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Organizational subcultural dynamics in digital transoformation projects

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ABSTRACT

The article aims to investigate the negative impact from organizational subcultural dynamics in digital transformation projects on number of conflicts and quality of communications and to elaborate proposals how to improve cross-subcultural communications within the projects. The methodology of the study includes participatory action research and case study. The network model of project culture helped to identify two cultural coalitions and their values. The model of the subcultural coalitions and their values helped to formulate the scope of communicational trainings and changed in the project communication system. The focus of the measures was on the preservation of the existing subcultures and on the improvement on the cross-subcultural communications. Comparing the number of conflicts within project before implementation of the measures based on the research and after it showed significant positive impact of these measures. The main findings show that in multidisciplinary and complex projects, such as digital transformation projects, subcultural dynamics can lead to formation of different coalition that do not share common values. This can be the source of the conflicts and low quality of communications. However, using the knowledge of coalitions' structure and values the management of companies can enhance cross-subcultural interfaces without decreasing positive effect from subcultural diversity.

KEYWORDS:

organizational subcultures, subcultural dynamics, participatory action research, network model of culture, project management, digital transformation.

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1. INTRODUCTION

The organizational culture plays a huge role in the operation and development of modern companies and enterprises. According to [Shein, 2008], the organizational culture can be represented as a system of elements at various levels in terms of their observability: elements of the most observable level (technology, architecture, dress code, etc.), the subsurface level (moral principles, norms of behavior, goals, mottos, etc.) and the deepest level (meanings, visions of reality, religious faiths and value beliefs). Any organization is characterized by the presence of subcultures together with the organizational culture as a common system of cultural elements for all employees. According to [Trice, Morand, 1991], an organizational subculture is defined as a cluster of visions, perceptions, behavior patterns and cultural forms that identifies a group of people within an organization. Subcultures in organizations are formed based on differences in the distribution of assignment, professional knowledge and competencies, age or national preferences, opinions and issues to solve, etc. [Trice, Beyer, 1993]. The cultural spaces of modern organizations are becoming increasingly diverse due to globalization, fragmentation of the general culture [Strakovich, 2010] and the complexity of the tasks solving, which require the involvement of specialists from various professional fields. Projects involved in complex sets of interrelated multidisciplinary tasks include digital transformation projects for the companies [Vail, Warner, 2019]. It can be assumed that in such socio-technical projects, managers have to face not only difficult technical tasks, but also complex subcultural dynamics that can both positively and negatively affect the effectiveness of projects.

This article presents the results of subcultural dynamics study in digital transformation projects implemented for external customers by a Russian company engaged in management and information technology consulting, system integration, development and implementation of information technology systems. The methodology includes the principles and tools of case study, participatory action research and interpretive research. Following the introduction, which determined the relevance and structure of the study, the theoretical aspects of the interaction of organizational subcultural dynamics and corporate communications are briefly considered. After determining the object and subject of the study, its methodology is justified. The presentation of research results is followed by their interpretation and the formulation of practical recommendations.

2. ORGANIZATIONAL SUBCULTURES IN DIGITAL TRANSFORMATION PROJECTS

The digital transformation projects of the companies are primarily focused on solving technical problems. The difference between information technology implementation projects and digital transformation projects is that the latter act as large-scale and complex organizational transformations, where social tasks also have to be solved along with technical tasks [Vail, Warner, 2019]. In the study of [Lebedeva, Shironina, 2019], the organizational resistance in digital transformation projects is investigated, and in

[Korolev, Butov, 2019] research, based on the generalization of several studies results, it is concluded that the lack of organizational culture development becomes one of the main reasons for failures in digital business transformation. The multidisciplinary and organizational nature of the digital transformation projects leads to the fact that they often involve interaction between existing subcultures in the organization. The subcultural dynamics are evident not only at the corporate level, but also within project teams.

