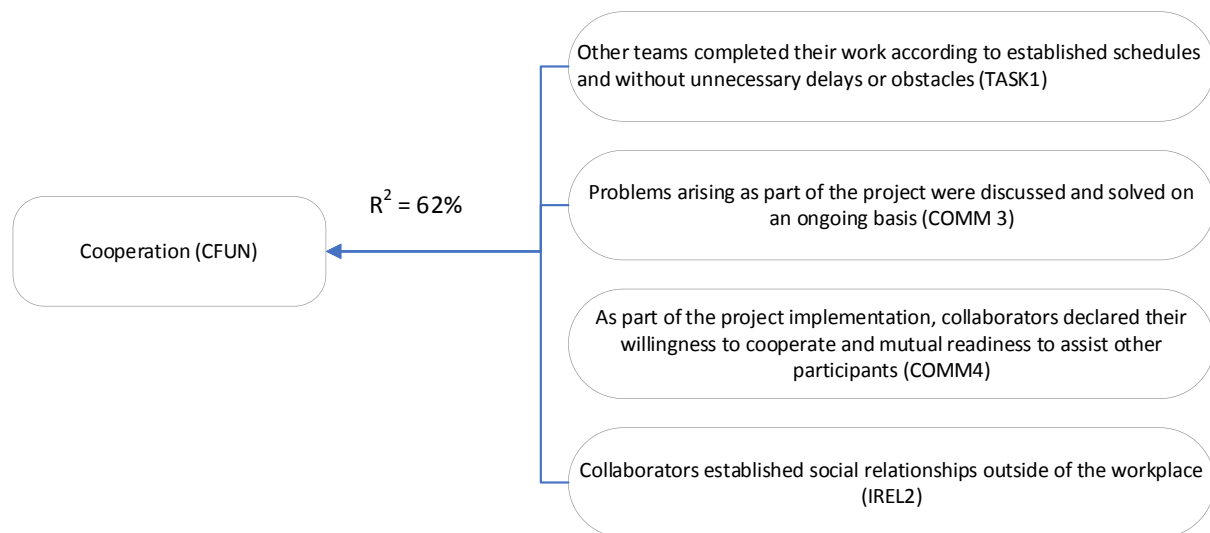


Figure 2. Results of regression analysis for the model describing determinants of cooperation (after rejecting factors $p < 0.05$).

In the area of rivalry, the factors that positively influenced competitive relations were those related to competition and limitations resulting from limited access to material resources. Usually, this concerns access to tools or software necessary for project implementation (TGBR1) and competition for intangible resources. In particular, this concerned emphasizing the parent unit's distinctiveness and contribution to the project's implementation (ITGBR2) (Fig. 3).

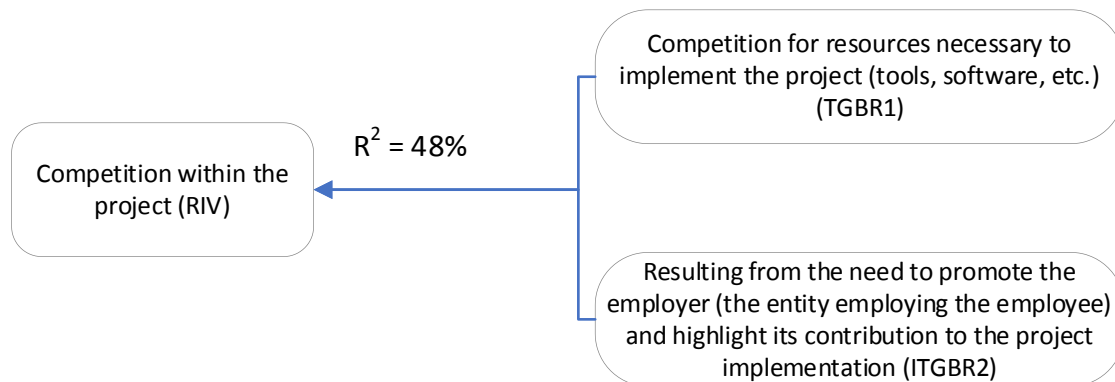


Figure 3. Results of regression analysis for the model describing determinants of competition (after rejecting factors $p < 0.05$).

The growing complexity of all types of projects and the simultaneous limited access to material and intangible resources force the creation of partnerships and undertaking cooperation activities. Such cooperation often goes beyond organizational boundaries and functional dependencies. Sometimes, we are dealing with a situation of undertaking joint actions by entities competing with each other in everyday market conditions. The conducted study, the undoubted limitation of which is the sample size, shows a significant regularity. It indicates several determinants that directly impact the assessment of the quality of the implemented cooperation/project. This is an essential issue because reputation and good cooperation experiences can result in further, jointly undertaken challenges. Some of the factors directly

influencing the assessment of cooperation are deterministic. This means the processes are predictable and can be identified with high probability at the project planning stage. These are strictly organizational factors related to the material resources of the analyzed projects. A much more exciting group of factors strongly influencing the evaluation of cooperation and the project's outcome are non-deterministic factors. These are factors related to the intangible assets of the project, mainly the human factor. There are various types of relationships between members of the research team. These are both cooperation and competition relationships. They should be the subject of monitoring and prudent management to further cooperation in network structures.

4. Summary

This work aims to verify the research hypothesis that cooperation and competition between teams significantly impact the quality of scientific projects. The aim was to research the nature of factors influencing cooperation relations. The research task was to analyze the factors facilitating cooperation and competition in projects implemented in network cooperation conditions.

The analyses indicated several factors that positively impact the quality of the project being implemented and, consequently, the willingness to continue joint activities. Both acts of cooperation and competition are inseparable elements of every undertaken project. However, the study shows that good project planning and systematic implementation of its assumptions are necessary for the success of the entire undertaking. Maintaining constant vigilance, monitoring the course, and detecting irregularities at the earliest possible stage is equally important. In such situations, the factor that positively impacts the project assessment is the ability to communicate between dispersed teams and the willingness to solve problems together. Because people and organizations with different levels of advancement and experience cooperate in the implementation of projects, a precious element is the willingness to cooperate, share knowledge, act as a mentor, and be ready to engage in discussions. Another valuable element is the openness to establishing non-professional relationships between members of project teams. In terms of competition, it is impossible not to notice the need to compete for material resources, which may also include funds allocated to implement the project. An exciting factor from the research is the need to self-promote one's unit. This is also wholly justified because within the framework of a jointly implemented project, individual contribution often disappears, and we began our considerations with a note on the need to build one's brand and a "portfolio of successes".

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