

Opportunity Research of using Network Project Groups in Organizing the Production of IT-Products and the Principles of Motivation for the Effectiveness of the Group's Functioning



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Abstract: *The article shows the relevance of creating network project groups in the organization of production of Information Technology (IT)-products. The goal of the study was identified, the decomposition of this goal was carried out, and other components of the logical structure of the study were identified. The hypothesis of the study is the following: when transforming an ordinary project group into a network one, characteristics are acquired that ensure the success of the project group and increase the competitiveness of IT-companies, using appropriate methods of motivation. The scientific novelty of the work lies in the fact that the relationship between the use of the network design approach and the company's competitiveness in the implementation of complex and non-standard projects in the IT-companies' organization of production is revealed. Features of employees' motivation of such divisions are revealed and fundamentally new solutions in the field of employees' motivation of IT-companies are defined.*

Keywords: *Fourth industrial revolution, IT-products, motivation, network project groups, production organization.*

I. INTRODUCTION

The research methodology includes the methodology for creating network project groups, described in the previous works of the authors [1, 2, 3, 4, 5] and the theoretical foundations of the theory of motivation. The "theory of work characteristics" was chosen as the main one, the authors of which are D. R. Hackman and G. R. Oldham. [6, 7]. It is chosen as the main one, because during it there was the following:

- analyzed criteria for the effectiveness of an action;
- it is the group structure that is considered to be the

decisive factor for achieving the success of group work;

- application of the theory proved to be effective in the functioning of project groups;
- theory applies to the regular project group and the network group.

Other cognitive theories of labor motivation were also used in the study, namely the theory of Herzberg, M. Follett, and E. Mayo, the theory of expectation of V. Vroom, and the theory of justice of J. M. Vroom. C. Adams, E. Locke's goal-setting theory [8]. The conditions for the feasibility of using a network project group and requirements for employees of such production structures are considered. A comparison of different models of project groups was made, their advantages and disadvantages were determined, and the conditions for their use in organizing the production of IT-products in the conditions of the fourth industrial revolution. Special attention is paid to overcoming such a disadvantage as the isolation of the project group. Requirements for employees that allow increasing the success of network project groups are identified. On the basis of theoretical studies of motivation methods, the principles of motivation of employees of network structures in the organization of production of IT-products are revealed [9].

In previous scientific works there was shown the actuality of creating network project groups for increasing of the effectiveness of projects' management, especially in terms of realization complicated, non-standard projects [10, 11]. It has been proven that network project group combines opportunities of an ordinary project group and opportunities, which were brought into it by personal connections of participants, i.e. there appears an additional resource, which will provide competitive advantage of the project group in the future [12]. When exploring the possibilities of organizing the production of IT-companies, the same problems arise associated with the implementation of complex tasks in the shortest possible time and the need to attract additional resources. Especially it is actual nowadays, in the era of transition to the forth industrial revolution, connected with the radical transformation of the production system and wide implementation of information technologies [13, 14].

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II. METHODOLOGY

The goal of real research looking for principal differences of network project groups and creation of competitive advantages, when organizing the production of IT-products due to the network approach and the peculiarities of motivation of employees of such network project groups [5].

For completing this goal in work there were created and solved the following tasks:

1. to define the abilities replacement an ordinary approach with network one, when organizing the production of IT-companies in terms of forth industrial revolution;
2. to analyze the abilities of usage different models of network project groups, when organizing the manufacture of IT-products;
3. to clarify the requirements for employees of network project structures;
4. to reveal the potential of network approach in overcoming disadvantages, which are defined by the isolation of project structures;
5. to develop principles for motivating employees of a network project group in organizing the production of IT-products.

The object of study is the production organization for

increasing the competitiveness of companies in the segment of the information technology market.

The subject of study is the complex of network groups' features and motivation methods, usage of which will increase the competitiveness of the company, which manufactures IT-products.

The practical significance of work consists of conclusions, which can be considered as the base for building and functioning of network project groups for IT-companies.

As it is seen in researches, made in previous works, project networks are used for non-standard, complicated and surprisingly appearing tasks. The usage of project network can be logical, when completing at least one of some conditions (Table 1).

In addition to the conditions, mentioned in the Table 1, there is another demand, which always has to be respected, without taking into consideration the expediency condition. For a successful work of network group the employees choose candidates, which have the ability and opportunity to increase their knowledge and skills. Otherwise, the network approach to the organization of project activities will not provide additional opportunities to the group, due to which it has an advantage over the usual group and can carry out non-standard, complex projects within a limited time frame [8].