The interaction of different organizational subcultures within project teams may be accompanied by a decrease in cohesion, deterioration of understanding in the course of solving problems, decrease in activities coordination, expansion in the number of non-constructive conflicts, reduction of the intra-project communication quality [Thomas, 1999]. This may be due to the presence of several subcultural coalitions that either have no or have few shared value beliefs and do not know and/or understand the values of other subcultures. Hence, the first hypothesis of the study: *the increased level of conflict within the teams of digital transformation projects may be due to the presence of subcultural coalitions with different cultural values.*

However, the cross-cultural studies also point to the potential positive effects of cultural and national diversity arising from a broader set of perspectives and approaches to problem solving [Dahlin et al., 2005]. It can be assumed that the "leveling" of organizational cultures, the dominance of organizational and cultural uniformity over the subcultural diversity can also lead to a decrease in the quality of communication. The organizational subcultures are sometimes observed in the scientific and educational literature in a negative way, what seems to be too one-sided perspective. The second hypothesis of the study is that, *overcoming the negative aspects of subcultural dynamics in the organization can be built on the subcultural diversity preservation and the establishment of balanced interactions between subcultures.*

3. SUBJECT AND OBJECT OF THE STUDY

The object of the study is a Russian company with 200 employees which specialized in management consulting, information technology consulting, system integration and software development, as well as dealing with digital transformation projects for its customers. Until 2014, the company projects rarely involved integrating the efforts of employees from management consulting and information technology areas. If this occurred, it required the co-optation of one or two representatives of management consulting to a team of four or six IT specialists (and vice versa). But since 2014, most projects have involved the development of complex organizational and technical complex solutions and the initiatives implementation for the digital transformation of the companies. Such projects involve the full integration of the efforts of representatives of management consulting and information technology departments. For example, one project involved the deployment of one or more ready-made software products, completion and integration of additional modules, the development and implementation of several digital services from scratch, the workflow system optimization, the introduction of cross-functional management, strategy development of cloud-based IT infrastructure and holistic knowledge management system (formal and informal knowledge, mentoring, etc.).

Both IT specialists and consultants of the company under the study have been working within the framework of a single information system, a unified reporting system and the same business processes before and after 2015. But collaborations were accompanied by a large number of non-constructive conflicts, which were recorded during and after the project results in the electronic project passports by project managers and project team members. Until mid-2015, the top management assumed that such conflicts were the result of natural phenomena, such as higher complexity of projects, the emergence of new tasks involving the search for non-trivial solutions, as well as the initial "adaptation" of employees from different departments. But since the beginning of 2016, the company management has found that the number of conflicts is only increasing. To eliminate this problem, six trainings on team building and communication were conducted within six months. The number of conflicts continued to increase, and their impact on the projects results became more significant. In 2017, after several more trainings, it became obvious that the measures taken were not yielding results, and internal conflicts were not decreasing in quantitative terms and were increasing in their significance (several projects were completed unsuccessfully, largely due to disagreements within the project teams). The company management realized that internal project conflicts have become persistent, that is difficult to explain by working disagreements, low communication and team skills. These circumstances served as the basis for the implementation of this study.

4. THE METHODOLOGY OF THE STUDY

The article is constructed as a study of a specific situation [Gerring, 2006] using the principles and tools of the participatory action research [Rahman, 2008] and interpretive research [Benaquisto, Given, 2008].

The methodological basis is the participatory action research (PAR); which combines the principles and tools of action research [Bezrukova, 2014; Zhukov, 2015] and participatory research [Shuklina, 2017]. The participatory action research is a fairly broad and diverse set of different research attitudes, approaches and tools that focus on:

- participation of people under the study, not as passive objects of observation and information providers, but as full-fledged co-researchers, whose activities are facilitated by an external researcher or a consultant;
- the creation of new knowledge for their immediate use and implementing changes in the organization, the ecosystem or the community;

- the use of scientific methods (and not just common sense, observations, etc.) by trained teams of organizations and communities [Rahman, 2008].

There are several terms (for example, participatory inquiry) that denote the same methodological framework, but they all agree that the participatory action research is actually implemented with the aim of obtaining practical results *cby the participants themselves, and not over them and not for them* [Rahman, 2008].

The participatory action research has been most widely used in the study of the development of communities and organizations that provide socially significant services, such as medicine and education [Bush et al., 2017]. The widespread use of the participatory action research in relation to commercial organizations and their associations has not been found, but nevertheless there are several examples of this. In particular, in [Kozlowski et al., 2018] research, this methodology is used to study the problems of sustainable development of business models and companies in the light clothing industry. In [Ragsdell, 2009], PAR is applied to the study of knowledge management, and in [Barros, 2010] research, the prospects for the development of emancipation management is explored. But also in relation to non-profit organizations, participatory action research is often used to solve practical management problems that also arise in commercial organizations. For example, in [Joy, Nambirajan, 2018] research, PAR studies and solves the problems of implementing automated planning systems in medical institutions, and in [Love et al., 2012] research the problems of optimizing the logistics of enterprises with state participation are observed.

The advantages of applying participatory action research to the study of organizational subcultural dynamics can be reduced to the following arguments. First, the organizational subcultures are constructed, maintained and implemented by the participants themselves. Therefore, they should act not only as objects, but also as subjects of the study. They themselves must learn and change their behavioral and communication practices. Secondly, the study of the culture based on surveys and interviews is often unable to reveal deeper levels of the culture [Shein, 2008], which are manifested in the context of practical activities and are hidden under socially acceptable responses in surveys and interviews. And, finally, thirdly, digital transformation projects organically combine both the research component associated with the search for non-trivial solutions to complex socio-technical problems, and the practical one aimed at implementing these solutions and achieving the required results.

Based on the PAR model proposed by [Kemmis et al., 2004], the present study was implemented in two cycles, the content of which is shown in Table 1.

This article focuses in detail on the research cycle stages.

According to Table 1, the participatory action research as a methodological basis for research is supplemented by such research tools as the "think out loud" methodology [Charters, 2003], minutes analysis [Isenberg, 1986] and modeling of organizational culture based on social network analysis [Titov, 2015]. At the research cycle stage 2, statistical methods were used to process data on the number of conflicts and the quality of intra-project communications before and during the execution stage (calculation of the average value, variance, standard deviation and variance analysis with the determination of the P-value).

The study involved 25 people (12 representatives of management consulting departments, 13 representatives of information technology consulting and development departments), 24 of them (with a distribution of 12 to 12) - both in the first cycle and in the second one. The sample included 50% of all employees actively involved in the complex projects under study, which involve both consulting and information technology components to an approximately equal extent. The sample was formed randomly, but in such a way that both areas of activity were represented as equally as possible. Among the selected employees were those who periodically took on the role of project manager or coordinator.

Two external researchers acted as facilitators and methodologists. Most of the research work, including technical work, was carried out by the company's employees. The study was conducted over 16 months, in 2017-201.

5. THE CONTENT AND RESULTS OF THE STUDY

5.1. CYCLE 1

During the training business games, where team activities similar to the company projects were simulated, participants generated aloud various judgments reflecting their values and preferred behaviors (decision-making, communication, problem analysis, proposals generating, etc.). These judgments were recorded, then similar in content were identified and merged (that is, two identical judgements in meaning, but expressed in different verbal forms were replaced by the common one). As the result there were about 60 value judgments made by 25 participants of the business games.