Table - I: Conditions for the appropriateness of the use of network project groups

№	Condition of usage network project groups	Description
1	If there is an ordinary working group, but some tasks come out of the zone of its control and influence	Such situation is possible when the necessary human and financial resources are dispersed across different departments of an organization, or across different organizations, and it is necessary to overcome structural or cultural differences, as well as difficulties in securing and financing
2	There is a hard, made for the first time, multi-stage task, which demands new knowledge and skills	In this case, it is not always clear whether its implementation is commensurate with existing capabilities and whether an optimal solution exists
3	If knowledge, which is necessary for solving a task or a series of tasks that determine the success of a project, is outside the organization	For example, we can talk about tasks and projects related to the search and implementation of fundamentally new solutions that require knowledge that is outside the competence of a working group or even an organization

In addition to all above-mentioned, the following conditions are highly desirable:

- it is necessary to take into consideration the of future employees' knowledge level and degree of usage of their external relations for solving problems in the past;
- it is logical to tell the members of project group about state ability of creation and usage of outer connections, which are useful for solving new and complicated tasks. That is, the project group staff, if necessary, independently determine the need for additional participants and make decisions on the use of personal relationships;
- for the first time it is necessary to have an observation, in order to make sure that new employees are not stopped by unexpected problems. At the same time, we have to be ready to give them a hand, and if it is necessary, suggest alternative views on the problem;
- curators and project managers from the side of senior management, as a rule, are its initiators. They have the right to determine the scope of the project, recruit staff in

the project group and appoint a project manager;

- the leader of the project group has to stick to the ideology of responsibility for made decisions and seek for optimal decision among all possible;
- the leader of the project group can also attract additional participants in the process in all regular ways. Such as invited consultants, employees of other departments or companies.

Resuming all mentioned above, network groups has higher resource intensive, than an ordinary one. This increases its possibilities, which can be considered as competitive advantage for IT-companies, making project activity.

III. RESULTS

After long years of usage and correcting the processes of forming and management, the project teams made debugged mechanisms, which allowed achieving good results.



However, all this work was mainly in the western companies, that is why there are two names: team and group.

Conception and classification of the word "team" was used by Japanese managers, working in the western companies.

Project network group is a project group, where each participant can be used for remote work, because he has the competencies, which are necessary for solving project tasks.

It can be independent invited consultants and employees of other companies. This way, project network combines opportunities of an ordinary project group and opportunities, which are found through personal connections of its employees [4]. In an ordinary project group, the composition of the group is formed from the amount of employees of the company or by using all called specialists. However, the process of creation the group and reaching the starting condition is toughened by the necessity of physical attendance on the territory of the development-company. This complicates and delays the involvement of specialists. This increases the amount of critical obstacles, such as significant removal from the place of work, the proposed schedule, any other forced limitations of opportunities, but not affecting the level of employees' competencies. In network group, the employee can physically be on any distance. There is only needed a reliable communication mechanism. This lowers the time for searching and attracting to work highly qualified professionals, regardless of barriers territorial remoteness or bureaucratic procedures. We can use specialists in different time zones for a specific production timetable. Thus, organize round-the-clock work on the

project. It is possible after the start of the project in turn take rare specialists of different profile through transition from one task to another. Credentials of employees entered into the process allow them to in turn attract and engage others employees, if dictated by the lack of the first necessary competencies. There are some main models of forming project groups. Other models can be looked through as models, combining different types of models with different share of their attendance of their signs. In many cases, when we speak about non-standard tasks and the necessity in rare specialists, organization managers use the standard way, i.e. make project groups. Such decision, certainly, is more effective, because it has more advantages, but it has some disadvantages [2]. We can form the list of advantages and disadvantages for each model, on the basis of which there is formed a project group. For bigger clarity, let us present the result in a table form (Table 2). Analyzing the experience of work of some project groups, we update the list of characteristics, and especially advantages and disadvantages, which will rely to all models of project groups. Thus, we show it in a table form (Table 3). While analyzing there was taken into account, what can be considered as project group and as an organization with a project structure in which one or several projects at the same time.

Disadvantages of project groups, caused by such quality as isolation, is logical to look through separately and accordingly to the types of works, which are main ones in project activity.

Table - II: Advantages and disadvantages of different models of project groups

Models of project groups			
№	Model	Advantages	Disadvantages
1	2	3	4
1	Using employees and managers without separation from the main work	Often used for projects that are limited by time and resources. The project manager is granted rights to access the necessary information, to plan and coordinate the use of resources	The project manager can only slightly influence employees from other departments due to the priority of their subordination to line managers of the departments. The increased load due to the combination of work on the project and tasks in the main position will require more effort from the project group and can lead to negligence
2.	"Company in the enterprise" or classic model	Often used when volumetric and complex tasks are performed. Integration of the project with the main activities of the company is provided. Work in such a project group has an unequivocal priority regarding subordination to the management of units. The project is usually supervised directly by management	Concentration of efforts on the project and the cessation of any work as part of its core business
3	Mixed forms	Most often used in medium-sized enterprises. The head is appointed from the company or invited from outside. It depends on the level of complexity of management tasks and the necessary qualifications of the leader. Company specialists who combine design and core activities or specialists from other companies may be involved. When using a mixed model, the project manager usually has great support from company management	The need to pay more attention to the selection of employees, especially from other companies. Due to the limited time, there is a need to recruit employees for a time insufficient for the search and objective assessment. Some information about the employee may not be identified or missed. If the recruitment process is delayed, the company becomes more vulnerable to competitiveness. There is possible overload of employee, reduced efficiency and low efficiency