In order to identify a smaller set of values in the space of 60 value judgments, their network analysis was carried out. A relationship has been established between the set of value judgments and the set of participants, reflecting who the owner of those statements is. With the help of the VOSviewer[1] software product, a network model of utterances was built. This network model is a graph whose vertices are formed by value judgments, and connections mean the utterance of two related judgments by one person. If one participant has made four different value judgments, then connections are established between them. Links have weight indicators that reflect the frequency of their simultaneous mention by several participants. If two value judgments were made by two people, then the weight of the relationship between these judgments becomes equal to two. If there are four participants who simultaneously expressed four identical judgments, then there will be connections between these judgments with weights equal to four. The

[1] URL: https://www.vosviewer.com/.

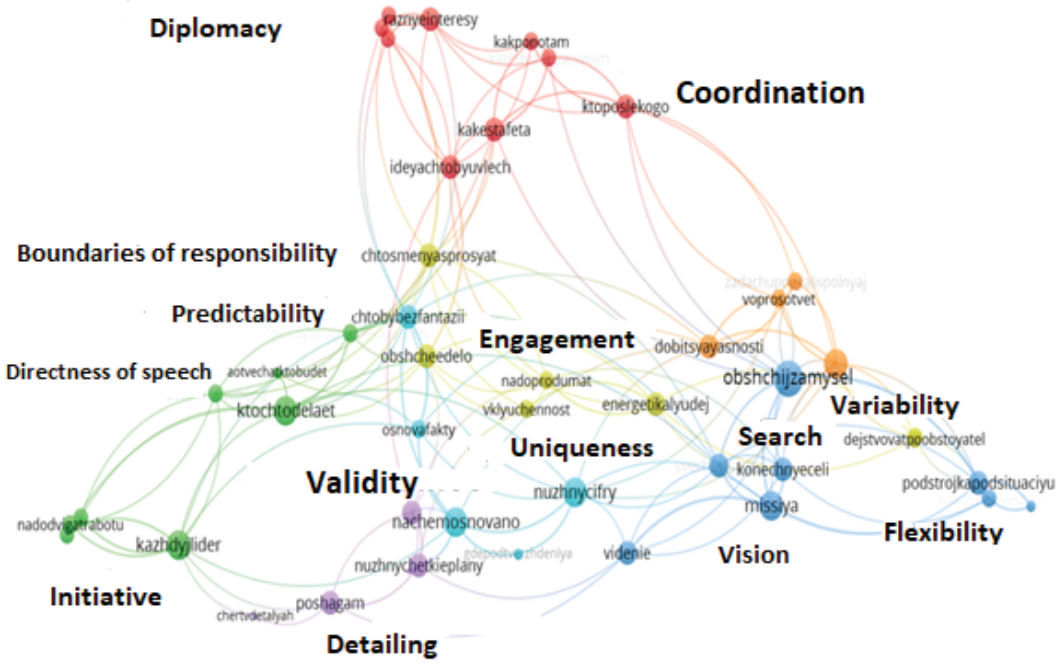
Table 1
The content of the participatory action study of the subcultural dynamics in intra-project communications

Cycle	Cycle stage	The content of cycle stage
Cycle 1	Planning	Development of training situations where participants solve practical tasks similar to their professional activities and contribute to the manifestation of elements of their subcultures Development of a data collection methodology based on the "think out loud" methodology and protocol analysis methodology Briefing participants
	Action	Conduct educational situations and stimulating the manifestation of subcultural preferences and value statements
	Observation	Minutes formation based on the results of training situations Minutes analysis with identification of key values Building a network model to identify shared values from a set of value judgments Building a network model that reflects the relationship between participants under study and value attitudes
	Reflection	Discussion of the network organizational culture model and identification of subcultural coalitions Retrospect of past conflict and non-conflict projects The definition of the common values of the identified sub-cultural coalitions Discussion of the different values applicability to different projects
Цикл 2	Planning	Development of training sessions, based on a shared value system Development of an extended project passport with more meaningful feedback on non-constructive communication
	Action	Training sessions performance Trainings on the project typology, team building regulations and the extended project passport Practical use of the project typology, team building regulations and the extended project passport within ten months
	Observation	Quantitative analysis of non-constructive conflicts on the basis of the data recorded in the passport project
	Reflection	Discussion of trends in non-constructive and constructive conflicts Discussion of the role of the project manager in subcultural dynamics Discussion of the impact of team structure on the number of conflicts

gravity algorithms built into VOSviewer allow placing the network model automatically in such a way that judgments with large weights will be located close to each other. The judgments that have no connections at all (that is, they were not expressed by the participants at the same time) are located as far away from each other as possible. As a result, the clusters of judgments can be identified in the network model, depending on the extent to which they are co-present in participants' statements.

Then the substantial consideration of the various groups of judgment was produced and fourteen values (here are the examples of the value judgments): diplomacy (different interests, need for arrangements), coordination (like clockwork, like a relay), predictability (no fantasy), engagement (inspired idea, common goal, people vibe), boundaries of responsibility (what is my area of responsibility), directness of speech (question/ answer, remove ambiguity, got and done), validity (with confirmation and objectives),

Fig. 1. The network model of value judgments and identified shared values of the participants of business games



uniqueness (with numbers and facts), initiative (be a leader, be proactive, offer solutions), variability (act according to the situation), flexibility (adjustment to the situation), detailing (with clear plans and details), vision (general plan, final goals), search (new-unknown), were identified. A network model of value judgments with selected values is shown in Fig. 1. The size of the circle and font reflects the frequency of value judgment, the thickness of the links shows their weight coefficients. Not all rarely encountered judgments are reflected in the depicted model.

Despite the implicit and multidimensional nature of the elements of any organizational culture, the validity of values is based on the fact that their identification:

- occurred in the context of direct participation in the simulation business game, in the course of practical problem solving activities, and not in the course of surveys and interviews;
- conducted in the framework of both formal and substantive analysis of value judgments;
- reflects both semantic and social (as far as they belong to the same people) congeniality of values.

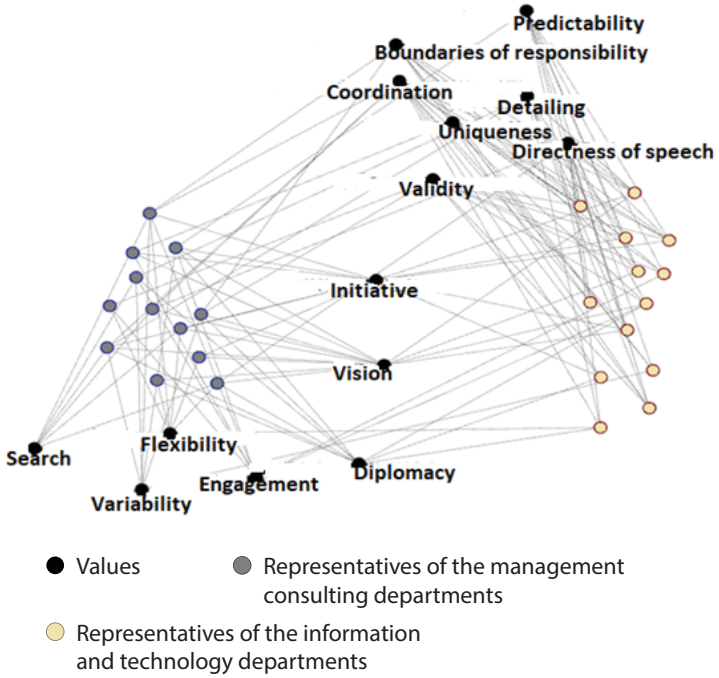
The next research step of the cycle 1 was to identify the subcultural coalitions within the company using a bimodal network model. This procedure was formal in nature and consisted of constructing a graph with two types of vertices-values and participants, and participants were labeled based on their belonging to different departments of the company. The model established relationships between values and participants. The previous analysis allowed determining what value judgments the participant expressed and, accordingly, what values he or she shared. The presence of a link between the participant and the value meant that he was the bearer of the corresponding value. With the help of the Gephi[2] software product, a network model was built. Built-in gravity algorithms made it possible to place participants as close as possible to the values they expressed during business games. The resulting network model revealed the presence of two subcultural coalitions (Fig. 2).