Table - III: Advantages and disadvantages of all models of project groups

№	Advantages, appealing to all models
1	Efforts focus on the implementation of one specific project or concentrate on solving one problem
2	Complex approach to solving project tasks
3	Increased personal responsibility of the leader for the final result of the project and for all its components
№	Disadvantages, appealing to all models
1	Crushing resources, complicating access to technical and information resources, complicating the support and development of the production and scientific and technical potential of a company, especially if there are several simultaneously launched projects
2	The project manager needs to administrate all stages of the project life cycle and take into account the place of the project in the chain of all launched projects of the company
3	Creation of project groups, which in the minds of employees are not sustainable entities, makes it difficult for employees to understand their place in the company
4	While using the project structure, uncertainties may arise with the prospective use of specialists in this company

Table - IV: Disadvantages caused by the isolation of the group

№	Types of works	Disadvantages, caused by the group isolation
1	Work on creation of new projects	Project group has enough resources, but bases in technical and production knowledge and inner abilities, which are available only inside the team. Very often, the group cuts from itself a knowledge resource, which could have been used as a resource of receiving information and skills for the new decisions' research
2	Work on changing an existing product	The group can lock itself in its information field and expects the client to provide them with the necessary information, after which the project group will be able to create a solution based on this information. The group, which works, using such scheme, always can handle the given task, but misses the ability of creation a new decision. The group does not go behind the limits of the given task that is why it gets a lower success

Thus, there are received the project group characteristics, which can be used for choosing the motivation principles of employees of IT-companies in the future.

For completing this task, there were researched methods of motivation theory, on which base the measures detailing the system proposed in the previous work of the authors were developed. It brings everything building to applying their results in project groups (ordinary and network) [1].

In terms of this work, we will discuss only these main positions of different theories, which coincide or complement each other. At the same time, we discard mutually exclusive ones. While transformation of an ordinary project group into network one leads to some difficulties, consideration of such a generalized list of criteria would be logical.

Then there were found the connections, formed in coinciding and complementing of different theories. They form the direction, in development of which there can be formed the motivation principal.

Coincidental positions are placed in one line. Positions, in turn, are taken from an intermediate scheme, where are found and shown graphically coinciding in meaning or complementing each other basic theses of different motivation theories [12].

There is no a universal way of creating a motivation

system. Principles of creation motivation system are developed on the basis of found on the previous state connections, where the basis is theory, which considers only the team structure. Thus, there are taken into account common principles of classical motivation theories [5].

Besides, taking into consideration the necessity of account for common principles there are motivation theories and dedicated to them works, it is logical as a reasonable addition give results of research of sociology doctor M. Follet and E. Mayo.

They said that except from material needs, a big meaning havs:

- the need in communication;
- the need in normal relationships with authority;
- the need in taking part in management.

Using results of the research motivation theories there were developed principles (Table 5) especially for building motivation system in network project groups. It was found out that during the development motivation measures it is necessary to take into consideration the following existing forms of motivation: material and intangible, psychological and organizational.

Table - V: Formulation of the principles of motivation of network employees design groups

№	Formulation
1	Importance. There is necessary the assessment and possibility of increasing its skills, estimation of achievements, and increasing of self-esteem. However, activities, raising employee's status, can cause respect and envy among colleagues
2	Unplanned promotions. Definiteness of goals. The final goal and intermediate goals must be clearly indicated. Statement of the importance of goals. Unplanned incentives based on importance

3	Rewards are more effective than punishments. As an encouragement, attention may be paid to the employee. The importance of the work performed. An explanation to the employee of his contribution, the importance of the task and the need to achieve a holistic result. The final stage of the assignment should not be a part, but an entire object
4	Quick reaction of authority raises the employee's importance in its eyes, independence and responsibility for the made decisions, participation and the ability of taking part in goal-system increases self-esteem
5	Reaction of the leader and the assessment of the implementation of the current tasks of the employee. The implementation of the principle of feedback during the assessment, feedback allows the employee to feel that he is not alone, to feel significant, that the leader of the group is not indifferent to his achievements or failures

IV. CONCLUSIONS

1. There was explored the conceptual apparatus of network projecting groups and teams.
2. There was defined the main number of terms of expediency of usage network projecting structures, while organization IT-products production.
3. There were found out principal differences in using ordinary and network approach in organization of IT-products manufacture.
4. There were explored the abilities of usage different models of project groups for increasing the effectiveness of their functioning in terms of network approach.
5. In terms of creation a system of measures on transformation an ordinary project group into network one, there are clarified requirement for employees of network project groups. In the result there is received a possibility of creation an additional resource and employees' motivation mechanism on completing a concrete task, project or series of tasks.
6. There were suggested the employees' motivation principles of network project group, based on the existing cognitive theories of labor motivation and taking into consideration the specialties of communication and integration in distributed structure.

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