Representatives of the consulting department share such values as search, flexibility, variability, engagement, and diplomacy. Representatives of IT departments share these goals to a much lesser extent, their values turned out to be predictability, boundaries of responsibility, coordination, detailing, uniqueness, directness of speech and validity. Only a small number of management consultants have been found to adhere to these values. Initiative and vision belong to shared values.

At the reflection stage of cycle 1, the results were discussed with the participants of the participatory study. The points of view expressed during the discussions fully confirmed the presence of two identified subcultures in the company that have weakly overlapping values. A retrospective analysis of past conflicts has shown that in most cases, the lack of understanding of the values (and even their presence) of other subcultures turned out to be, if not the source, then the basis for the emergence of conflicts and non-constructive communications. The ineffectiveness of the team building and communication trainings was interpreted to mean that they were conducted without taking into account existing values and coalitions. In most cases, the focus was on cohesion, the ability to establish working relationships quickly, and the establishment of personal contacts without taking into account subcultural inter-coalition dynamics. The participants noted that the training results, on the contrary, led to an aggravation of the negative perception of other points of view and values.

[2] URL: https://gephi.org/.

Рис. 2. Сетевая модель субкультурных коалиций
и их ценностей



5.2. CYCLE 2

Based on the cycle 1 results, a training program was developed aimed at making communication around common values, as well as developing skills not only for interpersonal, but also for inter-institutional communication. The regulations for the project passport formation were also expanded. Previously, it recorded conflicts - both constructive and non-constructive; the quality of communications was evaluated. In the new version, project managers were asked to describe, and team members were asked to confirm the description between which organizational and cultural values there were conflicts. The project manager also had the opportunity to involve in the conflict a representative of a particular subculture coalition not from among the project participants, in order to establish more constructive relations.

The implementation stage of the cycle 2 took twelve months; during this period most of the planned activities were implemented. It took two months to conduct trainings and develop regulations. For ten years, the practical use of the developed solutions took place. During these ten months, twelve projects were completed, involving the participation of representatives of both subcultural coalitions in the teams.

As part of the research stage of the cycle 2, a statistical analysis of the data on the number of conflicts in twenty joint

Table 2
Statistical values of comparative analysis of the number of non-constructive conflicts in projects before and during the participatory action study

Value	Projects before the study	Projects during the study
Number of the projects	20	14
Total number of conflicts	161	76
Average number of conflicts per project	8.05	5.43
Dispersion	6.26	4.57
Standard deviation	2.50	2.14
P-value = 0.003		

Table 3
Statistical values of comparative analysis of the communication quality in projects before and during the participatory action study

Measure	Projects before t he study	Projects during the study
Number of the projects	20	14
The sum of the project's communication quality ratings	83.5	88.1
Average assessment of the communication quality in the project	4.2	6.3
Dispersion	2.66	2.07
Standard deviation	1.63	1.44
P-value = 0.0004		

projects implemented before the start of the participatory studies discussed in this article, and twelve projects implemented during these studies, was carried out. To analyze the difference in the number of non-constructive conflicts, the arithmetic, variance and standard deviation values were calculated and the variance analysis was performed to determine the P-value. The calculations were performed in MS Excel using the data analysis tool "Single-factor analysis of Variance", the results are presented in Table 2.

According to the values in Table 2 it can be seen that the average number of conflicts per project has decreased from 8.05 to 5.43. At the same time, the difference between these values can be considered as statistically significant, since the P-value is very small (0.003, below the level of 0.005).

A comparative assessment of the communication quality in the projects before and during the study was also carried out. The results are presented in Table 3. According to the company methodology, the communication quality was evaluated on a 10-point scale in the context of five parameters: the speed of response of the communication participant, the completeness of the response, the time and effort to address the issue / problem discussion, participant engagement, communications orderliness. Each of the parameters is described in detail in the corporate methodology. Project team members gave each other ratings at the time of project completion. The overall assessment of the communication quality in the project was determined as the average for all project participants, weighted by the participation time in the project.

In Table 3 is shown that the communication quality in projects has improved significantly - the average quality rating has increased from 4.2 to 6.3 on average per project. A small P-value (0.0004) indicates the statistical significance of the differences in the assessments of the communication quality in two of project categories.

During the reflection stage of the cycle 2, six sessions were held to discuss the results of the previous stages of both cycles. The participants confirmed that the communication quality in the project teams had improved, but the improvement was not recognized as very noticeable. There are fewer non-constructive conflicts. Conflicts began to be resolved at earlier stages and take place in a more constructive manner. The participants noted that despite all the differences between subcultures, the communication and behavior of team members became more predictable. When participants began to understand what the value differences might be, it became easier for them to build relationships. It was noted that efforts to address subcultural differences were unlikely to be productive. Having different perspectives is useful in projects with high uncertainty. However, it was noted that the emphasis on shared vision and initiative as shared values did not play a significant role. There were opinions that the trainings conducted before the study may have brought their results, but somewhat later than expected. During the discussion it was revealed that subcultural team structure (ratio, which represented subculture), a subculture affiliation to the project manager, as well as the organizational culture of the customer play a prominent role, the study of which may be the subject for the next study cycle.

6. DISCUSSION OF THE STUDY RESULTS AND RECOMMENDATIONS

The study revealed the presence of two different organizational subcultures in the company involved in digital transformation projects for its customers, whose values were poorly coordinated both in terms of their content and in terms of distribution among the participants. The two groups of values were shared by two subcultural coalitions representing different structural divisions of the company. The analytically revealed subcultural dynamics in the company was confirmed during the discussion with the study participants. The study participants focused their efforts not on eliminating or suppressing subcultural differences, but on establishing more productive communications based on existing (albeit few) shared values, on explicitly identifying

the project team members belonging to different subcultures, and on understanding the differences in the values of the identified subcultures.

The results of the actions carried out on the basis of the first study stage led to a quantitatively noticeable reduction in the number of non-constructive conflicts and an increase in the quality of intra-project communications. Although it is impossible to exclude the influence of other factors on these changes (for example, the cumulative or delayed effect of previous optimization efforts), it can be concluded that:

- the low quality of intra-project communication, including the high level of non-constructive conflicts, was caused by unmanifested and disordered subcultural dynamics, which should be considered as confirmation of the first hypothesis;
- building communication between the identified organizational subcultures allowed improving the quality of communication without eliminating subcultural diversity in the company, which can be considered a confirmation of the second hypothesis.

Thus, the idea of organizational culture as a single corporate entity, which is advisable to optimize (in particular, to homogenize) for certain variables, may not allow identifying the roots of problems that affect the effectiveness of communications and activities in general. On the contrary, the idea of an organization as a multicultural space allows supplementing the already established theory of organizational culture and improves the effectiveness of communication management in practice. In addition to efforts to develop organizational culture components such as a unified vision, corporate values, and internal norms of behavior, managers are encouraged to identify and develop the subcultural landscape of their organizations in order to facilitate the establishment of coherent cross-cultural communication interfaces between employees and coalitions. The formation of a unified organizational culture should not be accompanied by attempts to unify or displace the existing organizational subcultures. Ignoring the fact of their existence does not contribute to effective communication and can negatively affect the results of activities in general.

Finally, in digital transformation projects, it is necessary to pay close attention to solving not only technical problems, but also problems related to the development of organizational cultures. The subcultural diversity can be used as a source of increased efficiency in solving large-scale tasks of digital transformation of enterprises and companies.

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